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Ancito Etienne
University of Lynchburg

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Foreign Aid Allocation and Impact in Latin America and the Caribbean (LAC): A Cross-Country Analysis of Foreign Aid Impact on GDP Per Capita and Life Expectancy

Ancito Etienne

Senior Research Seminar Project

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Dr. Gerald Prante, Chair

Dr. Eric Kyper

Dr. Michael Craig

Dr. Michael Schnur

ABSTRACT

This research paper is an empirical study of the impact of official development assistance and official aid received, [henceforth, to be referred to as "foreign aid"], on life expectancy and GDP per capita in Latin America and the Caribbean. I used a panel dataset of 19 countries dated from 1996 to 2014 to perform two distinctive regressions using the OLS method. In addition, an exploration of the impact of GDP per capita on life expectancy was conducted to determine whether there was a cause and effect phenomenon; that is, testing whether an impact of foreign aid on GDP per capita would have a positive spillover effect on life expectancy. The findings suggest that foreign aid does not seem to have a positive impact on either GDP per capita or life expectancy. However, GDP per capita is strongly correlated with increased life expectancy. This could be the cause of lack of good governance. Recommendations to policy makers and governments include more investments in the education sector for human capital development and investments in sectors that will spur economic growth per capita while focusing on creating an enabling environment and reducing corruption so that foreign aid can be leveraged to create growth.

Keywords: Latin America and the Caribbean (LAC); GDP per capita, Life Expectancy.

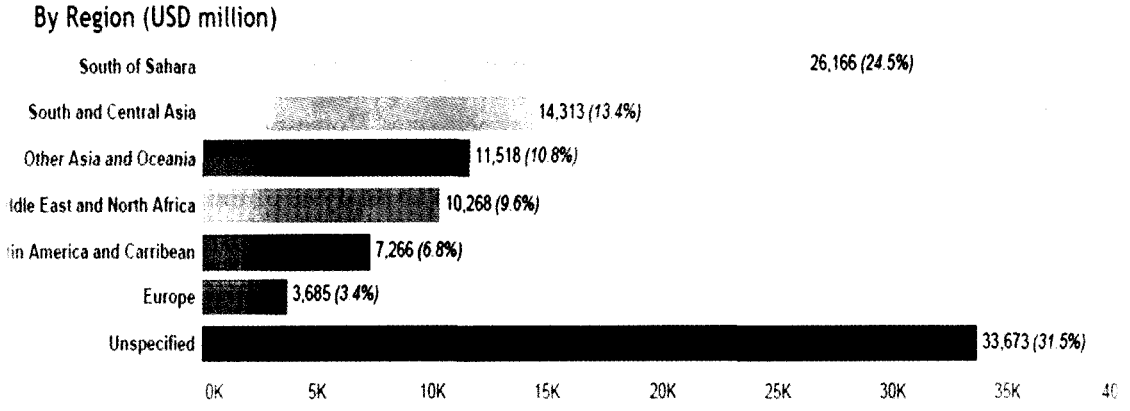
I. INTRODUCTION

The effectiveness of foreign aid has long been a subject of contentious debate. Many have challenged the concept of foreign aid as being an adequate tool in spurring growth in developing nations, arguing against the preventive means of corruption and misallocation of funds. Foreign aid, in principal, comes with stringent rules and conditions that recipient countries have to abide by. This method seeks to decrease fiduciary risk, but it inadvertently induces the cobra effect in many instances. This approach deprives recipient governments of the flexibility to use the earmarks on projects that would bear more impressive results, which is a potent argument for fungibility of aid.

Official development and official aid or foreign aid is comprised of at least 25% of grant funds. The rest includes soft loans, that is, loans countries pay over a period of times and below the market rate of interest. Foreign aid's goal is to encourage development and infrastructure, and by extension, to improve lives by creating employments that allow citizens to enjoy the basic necessities. It similarly decreases the rates at which deadly diseases affect recipient nations. Thus, it attempts to increase living standards and life expectancy. Correspondingly, a substantial measure of whether foreign aid has been effective is through an analysis of the total output of a country divided by the number of people of the recipient country, namely the nation's GDP per capita. GDP per capita is a measure of the relative economic performance and living standards of a country, and it enables the comparison of one country to another. A decrease in GDP per capita indicates a lack of economic growth and reflects a reduction in productivity, and the converse also holds true. Thus, the primary goal of this paper is to study the effect of foreign aid on GDP per capita and life expectancy. In addition, given the robust correlation between GDP per capita and life expectancy – as the Preston Curve shows and noted by Cutler in *The Bottom Billion*– I

plan to investigate the effect of GDP per capita simultaneously on life expectancy in LAC countries. The rationale behind this endeavor is an attempt to determine whether GDP per capita has a spillover effect on life expectancy, should the former be impacted by foreign aid. A finding of this sort would help governments to funnel strategically funds in sectors that would increase GDP per capita, and as a corollary, the living standards of their people. Thus, two regression equations are to be estimated in this research.

My primary motivation for this paper comes from various papers I have read about the persistent economic stagnation in Latin America and the Caribbean. More notably, a report released by the OECD forecasting the economy of Latin America and the Caribbean in 2017 made the same observation and the predictions for 2017 are not significantly hopeful (OECD 2016). This region receives substantial foreign aid as shown below. Still, it does not experience substantial economic growth.



Source: http://www.oecd.org/dac/financing-sustainable-development/development-finance-data/aid-at-a-glance.htm

According to the flypaper effect theory, exogenous aid to a recipient country should create an increase local spending, and by extension should create local economic growth. However, this theory is not proven to be supported in Latin America. Providing answers to the research

questions has implications for policy makers and for foreign aid donors. The ambiguity around the lack of effectiveness of foreign aid in LAC can exhaust donors and force them to stop donating, therefore leaving countries to face dire economic challenges alone. In addition, if the causes for the lack of effectiveness can be explained of foreign aid, then perhaps LAC governments could invest in eliminating the factors that stunt economic growth. This would encourage donors to be more generous seeing that their liberality is contributing to alleviating poverty by stimulating economic development. Given the political, social and economic conflicts that have impeded the economic development of the included countries, findings of improvement in these domains would indicate that these countries are capable of pivotal investments in human and physical capital that are necessary for sustained growth. Thus, the ultimate goal of this paper is to provide ex-post policy recommendations that will contribute to better allocation of foreign aid in the future. In addition, it aims to provide recommendations for more useful institutional methods that can engender an enabling environment for growth and development. Determining the effectiveness of foreign aid is central to the field of Development Economics, therefore being able to achieve an empirical analysis with this level of specificity for a particular region would substantially contribute to the current literature in Development Economics. It will also provide a framework for regression analyses of future foreign aid performance in Latin America and the Caribbean.

II. BACKGROUND

There is a plethora of research studies on the effectiveness of foreign aid. Many have dedicated tremendous effort in attempting to determine whether foreign aid actually creates growth and enables countries to ascend to the rank of developed countries.

However, Ekanayake and Chatma (2010) examined how valid foreign aid has been in helping with the economic growth of developing countries. Their study covered a group of 85 developing countries ranging from Asia to Latin American and the Caribbean focusing specifically between 1980 and 2007. For more accurate findings, separate models involving shorter time periods, namely, 1980-1989, 1990-1999, 2000-2007 were used. Ekanayake and Chatma (2010) found, identical to previous studies, that foreign aid has mixed or adverse effects on the economic growth of developing countries. This does not hold, however, for the African region, which is one of the largest recipients of foreign aid. As is evident, Ekanayake and Chatma's (2010) research is critical to this paper due to its focus on the effect of foreign assistance in recipient countries. Although their research concentrated more specifically on the impact of foreign aid on GDP growth rather than life expectancy and GDP per capita, the variants used such as initial GDP and labor growth are to be considered in this research paper. In addition, given the findings of Ekanayake and Chatma (2010), I anticipate that foreign aid will correspondingly have mixed results in LAC countries.

A study by Palloni & Souza (2013) on life expectancy in Latin America and the Caribbean found that historically life expectancy in this region saw little improvement until the 1950s, when medical, nutritional and public health interventions began to be implemented. These new interventions caused a shift in the social norm of having several children in an effort to overcome the odds of infant mortality. A longer life expectancy decreased the need to have more children than families can afford, and therefore provided families the experience of a higher standard of living. Palloni and Souza (2013) also found that life expectancy at age 60 in Latin America and the Caribbean escalated from 18 years to 23 years between 1950 and 1995, that is at a rate of

more than one year every ten years. They later found that life expectancy rose from 52 years to 73 years in the 2010 to 2015 period, which was based on a decrease in infant mortality.

Similarly, Shpak's (2012) studied the effect of foreign aid on health improvement. One of the measures for quality of health is the rate of decrease in avoidable deaths [commonly known as senseless deaths in public health], in other words, they are deaths triggered by a curable disease. Shpak's (2012) research covered the period between 1995 and 2009 and contained sample data on 34 developing countries. Shpak's (2012) research findings included the determination of earmarks and bilateral aid for health improvement to have a positive impact on avoidable deaths. Shpak's (2012) paper will contribute to my research on different levels. Taking into account the leading causes of senseless deaths, such as HIV/AIDS and cholera (WHO), I anticipate the inclusion of these determinants as well as the crude mortality rates in the regression involving looking at determinants of life expectancy.

In regard to GDP per capita, Dalgaard and Hansen (2004) examined how foreign aid contributes to growth. It was found that foreign aid has an overall positive relationship with GDP per capita. However, this relationship does not only rest on the miracle of foreign aid, rather it relies on the political and social circumstances of the country at the time of the allocation of the funding. Such findings will help determine what theoretical as well as empirical factors that may cause the impact of foreign aid on economic growth to vary in LAC countries.

III. MODEL DEVELOPMENT

My approach to measuring the impact of foreign aid has several advantages when it comes to LAC. First, I used data on the sectors that were not only universal to LAC countries, but also to the rest of the world. Second, I looked at the correlation between the indicators of growth, such

as GDP per capita in an effort to gather a more accurate reflection of aid efficacy. A graphical representation of the dependent and independent variables are provided in Figure 1-a and 1-b. The graphs helped to predict the signs of the independent variables based on observed trends between the independent and dependent variables. The two models to be studied are as follow:

$$\textbf{\textit{LIFEEXPECTANCY}} = \beta_0 + \beta_1 NETODA\&OA + \beta_2 LAGNETODA\&OA + \beta_3 GDPPERCAPITA + \beta_4 INCIDENCEOFHIV + \beta_5 DEATHRATE + \beta_6 HEALTHEXPENDITURE + \beta_7 ECONOMICFREEDOMSCORE + \beta_8 IMPROVEDSANITATION + \varepsilon \quad (1)$$

$$\textbf{\textit{GDPPERCAPITA}} = \beta_0 + \beta_1 NETODA\&OA + \beta_2 LAGNETODA\&OA + \beta_3 NATURALRESOURCESRENTS + \beta_4 CCSERVICES + \beta_5 FOREIGNDIRECTINVESMENT + \beta_6 GOODSSERVICESEXPORTS + \beta_7 EMPLOYMENT1524POPULATION + \beta_8 UNEMPLOYMENTLABORFORCE + \beta_9 CORRUPINDEX + \beta_{10} ECONOMICFREEDOMSCORE + \beta_{11} HEALTHEXPENDITURE + \beta_{12} INFLATION + \beta_{13} AGRICULTURALLAND + \beta_{14} HOUSEHOLDCONSUMPTIONGROWTH + \varepsilon \quad (2)$$

The empirical expectation of NETODA&OA and LAGNETODA&OA on life expectancy in LAC countries is a negative relationship. As noted by Brautigam and Knack (2004), foreign aid suffers from a lack of governance and corruption due to the fact that funds are either diverted into futile projects or embezzled by officials. LAC countries are no exceptions to this finding. Rodriguez (2004) conducted a study that made the same observation for Latin America and the Caribbean. As Rodriguez (2004) concluded, political instability and inequality in the distribution of political and economic power, rent-seeking, vested interests are some the plagues destroying growth in Latin America. In contrast, these variables are expected to have

dissimilar impacts on GDP per capita. Aid inflows should theoretically increase output level, ceteris paribus. In addition, foreign aid tends to cause a hysteresis phenomenon, i.e., the current year's aid impact may not be apparent until the following fiscal year.

I expect GDPPERCAPITA to have a positive effect on life expectancy. Since GDP per capita is a measure of the relative economic performance and living standards of a country, therefore a country that experiences growth will provide its citizens with opportunities to care for themselves. The latter will increase average consumption, which will further increase economic growth, thereby creating a continuous positive loop between consumption and income. This phenomenon contributes to life expectancy lengthening by allowing families to afford a better standard of living, as the trend shows in Figure 1-a. This follows, however, a logical contradiction. Meaning, it is not to be assumed that an increase in GDPPERCAPITA implies that citizens have access to the marginal increase. As in any society, wealth tends to be polarized. And given the political, social and economic reality of LAC countries, while in theory, a higher GDP per capita indicates growth because citizens should have sufficient resources to engage in economic activities that will help prolong their lives, this is not the case on average for LAC countries (Rodriguez 2004).

Elevated INCIDENCEOFHIV in a country is an impediment to increasing life expectancy, as the rate at which someone can contract each particular disease is more ascendant as more individuals contract the disease. Authentication of this statement is provided by the logistic growth model in the context of disease transmission derived by Pierre Francois Verhulst in 1847 (Verhulst 1847). In a study executed by Quinn (2006) to look at HIV/AIDS incidence in the world, it was found that HIV/AIDS continue to rise in certain parts of the world. In addition, HIV has an increasing strain on the output level of a country on a macro level through the

reduction of its young labor force. More specifically, in Latin America, Quinn (2006) predicted that if current incidence rates were to continue, the young adults aged 20-45 population would be affected by a rate of 70% and incidence rates in children up to 15 years would reach 12% (Quinn 2006). This would have a spillover effect, which then would incapacitate families to afford basic necessities on a micro level. Quinn (2006) emphasized the shattering link between HIV and Tuberculosis is a cause for global concern. Thus, I predict that these two variables would likely have the same negative impact on life expectancy.

In a study published by the Economic Commission for Latin America and the Caribbean, which discusses death rates in LAC countries, they found that there has been a substantial decrease in mortality rates in LAC countries (CEPAL 2014). However, the rates at which countries experience declines in mortality widely varied due to their different levels of social violence and the degree at which public health interventions are taken to prevent diseases and to sanitize environments. And given that mortality is the inverse of life expectancy, I expect a negative relationship between the two variables.

It is almost intuitive that increases in the sum of public and private HEALTHEXPENDITURE for curative and preventive purposes should contribute to increases in life expectancy. However, most research studies have found that life expectancy is more sensitive to changes in health expenditure in developed countries as supposed to developing countries. As Elisabeta Jaba et al. (2014) noted health expenditures, access to healthcare services, individuals' education, income distribution, are some of the factors that can explain variations in Life expectancy. Complete data could not be found on income distribution and individuals' education, therefore they could not be studied in this research. In general, there have been significant investments in Latin America and the Caribbean attempting to offer more access

to health services, and health expenditure as increased substantially over the past decade as can be shown in Figure 1-b. In addition, Shpak's (2012) founded health expenditure to have a positive impact on avoidable deaths. Therefore, HEALTHEXPENDITURE is expected to have a positive impact on life expectancy. Likewise, HEALTHEXPENDITURE should contribute to the gross domestic product of a country, and by extension increase GDP per capita. Therefore, these variables should be positively correlated.

It is almost irrefutable that an increase in IMPROVEDSANITATION should have a positive impact on life expectancy, ceteris paribus. This is a public health improvement that prevents diseases such as Cholera, a disease which today has become a subject of contentious debate between the MINUSTAH [United Nations Stabilization Mission in Haiti] and the Haitian government due to their role in the reemergence of a cholera epidemic in Haiti (Katz 2016).

Agricultural land as a percent of land area should contribute to the growth of GDP per capita in Latin America and the Caribbean. This region is a major exporter of agricultural products and the source of income of millions of individuals remains to farm. The ability to increase yields and occupy more agricultural land to increase productivity signals a rise in GDP per capita. Singariya (2015) conducted a research to examine the causal relationship among per capita GDP, agriculture, and manufacturing sector output in India using time series data. Singariya (2015) found that the agriculture sector affects per capita GDP strongly in the long run. Therefore, I expect these variables to have a positive relationship.

Economic freedom is associated with the right that everyone has to own property themselves as well as in association with others, as outlined in the Universal Declaration of Human Rights (UNDP). Economic freedom enables citizens to participate freely in economic activities, such as production, consumption, and investment without coercion or prevention

(Heritage.org). Economic freedom is strongly correlated with life expectancy. The 2016 report by the Fraser Institute found that "life expectancy is about 20 years longer in countries with the most economic freedom than in countries with the least." An observation of Figure 1-a shows that cyclical pattern between economic freedom and life expectancy. More specifically, an increase in economic freedom also causes an increase in longevity. Thus, I expect economic freedom to have a positive effect on life expectancy. Similarly, the same expected relationship is maintained for the impact of economic freedom on GDP per capita. That is to say, there is a positive causal relationship between an increase in economic freedom and GDP per capita. In a study, Chodak (2011) investigated the relationship between economic freedom in relation to economic growth and human development. He found that countries with higher economic freedom indices were the countries with high economic growth. In addition, Chodak (2011) found that a "significant connection could be observed between the Index of Economic Freedom and gross domestic product per capita." The findings of Chodak (2011) support the expected relationship between the variables.

The Corruption Index scores countries based on their lack of present corruption. The CORRUPINDEX variable is expected to have a negative relationship with GDP per capita, that is, the more corruption a country experiences, the more GDP per capita will decrease. This prediction is based on previous research studies done by Brautigam and Knack (2004), who observed that "increases in GDP per capita tend to be associated with improvements in governance".

In regard to inflation, it is a variable that affects greatly economic output as it increases. Monetarism - an economic theory that argues the controls of the money supply is the chief method of stabilizing the economy – strictly formulates that high inflation decreases gross

domestic output in the short run and greatly affects price levels in the long run. This causes the currency of the country experiencing the hyperinflation to decrease, and therefore should negatively impact GDP per capita, which is my expectation.

The variable HOUSECONSUMPTIONGROWTH is expected to have a positive relationship with GDP per capita. As consumption rises, it causes a nation's output level to rise and therefore contribute positively to its GDP per capita.

Computer, communications and other commercial service exports have gained considerable momentum in Latin America starting late in the 20th century and up until today. Until then, two-thirds of the market's global revenue was concentrated in advanced economies. However, during this interval, Argentina, Mexico, and Brazil emerged and became some of the leading countries in commercial service exports. The ability to participate in the exports of computer and communications services integrate countries into the world of globalization, which theoretically should help with growth. Thus, I expect a positive relationship between CCSERVICES and GDP per capita (Rosales 2007).

Notwithstanding the political instability and corruption in LAC countries, resource rents should have a positive effect on GDP per capita. LAC countries heavily rely on natural resources for development, and therefore exploitation and extraction of these resources should provide them with sufficient rents to stimulate development. An ambiguity of resource rents is that for successful development and growth to occur, there must be good governance, strong regulations and a decrease in corruption. Also, having high resource rents does not guarantee an increase in median income, as the individuals with the rights to these resources are quite polarized and are usually self-interested elitists (Collier 2007).

I expect GOODSSERVICESEXPORTS to have a positive effect on GDP per capita. Exports allow countries to be part of the global market, to sell their surplus of goods and to encourage exchange. Latin America is quite productive in agricultural and manufactured goods and the majority of LAC countries have access to the global market by at least three means of transportation: sea, plane, and railways. Given their interconnectedness and their proximity – which is an endowment that landlocked countries do not have — a positive relationship is expected of exports of goods and services on GDP per capita (Collier 2007).

Additionally, I expect foreign direct investment to have a positive relationship with GDP per capita. Most LAC countries are small economies; therefore, foreign direct investments should substantially contribute to their output level. This prediction seeks to challenge the findings of Bengoa (2003) and Almfraji (2014) who both conducted research looking at the relationship between foreign direct investment and economic freedom and growth and found a lack of enabling environment in LAC countries to activate economic activities. While this finding is true, foreign direct investment can be fruitful if invested creatively in the right sectors. Based on William's (2015) research study "as a region, LAC receives larger FDI inflows for the period 2005-2010 relative to other developing regions except for South, East, and Southeast Asia". Receipt of such significant FDI inflows should contribute to development, even incrementally, if invested rather purposefully.

Youth employment is critical in LAC countries. Many young people have to work to support their families depending on the socioeconomic status of the household in which they grew up. Such an occurrence disincentivizes them to remain in school and receive an education, which would in return increase their human capital and favor them in the job market in the long-term. Trucco & Heidi (2016) found that in Latin America, "labor incomes of the youths in the

household amounts to approximately 32% of the total and increases as they grow older, rising from 22.6% for the younger members to 40% for those in the 25-29 age bracket" – which is the closest employment-population category to the one studied in this research. Given the significance of youth employment in LAC countries' economies, I expect a positive relationship between youth employment and GDP per capita.

In regard to unemployment, the relationship with GDP per capita is a rather obvious one. Ball et al (2013) did a study on unemployment on LAC countries and found evidence of contractionary policies, which resulted in a reduction in nominal gross domestic production and caused a decrease in output level. Ball et al (2013) conclusively reported that LAC countries tend to react to inflation by implementing disinflationary monetary policy, which then crowd-out investments and therefore increased unemployment. This reaction shows a negative relationship between unemployment and GDP growth, known as "Okun's law". Thus, an increase in unemployment creates a decrease in GDP per capita.

IV. DESCRIPTION OF DATA

A major restraint regarding conducting a research study on LAC countries is the lack of data on certain countries and for certain periods. This was one of the limitations this paper faced in configuring which additional predictors would have an impact on the dependent variables. For example, data on education that contributes significantly to a nation's development could not be found, and therefore the impact of education on GDP per capita and life expectancy could not be studied empirically. On account of data incompleteness on the LAC countries, the following list of countries had to be excluded from this study: Antigua and Barbuda, Aruba, Bahamas, The Barbados, Belize, British Virgin Islands, Cayman Islands, Cuba, Curacao, Dominica, Grenada,

Guyana, Jamaica, Puerto Rico, Sint Maarten (Dutch part), St. Kitts and Nevis, St. Lucia, St. Martin (French part), St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos Islands, Virgin Islands (U.S.). The countries in Table 1 were observed in predicting life expectancy and GDP per capita, respectively.

The data to be applied have been retrieved from the World Bank's World Development Indicators database, Transparency International, The Heritage Foundation, The United Nations Development Programme and the World Health Organization. The World Bank is a reliable entity and "is a vital source of financial and technical assistance to developing countries around the world" (World Bank). It contains information for developed and developing countries collected over long lengths of time, and it captures the variation of variables across countries at different periods. Therefore, this data source is deemed reliable and contains sufficient accuracy for a regression analysis. The data items collected from the World Bank are reflected in Table 2 and Table 3.

In addition, Transparency International (TI) was consulted to retrieve data on corruption. TI "is the global civil society organization leading the fight against corruption" (TI). The organization has developed a corruption index that seeks to identify the countries in which there is a flagrant appearance of corrupt behaviors, including extortion, bribery, and any other explicit corrupt practices. Countries are given a score over 10 or 100 interchangeably. A score of 10 indicates no corruption, whereas a score of zero concludes that a country lacks governance, business flexibility and a high level of corruption. Inferred that this organization is democratic, politically non-partisan and non-sectarian in their work, their database can be presumed to be an unbiased proxy as a data source.

In regard to the economic freedom data, it was retrieved from The Heritage Foundation. Similar to Transparency International, countries are graded on a scale of 0 to 100 based on the level of economic freedom they provide. A score of zero indicates the country provides the least economic freedom, whereas a score of 100 signals the highest economic freedom provision. The criteria include four broad categories such as Rule of Law, namely, property rights and protection against corruption; Limited Government, or more specifically, fiscal freedom and government spending; Regulatory Efficiency, such as business freedom, labor freedom and monetary freedom; and finally, Open Markets, including trade freedom, investment freedom and financial freedom (The Heritage Foundation). These criteria set an international standard that is likely to receive unanimous approval, therefore it can be considered as a reflective measure for analysis of economic freedom.

The data on health expenditure were gathered from the World Health Organization's website. This organization, amongst other things, provides health-related statistics for its 194 member states for over than 1000 indicators.

Finally, The United Nations Development Programme was accessed to acquire a well-ordered list of LAC countries based on the Human Development Index, as can be seen in Table 1. The Index was developed "to emphasize that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone" (UNDP). And given that this research seeks to investigate the impact of foreign aid on life expectancy and GDP per capita, listing out the country in an orderly fashion indicates the profile of the country to be studied.

V. METHODOLOGY

For equations (1) and (2), The OLS method (Ordinary Least Squares) was used to perform a set of two Ordinary Least Squares regressions. This method offers an estimate of the unknown parameters in a linear regression model with the goal of minimizing the sum of the squares residuals between the observations.

Prior to running the regressions, a multicollinearity test was performed to observe any sensitive connections between the independent variables, as shown in Table 8 and 9. For both equations, there was only one concerning observation of collinearity between two variables, named NETODA&OA and LAGNETODA&OA. Given the nature of the data, this was an expectation.

Also, a Durbin-Watson test was conducted which revealed no serial correlation in equation (1), but positive serial correlation in equations (2), as shown in Table 13. The Durbin-Watson for equation (2) was close to two, which should lessen OLS' behavior to underestimate the true variance and supply inefficient estimates. Finally, an F-test was used to test the significance of the overall equations, that is, how useful are the independent variables at predicting the dependent variables. For both equations, the calculated F-statistic exceeds the critical F-value. This means both equations were statistically significant at the 0.5% significance level.

VI. RESULTS

Table 4 and 5 provide descriptive statistics for both the dependent and independent variables of equations (1) and (2). The regression results for equations (1) and (2) are given in Table 6 and 7. The results to determine the statistical significance of the independent can be found in Table 10 and 11. The life expectancy regression equation was estimated using some of the variables

commonly known to influence life expectancy either positively or a negatively impact. Six (6) of the independent variables were found to be statistically significant, namely, GDPPERCAPITA, INCIDENCEOFHIV, DEATHRATE, HEALTHEXPENDITURE, ECONOMICFREEDOMSCORE, IMPROVEDSANITATIONFACILITIES.

An adjusted coefficient of determination or adjusted R-square of 91.9% was obtained, which is the percentage of the variations in life expectancy that can be explained by the predictors. Given the sample size and the strong adjusted R-Square of 91.9% received, the effect of the coefficients of the statistically significant variables can be said to be strong empirical findings. For LAC countries, the average life expectancy was found to be 72 years, with Chile and Haiti having a maximum and a minimum average life expectancy 81.5 and 56.6 in 2014, respectively.

NETODA&OA and its lagged counterpart were observed to have no statistical significance. More specifically, based on the p-values obtained, there is a 15% and 90% chance that NETODA&OA and LAGNETODA&OA respectively do not affect life expectancy. This finding is consistent with other research studies, such as Rodriguez (2004) previously cited. Rodriguez (2004) found that LAC countries are less likely to experience growth triggered by foreign aid due to the lack of an enabling environment. The variable INCIDENCEOFHIV revealed to be statistically significant. A 1-percent point increase in the incidence of HIV as a percent of uninfected population ages 15-49 would decrease life expectancy by -1.9 years. This is consistent, in theory, with the logistic growth model in respect to spread of diseases. That is, the more people that become infected, the more increased the chances of an individual contracting the disease would be. Given the nature of HIV, when it escalates, it can damage an individual's life expectancy quite substantially.

The variable crude death rate per 1,000 people appeared to be statistically significant. This is an intuitive outcome given the inverse correlation between life and death. A 10-point increase in life expectancy would cause a 9.5 decrease in life expectancy. HEALTHEXPENDITURE was found to be statistically significant. Given the findings of Shpak's (2012), such a result was expected. A 10-point increase in total health expenditure as a percent of GDP would cause a 1.6-year increase in life expectancy.

IMPROVEDSANITATION was found to be statistically significant. This is consistent with natural expectation given improved sanitation as a percent of the population with access should prevent contagious and bacterial diseases such as cholera. Similarly, ECONOMICFREEDOM was statistically significant. Economic freedom allows citizens to partake in economic activities that eventually enables them to afford a higher standard of living; therefore, this finding is consistent with economic theory. A 10-percent point increase in improved sanitation facilities as a percent of the population with access and economic freedom could increase life expectancy by 1.3, 0.7 years, respectively.

In regard to GDP per capita, nine (9) of the independent variables were found to be statistically significant, namely, NETODA&OA, LAGNETODA&OA, NATURALRESOURCESRENTS, CCSERVICES, FOREIGNDIRECTINVESMENT, GOODSSERVICESEXPORTS, EMPLOYMENT1524POPULATION, UNEMPLOYMENTLABORFORCE, HEALTHEXPENDITURE. A low Adjusted R-square of 38% was obtained, indicating that level of variation of GDP per capita could be explained by the independent variables. But given that a panel dataset was used and the relationship between the dependent and independent variables is not deterministic, the low R-square was expected as a possibility. One factor that explains the low R-square is the fact that countries differ in ways that

are not easily quantified; therefore, it makes sense to focus on identifying the variables that appear to have a substantive impact on the dependent variable rather than R-square. And given the goal for estimating this equation was to look at the sectors that would contribute the most to an increase in GDP per capita, therefore focusing on these variables is of importance.

For the 19 LAC countries observed, the average GDP per capita was found to be 4613.8US$, with Uruguay having a maximum GDP per capita of 16737.97 US$ and Haiti having a minimum GDP per capita of 831.59 US$ in 2014.

Similar to the negative impact NETODA&OA would have had on life expectancy, had it been statistically significantly, it was also found that net ODA received per capita has a negative impact on GDP per capita. A 1 million point increase in NETODA&OA received would consequently decrease GDP per capita 1.5US$. Its lag effect was similarly negative and would cause a decrease 2.78US$ for every 1 million point increase in NETODA&OA for the previous year. Brautigam and Knack (2004) found "increases in GDP per capita tend to be associated with improvements in governance." This could explain the behavior of the estimates, considering that Latin America and the Caribbean experience a horrendous lack of governance.

The variables EMPLOYMENT1524POPULATION and UNEMPLOYMENTLABORFORCE were found to be statistically significant. However, EMPLOYMENT1524POPULATION had a negative sign. Referring to the research study that Trucco & Heidi (2016) conducted and found that "labor incomes of the youths in the household amount to approximately 32% of the total and increases as they grow older", I expected this variable to positively impact GDP per capita. UNEMPLOYMENTLABORFORCE had the expected sign and was consistent with economic theory, that is, unemployment and GDP per capita share an inverse correlation.

The variable NATURALRESOURCESRENTS does have a positive relationship with GDP per capita as expected. A 1 percent point increase in total natural resources rents as a percent of GDP would create a 260 point increase in GDP per capita. The variable CCSERVICES did not have the expected sign. Computer, communications and other services as a percent of commercial service exports contribute to a nation's growth and economic output, therefore should positively be correlated with its gross domestic product per capita.

Disappointingly, the economic freedom variable has shown to have a negative relationship with GDP per capita. This is very counterintuitive, given that the more endowment of economic freedom a country possesses, the more economic activities it procures, which should result in a higher GDP per capita. I find this result to be unprecedented, given the "significant connection could be observed between the Index of Economic Freedom and gross domestic product per capita" Chodak (2011).

The corruption variable was found to have no statistical significance. This finding is not consistent with expectation. Corruption is an impediment to development and a lack of the latter contributes to a decrease in GDP per capita. Therefore, the strong correlations between these two economic variables should have had at least some significance. Looking at the correlation matrix of economic freedom and corruption in Table 9, there was no collinearity observed, which could have made the estimates to behave in such manner.

In contrast, a highly reassuring result is the high degree of relationship between foreign direct investment foreign direct investment and GDP per capita. A 1 percent point increase in foreign direct investment would inadvertently motivate a 325US$ increase in GDP per capita. Panama and Bolivia each have an average of 9.68 and 0.22 of foreign direct investment as a percentage of GDP, the highest and lowest respectively in 2014.

As far as, exports of goods and services a percent of GDP, against all expectations, it has a negative relationship with GDP per capita, causing a decrease of 70US$ increase in GDP per capita for every 1-percent point increase.

The variables found to have no statistical significance on GDPPERCAPITA were the CORRUPINDEX, ECONOMICFREEDOMSCORE, INFLATION, AGRICULTURALLAND, and HOUSEHOLDCONSUMPTIONGROWTH. These variables, as listed, their p-values show that there is a 70%, 50%, 14%, 12%, 17% chance that they do not have any effect on GDPPERCAPITA respectively at the 0.05 significance level.

VII. CONCLUSION

The findings of this study suggest that official development assistance and official aid received does not contribute to improving life expectancy and it is likely to have adverse effects on GDP per capita. Foreign aid's goal remains to encourage development and infrastructure, and by extension, to improve lives by creating employments that allow citizens to enjoy the necessities. Therefore, the findings imply that either foreign aid would need to invest more purposefully and creatively in order for it to reach its intended goal or a different form of accompaniment of countries would need to be formulated.

The results of this study are an excellent benchmark for policymakers and government officials to consider in their respective countries, should they endeavor to implement strong expansionary policies that can lead to real growth per capita. Neither the corruption index nor the economic freedom had any statistical significance but as noted by Brautigam and Knack (2004), foreign aid suffers from a lack of governance and corruption. Therefore, LAC countries should remain resolute to creating and enabling environment and reducing corruption. Rather than

politicians and civil servants abusing their power, they could focus on reducing the level of corruption to encourage entrepreneurship, business activities to contribute to the development of their country. Creating an environment conducive to economic activities could create the make development work more efficient at increasing infrastructure, contribute to living standards and encourage free economic activities.

This empirical study also suggests foreign direct investments are more beneficial than foreign aid. Meaning, rather for countries to receive official development assistance and official aid, they should encourage more foreign investments. But in order for investors to be attracted to an economy such the LAC's, there must be the presence of an enabling environment, meaning, less corruption, more security, more property rights, more fiscal freedom, more business and investment flexibility (The Heritage Foundation). Without this foundation, LAC countries' economies are likely to remain stagnant, or if there is progress, it should be expected to be quite minimal.

Due to the lack of data on Latin American and Caribbean countries, using other predictive variables was very restrictive. An index of political stability, for example, would have been a potent way of determining the impact of political unrest on GDP per capita, and by extension the impact of the latter on life expectancy. Education data are similarly lacking. Giving the extensive literature on the impact of education on GDP growth and its ramifications throughout a country, having such a dataset would better help LAC countries to determine how much spending should be directed towards educating and training. As found by La Porta et al (1999), investments in human capital enormously increase efficiency in all sectors and increase government's performance. Moreover, Collier (2007) reported in *The Bottom Billion* that the higher the percentage of a country's population that holds secondary degrees, the more likely the country is

to remain stable and experience growth. Therefore, for future research, I would recommend an extensive study on the impact of education and the dependent variables in LAC as a mechanism to empower governments with brand new data in order for them to implement sound policies that will contribute to more education access and a stronger focus on development. Incorporating these data in a regression would also help to account better for endogenous variables.

Lastly, considering that only around 40% of the variations in GDP per capita could be explained by the independent variables, it is evident that there are other predictors that can explain the remaining 60% of the variations. Therefore, future research should investigate these potential independent variables.

VIII. TABLES AND FIGURES

Table 1: List of Countries Studied in both Regression Equations Listed by HDI Ranking of 2014. Source: http://hdr.undp.org/en/data

Argentina	0.83557
Bolivia	0.66183
Brazil	0.75529
Chile	0.83218
Colombia	0.72017
Costa Rica	0.76575
Dominican Republic	0.71503
Ecuador	0.73167
El Salvador	0.66578
Guatemala	0.62721
Haiti	0.48337
Honduras	0.60605
Mexico	0.75621
Nicaragua	0.63143
Panama	0.77968
Paraguay	0.67916
Peru	0.7342
Uruguay	0.79276
Venezuela, RB	0.76225

Table 2: GDP per capita Variables Descriptions and Expected Signs

Source: World Bank, Heritage Foundation, Transparency International

Variable Names	Brief Descriptions	Expected Signs
GDPPERCAPITA	GDP per capita (current US$)	+
NETODA&OA	Net ODA received per capita (current US$)	+
LAGNETODA&OA	Lag Net ODA received per capita (current US$)	+
NATURALRESOURCESRENTS	Total natural resources rents (% of GDP)	+
CCSERVICES	Computer, communications and other services (% of commercial service exports)	+
FOREIGNDIRECTINVESMENT	Foreign direct investment, net inflows (BoP, current US$)	+
GOODSSERVICESEXPORTS	Exports of goods and services (% of GDP)	+
EMPLOYMENT1524POPULATION	Employment to population ratio, ages 15-24, total (%) (modeled ILO estimate)	+
UNEMPLOYMENTLABORFORCE	Unemployment, total (% of total labor force) (modeled ILO estimate)	_
CORRUPINDEX	Corruption Index	_
ECONOMICFREEDOMSCORE	Economic Freedom Overall Score	+
HEALTHEXPENDITURE	Total expenditure on health as a percentage of gross domestic product (numeric)	+
INFLATION	Inflation, consumer prices (annual %)	_
AGRICULTURALLAND	Agricultural land (% of land area)	+
HOUSEHOLDCONSUMPTIONGROWTH	Household final consumption expenditure per capita growth (annual %)	+

Table 3: Life Expectancy Variables Descriptions and Expected Signs

Source: World Bank and Heritage Foundation

Variable Names	Brief Descriptions	Expected Signs
LIFEEXPECTANCY	Life expectancy at birth, total (years)	_
NETODA&OA	Net official development assistance and official aid received (current US$)	_
LAGNETODA&OA	Lag Net official development assistance and official aid received (current US$)	+
GDPPERCAPITA	GDP per capita (current US$)	+
INCIDENCEOFHIV	Incidence of HIV (% of uninfected population ages 15-49)	_
DEATHRATE	Death rate, crude (per 1,000 people)	_
HEALTHEXPENDITURE	Health expenditure, total (% of GDP	+
ECONOMICFREEDOMSCORE	Economic Freedom Overall Score	+
IMPROVEDSANITATION	Improved sanitation facilities (% of population with access)	+

Table 4: Descriptive Statistics for the Life Expectancy Regression Variables

	Average	Minimum	Maximum	Std. Deviation
LIFEEXPECTANCY	72.04717674	56.59495122	81.49619512	4.697721351
NETODA&OA	298747867	-299530000	3036010000	331721922.7
LAGNETODA&OA	293349833.8	-299530000	3036010000	322857686.7
GDPPERCAPITA	4613.822313	329.7819844	16881.384	3544.494019
INCIDENCEOFHIV	0.052465374	0.01	0.77	0.087729157
DEATHRATE	6.192736842	3.976	11.592	1.662171836
HEALTHEXPENDITURE	6.608259363	3.37865	11.58764	1.549042463
ECONOMICFREEDOMSCORE	61.35373961	36.1	79	8.2441
IMPROVEDSANITATION	72.94570637	19.6	99	18.3768949

Table 5: Descriptive Statistics for the GDP per capita Regression Variables

	Average	Minimum	Maximum	Std. Deviation
GDPPERCAPITA	4613.822313	329.781984	16881.384	3544.49
NETODA&OA	298747867	-299530000	3036010000	331721922.70
LAGNETODA&OA	293349833.8	-299530000	3036010000	322857686.70
NATURALRESOURCESRENTS	4.425173746	0.0582608	25.41435572	5.21
CCSERVICES	27.12197145	-9.35039073	72.73145455	19.36
FOREIGNDIRECTINVESMENT	3.573441047	-5.0072358	16.22949045	2.77
GOODSSERVICESEXPORTS	30.01122037	6.73016965	76.98827207	14.31
EMPLOYMENT1524POPULATION	43.29445984	24.2999992	63.09999847	8.26
UNEMPLOYMENTLABORFORCE	7.562603896	1.29999995	18.39999962	3.70
CORRUPINDEX	3.516066482	1.4	7.8	1.44
ECONOMICFREEDOMSCORE	61.35373961	36.1	79	8.24
HEALTHEXPENDITURE	6.608259363	3.37865	11.58764	1.55
INFLATION	9.097867226	-1.16689547	99.87714224	10.79
AGRICULTURALLAND	42.31373478	17.2828125	85.48737287	17.27
HOUSEHOLDCONSUMPTIONGROWTH	2.285242627	-16.8868362	16.1359197	4.07

Table 6: Regression Results for Life Expectancy

Regression Statistics	
Multiple R	0.96003
R Square	0.92166
Adjusted R Square	0.91988
Standard Error	1.32975
Observations	361

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	8	7322.27406	915.2842575	517.627	1.63E-189
Residual	352	622.4168597	1.768229715		
Total	360	7944.690919			

	Coefficients	*t Stat*	*P-value*
Intercept	62.04014253	70.30302481	2.7625E-209
NETODA&OA	-5.57203E-10	-1.413682147	0.158339006
LAGNETODA&OA	4.9957E-11	0.12281324	0.902325079
GDPPERCAPITA	0.000296046	10.5129931	1.15722E-22
INCIDENCEOFHIV	-2.402011724	-2.328587904	0.020446628
DEATHRATE	-0.991745999	-18.8574036	2.54237E-55
HEALTHEXPENDITURE	0.214324624	4.22621452	3.03163E-05
ECONOMICFREEDOMSCORE	0.072888698	7.656291892	1.86318E-13
IMPROVEDSANITATION	0.125741124	16.55914766	5.96312E-46

	Standard Error	*Lower 95%*	*Upper 95%*
Intercept	0.882467613	60.30457032	63.77571473
NETODA&OA	3.9415E-10	-1.33239E-09	2.17982E-10
LAGNETODA&OA	4.06772E-10	-7.50052E-10	8.49966E-10
GDPPERCAPITA	2.816E-05	0.000240663	0.000351429
INCIDENCEOFHIV	1.031531479	-4.43075174	-0.373271708
DEATHRATE	0.052591864	-1.095179797	-0.888312202
HEALTHEXPENDITURE	0.050713144	0.114585754	0.314063494
ECONOMICFREEDOMSCORE	0.009520104	0.054165259	0.091612137
IMPROVEDSANITATION	0.007593454	0.110806879	0.140675369

Table 7: Regression Results for GDP per capita

Regression Statistics	
Multiple R	0.636052968
R Square	0.404563378
Adjusted R Square	0.380470567
Standard Error	2789.878049
Observations	361

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	14	1829774467	130698176	16.7919	2.15722E-31
Residual	346	2693063158	7783419.53		
Total	360	4522837625			

	Standard Error	*Lower 95%*	*Upper 95%*
Intercept	2168.570211	993.3387811	9523.816955
NETODA&OA	8.22068E-07	-3.1741E-06	5.96803E-08
LAGNETODA&OA	8.4352E-07	-4.4404E-06	-1.1222E-06
NATURALRESOURCESRENTS	37.30901239	187.0808464	333.8428531
CCSERVICES	8.240672293	-32.9053364	-0.48910435
FOREIGNDIRECTINVESMENT	69.35489968	188.8036207	461.6241432
GOODSSERVICESEXPORTS	12.28515696	-94.8586062	-46.5326342
EMPLOYMENT1524POPULATION	23.47446865	-103.292543	-10.9513121
UNEMPLOYMENTLABORFORCE	51.84921829	-250.262983	-46.3043459
CORRUPINDEX	135.8514737	-216.587545	317.8097395
ECONOMICFREEDOMSCORE	24.2699614	-63.9483355	31.52211551
HEALTHEXPENDITURE	119.4491891	470.7266789	940.6024964
INFLATION	16.39377921	-56.5416606	7.946348673
AGRICULTURALLAND	11.46714544	-5.05960704	40.04856305
HOUSEHOLDCONSUMPTIONGROWTH	39.69029753	-23.37138	132.757859

	Coefficients	*t Stat*	*P-value*
Intercept	5258.577868	2.424905517	0.015823773
NETODA&OA	-1.5572E-06	-1.894246098	0.059026087
LAGNETODA&OA	-2.78128E-06	-3.297235181	0.001077724
NATURALRESOURCESRENTS	260.4618497	6.981204622	1.50221E-11
CCSERVICES	-16.69722036	-2.026196379	0.043511495
FOREIGNDIRECTINVESMENT	325.213882	4.689126269	3.95428E-06
GOODSSERVICESEXPORTS	-70.69562019	-5.754555713	1.91461E-08
EMPLOYMENT1524POPULATION	-57.12192755	-2.433364027	0.015465067
UNEMPLOYMENTLABORFORCE	-148.2836645	-2.859901642	0.004494921
CORRUPINDEX	50.61109747	0.372547283	0.709713509
ECONOMICFREEDOMSCORE	-16.21310997	-0.668031964	0.504558552
HEALTHEXPENDITURE	705.6645876	5.907654902	8.30367E-09
INFLATION	-24.29765594	-1.482126581	0.139216786
AGRICULTURALLAND	17.49447801	1.525617521	0.128018679
HOUSEHOLDCONSUMPTIONGROWTH	54.6932395	1.378000239	0.169093719

Table 8: Correlation Matrix For Life Expectancy Independent Variables

	LIFE EXPECTANCY	*NET ODA&OA*	*LAG NET ODA&OA*	*GDP PER CAPITA*	*INCIDENCE OF HIV*	*DEATH RATE*	*HEALTH EXPENDITURE*	*ECONOMIC FREEDOM SCORE*	*IMPROVED SANITATION*
LIFEEXPECTANCY	1								
NETODA&OA	-0.44	1							
LAGNETODA&OA	-0.45	0.83	1						
GDPPERCAPITA	0.657	-0.29	-0.31	1					
INCIDENCEOFHIV	-0.51	-0.05	-0.02	-0.23	1				
DEATHRATE	-0.64	0.19	0.192	-0.13	0.438	1			
HEALTHEXPENDITURE	0.266	-0.01	0.008	0.212	-0.12	0.06	1		
ECONOMICFREEDOMSCORE	0.399	-0.18	-0.19	0.162	-0.3	-0.15	0.2938	1	
IMPROVEDSANITATION	0.895	-0.52	-0.53	0.676	-0.43	-0.45	0.2565	0.28505	1

Table 9: Correlation Matrix For GDP Per Capita Independent Variables

	GDP PER CAPITA	NET ODA &OA	LAG NET ODA &OA	NATURAL RESOURCES RENTS	CC SERVICES	FOREIGN DIRECT INVESMENT	GOODS SERVICES EXPORTS	EMPLOYMENT 15 24POPULATION	UNEMPLOYMENT LABORFORCE	CORRUP INDEX	ECONOMIC FREEDOM SCORE	HEALTH EXPENDITURE	INFLATION	AGRICULTURAL LAND	HOUSEHOLD CONSUMPTION GROWTH
GDPPERCAPITA	1														
NETODA&OA	-0.3	1													
LAGNETODA&OA	-0.3	0.83	1												
NATURALRESOURCESRENTS	0.28	-0	-0	1											
CCSERVICES	-0.2	0.16	0.18	-0.21	1										
FOREIGNDIRECTINVESMENT	0.19	-0	-0	-0.04	0.1	1									
GOODSSERVICESEXPORTS	-0	-0.2	-0.2	0.021	0	0.355	1								
EMPLOYMENT1524POPULATION	-0.2	0.06	0.06	-0.12	0.2	-0.15	0.102	1							
UNEMPLOYMENTLABORFORCE	0.06	-0.2	-0.2	-0.01	-0	0.018	-0.13	-0.57	1						
CORRUPINDEX	0.31	-0.2	-0.2	-0.01	-0	0.275	0.051	-0.151	-0.0008	1					
ECONOMICFREEDOMSCORE	0.16	-0.2	-0.2	-0.19	-0	0.387	0.142	-0.022	0.0207	0.53	1				
HEALTHEXPENDITURE	0.21	-0	0.01	-0.31	0.2	0.156	0.178	-0.046	0.0017	0.38	0.294	1			
INFLATION	-0.1	-0.1	-0.1	0.239	-0	-0.19	-0.06	-0.071	0.1222	-0.2	-0.37	-0.31	1		
AGRICULTURALLAND	-0	-0	-0	-0.48	0	-0.28	-0.22	-0.105	0.0856	0.1	0.066	0.297	-0.1	1	
HOUSEHOLDCONSUMPTIONGROWTH	0.17	-0	-0.1	0.161	0	0.167	0.123	-0.036	-0.0122	0.09	-0.01	0.002	-0.2	-0.03	1

Table 10: t-test for Life Expectancy Regression Results

Degrees of Freedom	Significance Level	Observations	Number of Coefficients
352	0.05	361	9

	Coefficients	*|t Sta|*	*tc*	*Statistical Significance*
Intercept	**61.429484**	**70.3030248**	**1.64919403**	**statistically Significant**
NETODA&OA	-5.36E-10	-1.4136821	1.64919403	No statistical significance
LAGNETODA&OA	7.659E-11	0.12281324	1.64919403	No statistical significance
GDPPERCAPITA	**0.0002865**	**10.5129931**	**1.64919403**	**statistically Significant**
INCIDENCEOFHIV	**-1.862711**	**-2.3285879**	**1.64919403**	**statistically Significant**
DEATHRATE	**-0.957507**	**-18.857404**	**1.64919403**	**statistically Significant**
HEALTHEXPENDITURE	**0.1631506**	**4.22621452**	**1.64919403**	**statistically Significant**
ECONOMICFREEDOMSCORE	**0.0788237**	**7.65629189**	**1.64919403**	**statistically Significant**
IMPROVEDSANITATION	**0.1315175**	**16.5591477**	**1.64919403**	**statistically Significant**

Table 11: t-test for GDP per Capita Regression Results

Degrees of Freedom	Significance Level	Observations	Number of Coefficients
346	0.05	361	15

	Coefficients	*|t Stat|*	*tc*	*Statistical Significance*
Intercept	**5258.5779**	**2.42490552**	**1.649269**	**statistically Significant**
NETODA&OA	**-1.56E-06**	**-1.8942461**	**1.649269**	**statistically Significant**
LAGNETODA&OA	**-2.78E-06**	**-3.2972352**	**1.649269**	**statistically Significant**
NATURALRESOURCESRENTS	**260.46185**	**6.98120462**	**1.649269**	**statistically Significant**
CCSERVICES	**-16.69722**	**-2.0261964**	**1.649269**	**statistically Significant**
FOREIGNDIRECTINVESMENT	**325.21388**	**4.68912627**	**1.649269**	**statistically Significant**
GOODSSERVICESEXPORTS	**-70.69562**	**-5.7545557**	**1.649269**	**statistically Significant**
EMPLOYMENT1524POPULATION	**-57.12193**	**-2.433364**	**1.649269**	**statistically Significant**
UNEMPLOYMENTLABORFORCE	**-148.2837**	**-2.8599016**	**1.649269**	**statistically Significant**
CORRUPINDEX	50.611097	0.37254728	1.649269	No statistical significance
ECONOMICFREEDOMSCORE	-16.21311	-0.668032	1.649269	No statistical significance
HEALTHEXPENDITURE	**705.66459**	**5.9076549**	**1.649269**	**statistically Significant**
INFLATION	-24.29766	-1.4821266	1.649269	No statistical significance
AGRICULTURALLAND	17.494478	1.52561752	1.649269	No statistical significance
HOUSEHOLDCONSUMPTIONGROWTH	54.69324	1.37800024	1.649269	No statistical significance

Table 12: F-test for GDP per Capita and Life Expectancy Regression Equations

Life Expectancy F-test	
N	361
K	9
Df 1 (K-1)	8
Df 2 (N-K)	352
Critical F-value	1.964732
F-statistic	517.6275
Significance Level	0.05
F-statistic > Critical F-value	Regression equation is significant.

GDP per capita F-test	
N	361
K	15
Df 1 (K-1)	14
Df 2 (N-K)	346
Critical F-value	1.7204413
F-statistic	16.791871
Significance Level	0.05
F-statistic > Critical F-value	Regression equation is significant.

Table 13: Durbin-Watson Test for GDP per Capita and Life Expectancy Regression Equations

	K-Independent Variables	N-Observations
GDP per capita	361	15
Life Expectancy	361	9

	d_L	d	d_U		
GDP per capita	1.74681	1.566	1.90819	Reject H_0	**Positive serial correlation**
Life Expectancy	1.78182	2.113	1.87261	Reject H_0	**No positive serial correlation**

H_0	No positive serial correlation
H_a	Positive serial correlation
$d<d_L$	Reject Ho
$d>d_U$	Do no reject Ho
$d_L<=d<=d_U$	Inconclusive

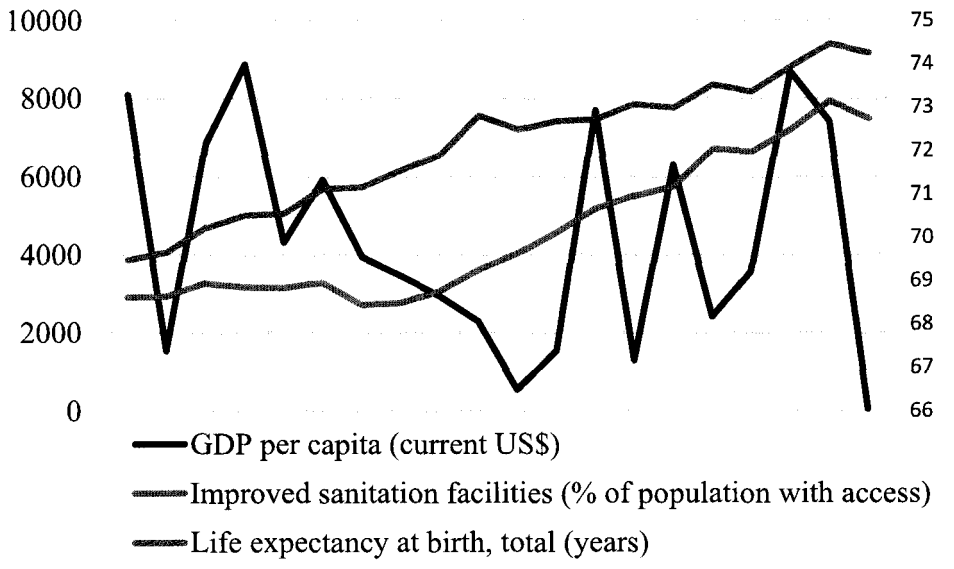
Table 14: Correlation Matrix For Life Expectancy Independent Variables

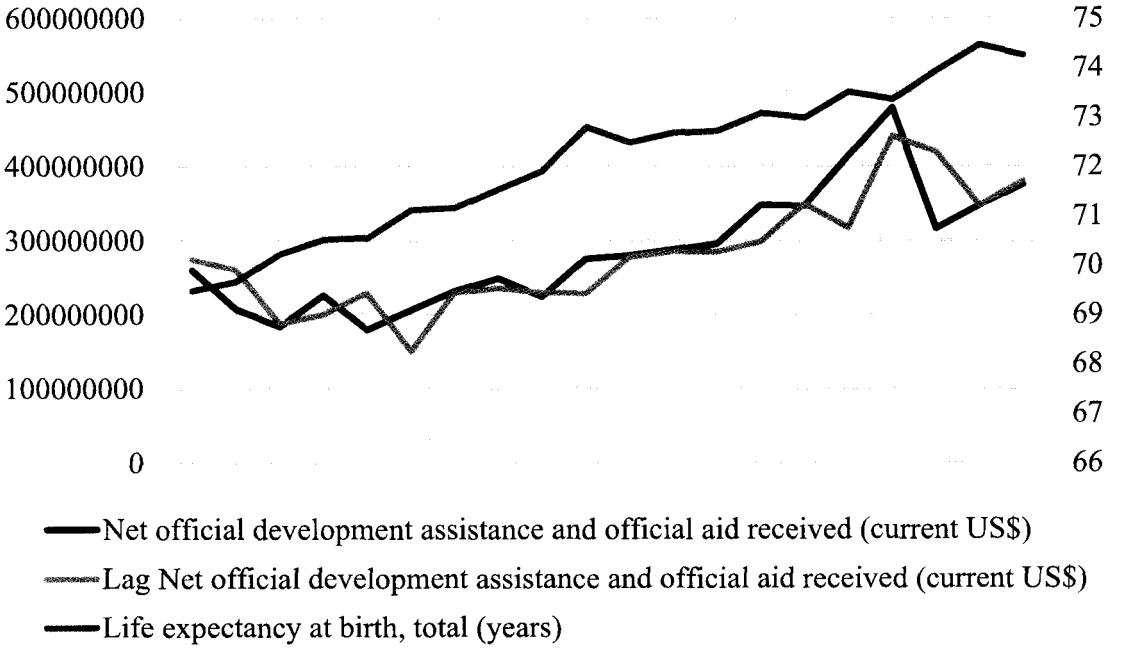
	LIFE EXPECTANCY	*NET ODA &OA*	*LAG NET ODA &OA*	*GDP PER CAPITA*	*INCIDENCEOFHIV*	*DEATHRATE*	*HEALTHEXPENDITURE*	*ECONOMICFREEDOMSCORE*	*IMPROVEDSANITATION*
LIFEEXPECTANCY	1								
NETODA&OA	-0.44	1							
LAGNETODA&OA	-0.45	0.83	1						
GDPPERCAPITA	0.657	-0.29	-0.31	1					
INCIDENCEOFHIV	-0.51	-0.05	-0.02	-0.23	1				
DEATHRATE	-0.64	0.19	0.192	-0.13	0.438	1			
HEALTHEXPENDITURE	0.266	-0.01	0.008	0.212	-0.12	0.06	1		
ECONOMICFREEDOMSCORE	0.399	-0.18	-0.19	0.162	-0.3	-0.15	0.2938	1	
IMPROVEDSANITATION	0.895	-0.52	-0.53	0.676	-0.43	-0.45	0.2565	0.28505	1

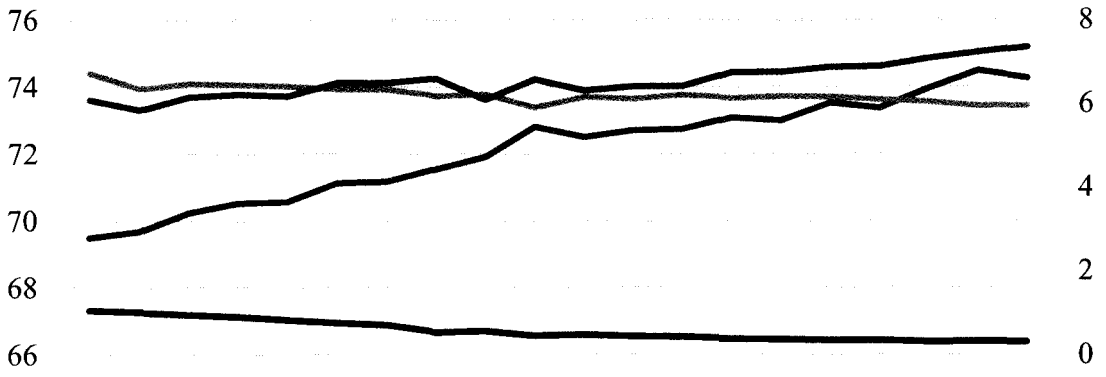
Table 15: Correlation Matrix For GDP Per Capita Independent Variables

	GDP PER CAPITA	*NET ODA &OA*	*LAG NET ODA &OA*	*NATURALRESOURCESRENTS*	*CCSERVICES*	*FOREIGNDIRECTINVESMENT*	*GOODSSERVICESEXPORTS*	*EMPLOYMENT1524POPULATION*	*UNEMPLOYMENTLABORFORCE*	*CORRUPINDEX*	*ECONOMICFREEDOMSCORE*	*HEALTHEXPENDITURE*	*INFLATION*	*AGRICULTURALLAND*	*HOUSEHOLDCONSUMPTIONGROWTH*
GDPPERCAPITA	1														
NETODA&OA	-0.3	1													
LAGNETODA&OA	-0.3	0.83	1												
NATURALRESOURCESRENTS	0.28	-0	-0	1											
CCSERVICES	-0.2	0.16	0.18	-0.21	1										
FOREIGNDIRECTINVESMENT	0.19	-0	-0	-0.04	0.1	1									
GOODSSERVICESEXPORTS	-0	-0.2	-0.2	0.021	0	0.355	1								
EMPLOYMENT1524POPULATION	-0.2	0.06	0.06	-0.12	0.2	-0.15	0.102	1							
UNEMPLOYMENTLABORFORCE	0.06	-0.2	-0.2	-0.01	-0	0.018	-0.13	-0.57	1						
CORRUPINDEX	0.31	-0.2	-0.2	-0.01	-0	0.275	0.051	-0.151	-0.0008	1					
ECONOMICFREEDOMSCORE	0.16	-0.2	-0.2	-0.19	-0	0.387	0.142	-0.022	0.0207	0.53	1				
HEALTHEXPENDITURE	0.21	-0	0.01	-0.31	0.2	0.156	0.178	-0.046	0.0017	0.38	0.294	1			
INFLATION	-0.1	-0.1	-0.1	0.239	-0	-0.19	-0.06	-0.071	0.1222	-0.2	-0.37	-0.31	1		
AGRICULTURALLAND	-0	-0	-0	-0.48	0	-0.28	-0.22	-0.105	0.0856	0.1	0.066	0.297	-0.1	1	
HOUSEHOLDCONSUMPTIONGROWTH	0.17	-0	-0.1	0.161	0	0.167	0.123	-0.036	-0.0122	0.09	-0.01	0.002	-0.2	-0.03	1

Figure 1-a: Graphical Relationship Between Life Expectancy and the Independent Variables for the 1996-2014 Period.



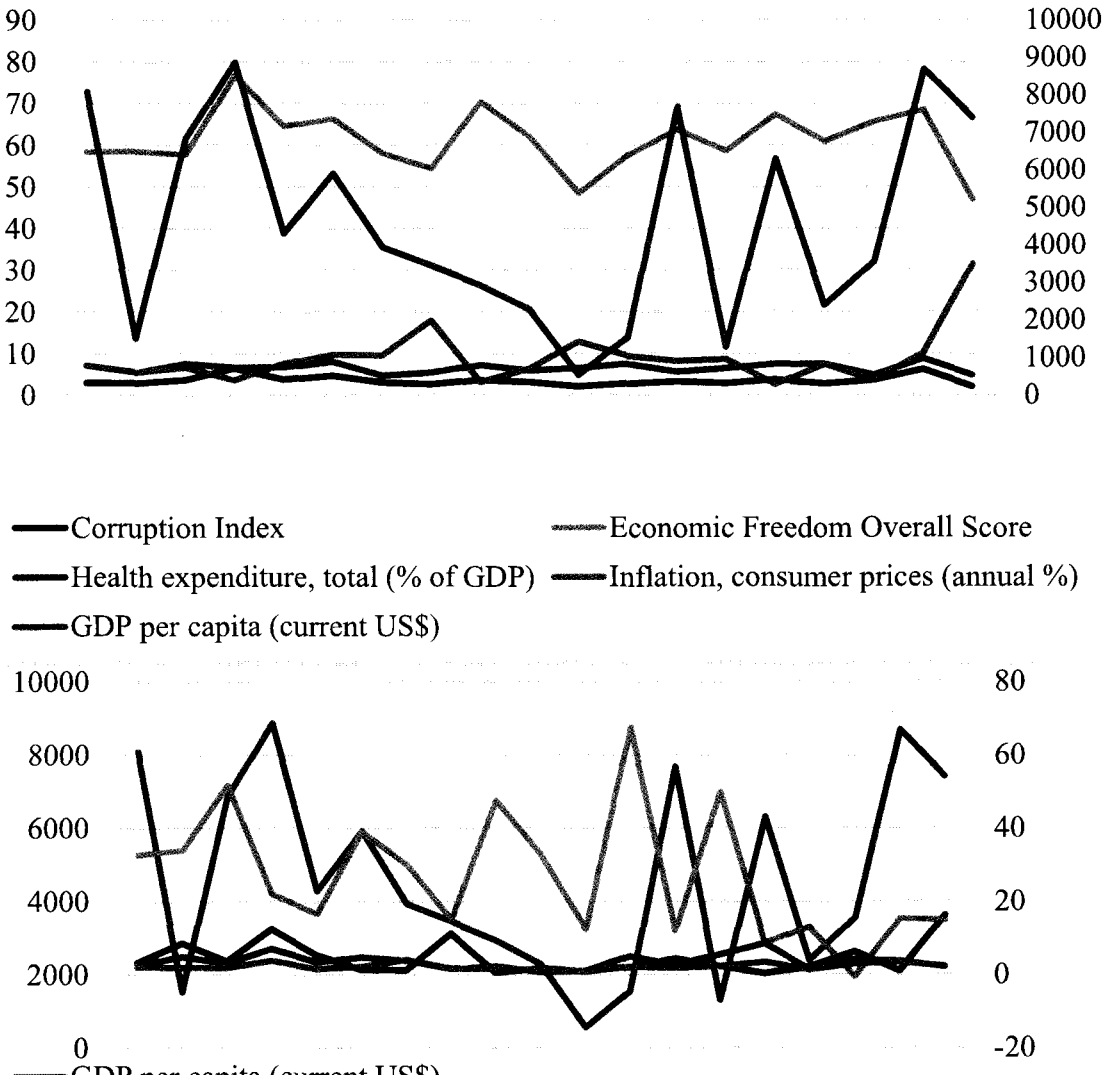


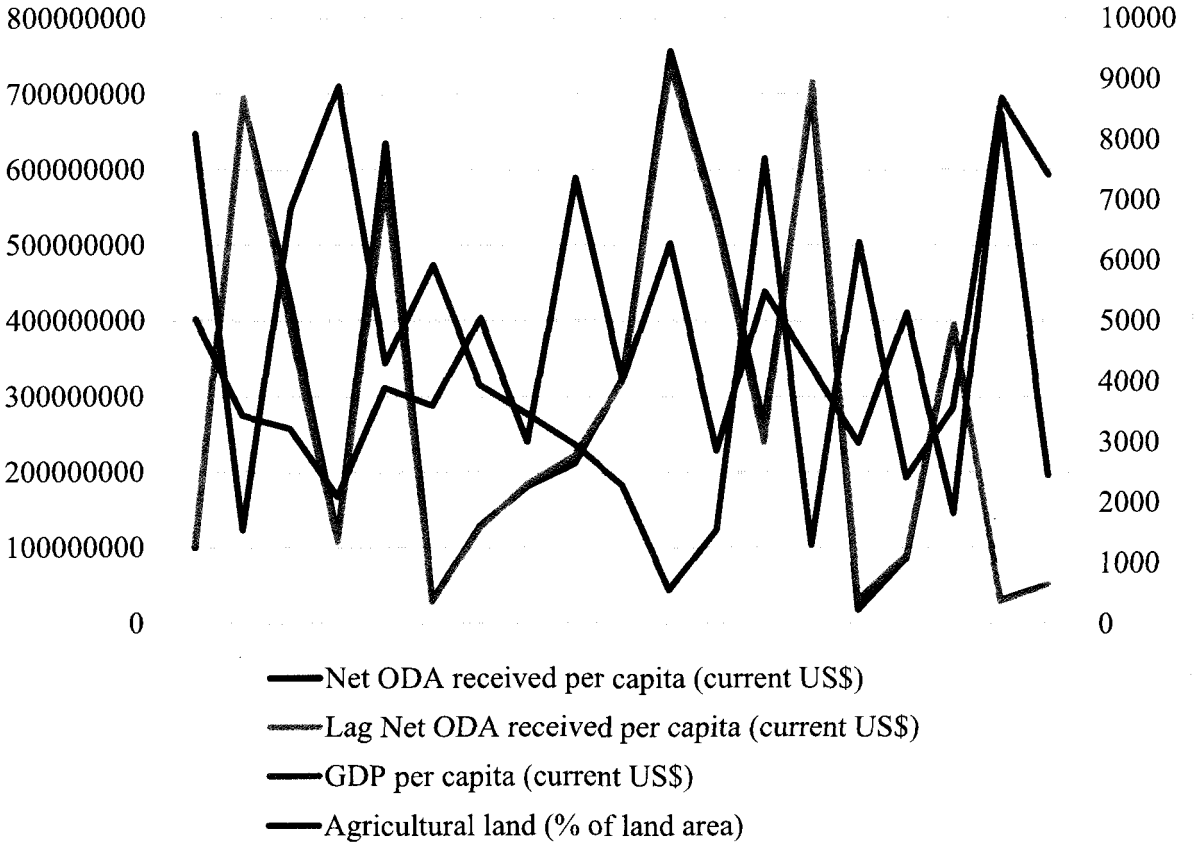


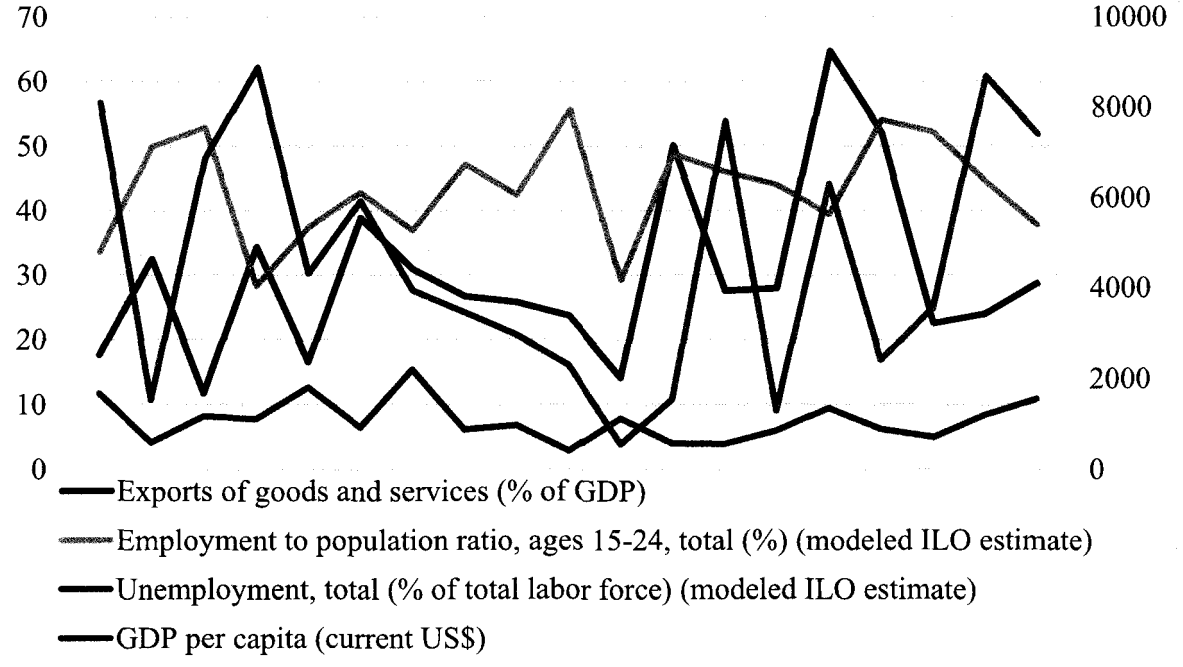
—Life expectancy at birth, total (years)
—Incidence of HIV (% of uninfected population ages 15-49)
—Death rate, crude (per 1,000 people)
—Health expenditure, total (% of GDP)

—Life expectancy at birth, total (years)
—Economic Freedom Overall Score
—Improved sanitation facilities (% of population with access)

Figure 1-b: Graphical Relationship Between GDP per capita and the Independent Variables for the 1996-2014 Period.




800000000
700000000
600000000
500000000
400000000
300000000
200000000
100000000
0
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Net ODA received per capita (current US$)
Lag Net ODA received per capita (current US$)
GDP per capita (current US$)
Agricultural land (% of land area)


70
60
50
40
30
20
10
0
10000
8000
6000
4000
2000
0
Exports of goods and services (% of GDP)
Employment to population ratio, ages 15-24, total (%) (modeled ILO estimate)
Unemployment, total (% of total labor force) (modeled ILO estimate)
GDP per capita (current US$)

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