Does Poverty Reduction Cause Economic Development?

Mariam Ijaz

Abstract

Extreme poverty is a threat faced by billions of people making economic development as a chief goal for most of the countries all over the world. Having a deep understanding of the whole gamut of poverty, this study attempts to empirically investigate that whether a causal link exists between poverty reduction and economic development or not? And if it exists, then what is the direction of that causal link. The Panel data cover 26 developing countries, on the basis of the availability of data, for the years from 1994 to 2015. Through Co-integration to Pairwise Granger Causality Test & Granger Causality based on VEC Model, this study analyses the causality between poverty reduction and economic development. This study, apart from poverty reduction, also incorporates some other independent variables affecting economic development. The trickle-up theory, adopted in this study, explains the channels through which poverty reduction could cause economic development. The main conclusion drawn from the empirical results is that a causal link running from poverty reduction to economic development exists. This implies that poverty reduction causes economic development.

Keywords: Poverty Reduction, Economic Development, Granger Causality, Co-integration.

1. Introduction

Poverty is considered as to be one of the biggest obstacles in the way to stability, prosperity, development, and peace. Sachs et al. (2009) studied that around 8 million people, or even more, in the world are currently living in extremely poor conditions due to which they are on the verge of dying. Poverty has, indeed, become an international urgency and alleviating it, has become a major goal for all the countries around the world. For the achievement of this goal, a number of reforms and strategies have been taken up, in order to be able to run on the path of economic development.

Poverty and development, these two terms can be referred to as the two sides of a coin; one postulates and stimulates the other. Basically, if we consider the West, all those inventions that people enjoy in their daily lives and the advanced technology that they use, came into existence because of poverty. But on the other hand in Africa, the case is entirely opposite; progress is being hindered by poverty. The various conflicts, corruption, lack of health facilities and infrastructure, poor education cannot lead to a
healthy population who can contribute to economic progress and development by their active participation. Having an optimistic approach, it is still believed that Africa can make it to the list of developed nations if it turns out to be successful in reducing poverty (Dokun Oyeshola, 2007). So this study inherently emphasizes the relationship between poverty reduction and economic development. The world today is faced with a lot of challenges in the form of massive inequalities. These inequalities not only affect the whole globalized political world but also affect the lives of millions of people by influencing their daily lives, their interactions, freedom, and capabilities. Especially they target the extremely poor population who cannot afford a decent standard of living.

In order to prove the correlation that exists between poverty reduction and economic development through empirical analysis, we have basically two sets of approaches. One school of thought believes that economic development leads to poverty reduction (Dollar, Kleineberg, & Kraay, 2013). People having this view are very confident about their approach that economic development creates such an atmosphere and gives rise to opportunities that prove advantageous for all the people, including even those having meager resources. While the people from the second school of thought have opposing views; they believe that poverty reduction causes economic development (Thirlwall, 1989). This approach is not denying the importance of economic development but views it only as the outcome of the measures that have been taken to reduce poverty. This school of thought does not believe that the outcomes from increased economic growth will directly benefit the poorest population or the gains from the economic growth will automatically trickle down to the population living in extreme poverty.

So this study will help us find the better approach of the two, which best goes with the reality. More than one billion people around the world live on less than $1 a day and that clearly is a massive human failure when seen with the existing worldwide disparities (Olinto, Beegle, Sobra do, & Uematsu, 2013). The most appropriate approach to deal with this worldwide problem is to first investigate whether poverty reduction causes economic development or is it the economic development that triggers poverty reduction. If it is the former case then comes, the identification of the channels through which reduction in poverty results in economic development. But if the case is the latter one, then the major pillars of economic development are studied that are held responsible to curb the colossal problem of poverty.

Well, poverty cannot simply be defined by a standard definition; rather the choice of definition is entirely a country’s prerogative. Poverty is relative in nature. However, the definition needs to include the multidimensional character of poverty which cannot be fully explained by the monetary indicators alone. So the definition should recognize the non-monetary aspects of poverty. That includes the social, political and structural elements. In fact the chronic deprivation in the form of hopelessness, powerlessness and uncertainty experienced by the poor people because of lack of infrastructure, basic health facilities, education system, abnegation of opportunities to have a decent standard of living, dignity, freedom, proper sewerage system (Cairncross, Hardoy, &
Defining economic development is a complex task. Economic development, according to some economists, can be interpreted as a complex issue aimed at improving the welfare of the people, individually and collectively, by allowing them to be the driver of their own destiny and to enjoy a better standard of living. Though long-term and high rates of growth is an essential condition for economic development but growth, alone cannot promote economic development. The elements needed for having a decent standard of living, however, is an amalgamation of various dimensions relating to economic, cultural, institutional, environmental and social elements (Dokun Oyeshola, 2007), (Amartya Sen, 1999), (Arndt, 1989), (DOyeshola, 1989), (Okun & Richardson, 1962), (Ul Haq, 1995), (Wealth, 1989).

1.2. Virtuous Cycle of Poverty Reduction and Economic Development

Poverty reduction and economic development are two inseparable concepts which are considered as to be the backbone of each other by setting the premise for one another. Reducing poverty can help boost economic growth rate which is considered as to be an important factor behind economic development. Poverty, with undernutrition and ill health as dimensions, contributes to a lower productivity, which hampers growth and ultimately development. Economic growth, an important factor behind economic development, cannot take place without addressing the constraints affecting the people living in extreme poverty (Lopez & Servén, 2009). This study explores the causal relationship between poverty reduction and economic development. Also it determines the direction of the causality running between poverty reduction and economic development.

When some countries are regarded as to be slow in their economic growth and progress, we are implying that since these countries have become prey to the global problem of poverty so their growth is hampered. The direction of causality from poverty reduction to greater economic growth and development leads us to the concept of the virtuous cycle (Perry, Lopez, Maloney, Arias, & Servén, 2006), where poverty and growth interact, reduced poverty leading to higher growth and higher growth leading to reduced poverty. In many developing economies where people are plagued with poverty, larger portions of the population lack in having the access to credit. Mostly because they do not have enough resources to pay back the loans, hence their requests for loans are denied. By excluding a major portion of the population from investment opportunities, we are heading towards a path of decreased investment rates hence resulting in lower growth. Thus reducing poverty incidence by giving people an access to an equal share of opportunities and public goods and service, through which they can acquire skills to play their part in the development of the country ((Banerjee & Newman, 1994), (Lopez & Servén, 2009)).
(Galor & Zeira, 1993), shared similar views about poverty having feedback effects on growth, the people living under extreme poverty neither have enough resources to pay for the educational expenditures nor have access to borrow from the financial sector, hence extreme poor people lack in literacy and thus promotes very low economic development. So it is assumed that higher poverty rates lead to lower educational attainment and thus poor people would be willing to work as unskilled labor having low returns.

This study is structured in a way that the Section I deals with the introduction of the basic terms important to this paper, the analysis of different theories regarding the relationship between poverty reduction and economic development. Section II reviews the studies that have already been conducted on the relationship between these two variables. Section III deals with the theoretical framework, throwing light on some important economic theories explaining the relationship between economic development and poverty reduction, thus forming the groundwork for this study. Section IV is dedicated to the results that have been obtained from cross-country regression analysis based on the empirical model. Finally, Section V concludes and draws policy implications. Thereafter the references are presented and then the relevant information regarding the data is provided in Appendix.

2. Literature Review
Nowadays most of the developing countries are fighting for very crucial issues like poverty and low growth rates. It has become the main agenda for almost all the developing countries to curb poverty and raise economy through economic development. Economic development and poverty reduction are two integral concepts that are interlinked with each other. Mainly there exist 2 approaches that aim at explaining the relationship between poverty reduction and economic development. One of the approaches singled out economic development as to be the way out of poverty since it is believed that economic development sets the premise for poverty reduction (Dollar et al., 2013). On the other hand, the second approach holds poverty reduction responsible for achieving economic development. It discusses that in order to achieve economic development, our attention should focus towards the poverty-stricken population. Pulling the poverty-stricken people out of poverty and equipping them with some skills through vocational training and by educating them along with the higher rate of economic growth can lead any country on the path of development (Thirlwall, 1989).

2.1. Survey of Literature
Investigating whether poverty reduction in India is accompanied by improvements in the quality of life or not, Dreze and Sen (2002) examined a steady reduction in poverty followed by substantial improvement in education, health, and their nutrition level. The development of these basic features of human capabilities allows the poverty-stricken people to join in the development process—for instance, the participation of households in the services sector was made possible only through acquiring education,
an important factor in improving the quality of life. They have concluded that poverty reduction that India has experienced in the past few years is followed by a better standard of living and economic growth thus giving rise to economic development.

The significant relationship between unemployment, poverty reduction and economic growth from 1969 to 2006 in South Africa had been studied by Odhiambo (2011) using the ARDL-Bounds testing approach. To his surprise, no basis for any causality was found between any of the three variables. He used 2 proxies to measure poverty reduction; household consumption per capita and infant mortality. Similarly making use of OLS technique, Okoroafor and Chinweoke (2013) investigated and analyzed the relationship between economic growth and poverty from 1990 to 2011 in Nigeria and were surprised to have found no existing correlation between poverty reduction and economic growth. They ascribed the no causal relationship between the two variables to the neglecting behavior of government regarding human-capital development.

Stevans and Sessions (2008) investigated the effective relationship between economic growth and poverty using the error correction model. He found that higher economic growth results in a reduction in poverty level especially the increased GDP growth have a profound effect on poverty from 1960-2000. The countries from which the data has been collected, however, has not been mentioned by the author. He took poverty change as a dependent variable and GDP as his main independent variable.

Adams (2003) in his study depicted that poverty reduction had been possible only because of sustained and a higher rate of growth, a 10 percent increase in a country’s average income results in reducing the poverty rate by 20 to 30 percent. He took data from 50 developing countries to study the relationship between poverty, economic growth, and inequality through regression analysis and by estimating the growth elasticity of poverty. He found a weak causal relationship between poverty and economic growth. For this study, the dependent variables were poverty and inequality, while the economic growth being the independent variable.

Lopez and Servén (2009) conducted a study using data from 1960-2000 covering about 85 countries, employing GMM estimation technique to examine the relationship between poverty and economic growth. Poverty was taken as to be an independent variable while per capita income, a proxy variable for economic growth was considered as to be the dependent variable. They found a significant and negative effect of poverty on economic growth, which is a very important factor behind economic development. It is implied through this result that poverty acts as a barrier to growth. There are a number of pieces of evidence that show economic growth reduces poverty and that poverty hampers growth.

Poverty is biggest challenge and threat that the world is facing today. Omoniyi (2013), in his paper has discussed the importance of education in alleviating poverty and thus achieving economic development. He emphasizes on the fact that the quality of
education matters because it helps in building the human capital which plays a crucial role in curbing poverty. Education promotes creativity and productivity of people, enhances self-understanding, advances technological progress and entrepreneurship, it improves the quality of life thus directly influencing economic development of the country.

By conducting a research on an extensive network of enterprises consisting of 221 units for the period over 1970 to 1985 in the U.S.A., Scherer and Huh (1992) determined that enterprises with executives having a higher level of education have a higher expenditure on research and development. This results in innovation leading to high level of economic development. Similarly, Sapir et al. (2004) proclaimed that the European Union's slower economic growth that is observed is attributed to its relatively scanty investment in higher education. 1.1% of its total GDP is spent on education when compared to that of U.S, which is 3 percent of total GDP.

Seetanah, Ramessur, and Rojid (2009) in their research attempt to investigate the role of infrastructure in alleviating poverty by taking a sample of 20 developing countries from 1980-2005 and applying the GMM Model, Panel Causality Analysis, and Static Fixed Effect. The results show that infrastructure is a very crucial tool in curbing poverty because it provides easy access to resources and services and provides the disadvantaged people with a number of employment opportunities. Better transportation facilities have proved to be a foreteller of poverty reduction and result in economic development.

2.2. Research Gap
Mostly the research has been conducted on the impact of economic growth on poverty reduction, by keeping economic growth as independent variable and poverty reduction as the dependent variable. On the other hand, our study is focusing mainly on economic development rather than economic growth. Hence, HDI, an indicator for economic development, has been taken as our dependent variable. Secondly, the impact of poverty reduction on economic development is being examined in this study, whether poverty reduction causes economic development or not? That’s why we have taken poverty reduction as our main independent variable. This relationship, which is an implication of the trickle-up theory, has remained under studied.

3. Theoretical Framework
There exist two debatable perspectives on the relationship between poverty reduction and economic development in the literature.

3.1. Trickle Up Theory
In comparison to trickle-down theory that states the gains achieved from higher economic growth and a better standard of living for any country would trickle down to the poor, lies the ‘trickle-up theory’ which claims that poverty is reinforcing and self-sustaining in nature thus impeding the poor people from contributing towards economic
development. So in order to harvest economic development, we have to first focus on the goal of reducing poverty. This will, in turn, result in increased economic growth and development, which would trickle up to the middle class and then to the affluent class. The main cause of the fact that countries are not being able to grow fast, lies within the simple fact that they are too poor to grow. By generating a vicious cycle, extreme levels of poverty lead to decreased economic development & growth and in turn, lower growth & development result in higher levels of poverty. Thus economic development and growth are being hampered by poverty. Such situations demand economic policies that target and alleviate poverty by boosting the standards of living of disadvantaged people so that they can also contribute towards economic development. This gives rise to virtuous circle between poverty reduction and economic development and growth (Norton, 2002), (Bourguignon, 2004), (Perry et al., 2006), (Johannes & Tonda, 2011), (Thorbecke, 2013), (Azariadis & Stachurski, 2005).

Better standard of living is the basic instrument to break out of poverty, and it can be achieved through a number of means for instance by investing in human capital. Improved health, better education, innovative skills, altogether not only pulls up people out of poverty but also contribute towards the economic development and technological progress. Illiteracy, Poor health conditions, lack of clean water and poor sanitation, hopelessness, lack of opportunities, inefficient transport system, and powerlessness, all have a negative impact on development and act as barriers for productivity. By investing more in human capital, not only the level of productivity will increase but also the contribution of poor in economic development will be noticeable. This is because along with alleviating poverty level, you are equipping the poor lads with skills and better health which can be productively used for economic development (Thirlwall, 1989).

Bhagwati and Arvind in their recent book, Why Growth Matters, have asserted that in order to reap massive poverty reduction, the economic policies should be molded in such a way that they support two dimensions, one leading to faster but sustained growth while the other leading to the effectiveness of social spending. It is argued that growth does not only ‘pulls up’ people above the poverty line but also creates gainful employment opportunities which in turn leads to increased wages of the poor. Through increased wages, they can have access to better health, greater purchasing power, and quality education and by acquiring the required skills, can play their own part in the development of the country (J. Bhagwati & Panagariya, 2013), (J. N. Bhagwati, 1988).

The unhealthy environment that came into existence because of poverty and resource meagerness gives rise to many fatal, transmittable diseases like meningitis, tuberculosis, and influenza. The outbreak of such diseases is often helped by low resistance among dwellers. The low resistance is normally due to malnutrition, which badly affects the health of poverty-stricken people who, otherwise, would have played an important role in active labor. The implication that can be drawn is that poverty reduction can boost economic development by keeping the environment healthy. This is because the
presence of poor and detrimental environment is devastating, that makes development almost impossible to achieve (Dokun Oyeshola, 2007).

Basu (2013) argued that the benefits of growth will not trickle down to the poor on its own and also that the poor shouldn’t wait for the trickling down of benefits rather, they should look upon to the anti-poverty policies at government level that encourages trickle up growth.

4. Research Methodology
4.1. Data and Specification

The total number of developing countries that we are able to use for this study is 26, out of 153 developing countries classified by the World Bank. This selection of countries is based on the availability of data and its limitations. The data of the selected countries is strongly balanced. The Table 1 in the appendix shows the list of the countries. The data used in this study is gathered from World Development Indicators of the World Bank and Human Development Reports (UNDP).

Since an empirical panel data regression analysis is conducted so the dependent variable to be used is selected as HDI, which is an indicator of economic development. While on the other hand, the Poverty headcount ratio at $1.90 (2011 PPP) (% of the population) an indicator for measuring poverty is set to be variable for poverty reduction. It tells us about the estimated proportion of the population living with a consumption or income level which is below the poverty line that has already been predetermined for each country (McGillivray, 1991). Again the choice of this variable is heavily based on the limitation of data. Though economic development is affected by a number of various factors, in this study, however, our main focus is on the impact of Poverty headcount ratio has on HDI, the relationship between poverty reduction and economic development is studied.

The twenty-six developing countries have been selected based on the availability of data for our two main variables, HDI and poverty headcount ratio, for the minimum of at least 11 years since we are considering data for 22 years, so we can select only those countries for which the data is available for half of the years from the total number of years that we have chosen. Independent variables apart from poverty headcount ratio, having a direct effect on HDI have also been incorporated in our regression model in order to avoid the swelling up of the error term.

4.2. Functional Form

Since we have taken economic development, whose indicator is HDI, as a function of poverty reduction, whose proxy variable is Poverty headcount ratio, in our study so our regression model will be designed in this manner:
HDI = f(HCR, GCF, GINI, DCF)

Where,
HDI = Human Development Index (HDI)
HCR = Poverty headcount ratio at $1.90 a day (2011 PPP) (% of population)
GCF = Gross capital formation (current US$)
GINI = GINI index (World Bank estimate)
DCF = Domestic credit provided by financial sector (% of GDP)

Now we will rewrite the above equation with econometric specification:
HDI\_it = \alpha \_it + \beta \_1 HCR\_it + \beta \_2 DCF\_it + \beta \_3 GCF\_it + \beta \_4 GINI\_it + \epsilon \_it

Where,
i = the respective countries selected for this study
t = the representative of the years.
\alpha = refers to the intercept
\beta = coefficient of variables
\epsilon = denotes the error term.

4.3. Hypothesis

This study examines the relationship between poverty reduction and economic development for which there exist 2 possibilities of the results. Hence the 2 possible alternative hypotheses are assumed as:

H\_1A: Unidirectional causality directing from Poverty Reduction to Economic Development

H\_2A: Bi-directional causality between Poverty Reduction and Economic Development

4.4. Regression Model

The regression equation is extended to include a number of various control variables which are expected to have a significant impact on the level of HDI in the countries that we have selected for this study. The regression equation exhibits that change in any of the independent variables, may it be poverty headcount ratio or gross capital formation, it does induce a change in the dependent variable, GDP per capita. The error term, here, accounts for all the factors apart from the above stated independent variables that have a part to play in influencing economic development, either positively or negatively.
\[ Y_{i,t} = \alpha_{i,t} + \sum_{l=1}^{p} \gamma_1, i, lX_{ai}, t - l + \sum_{l=1}^{p} \gamma_1, i, lX_{bi}, t - l + \sum_{l=1}^{p} \gamma_1, i, lX_{ci}, t - l + \sum_{l=1}^{p} \gamma_1, i, lX_{di}, t - l + \varepsilon_{1,i,t} \]

Where,

\( i \) = refers to the country

\( t \) = equals the time period

\( l \) = represents lag

\( \varepsilon \) = represents error term

\( \gamma \) = Coefficient of the variables

\( Y = \Delta \text{LnHDI} \)

\( X_a = \Delta \text{LnHCR} \)

\( X_b = \Delta \text{LnDCF} \)

\( X_c = \Delta \text{LnGCF} \)

\( X_d = \Delta \text{LnGINI} \)

All of the variables that we have employed in our study are expressed in first difference of their logarithms. We have taken the lagged terms for only the independent variables.

5. Estimation and Discussion

Now we can find out that whether or not our desired variables, poverty reduction and economic development are co-integrated or not? Does poverty reduction cause economic development or is it economic development that causes poverty reduction? In order to find out these relations, the data has to undergo a number of tests which are discussed below:

5.1. Stationarity Test

In order to test the stationarity of each variable, we apply panel unit root tests. The primary step for this analysis is to establish a degree of integration for the individual variables, at which they will show stationarity. If the probability-value for the individual variable comes out to be less than 0.05 at a particular integration level, then we say that stationarity exists. Then we find the order of integration at which the variable shows stationarity. In this study, we have used four panel unit root tests; Levin, Lin & Chu t*-statistic, Im, Pesaran and Shin W-statistic, PP–Fisher Chi-square statistic and ADF–Fisher Chi-square statistic.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Test of Unit root</th>
<th>Levin, Lin &amp; Chu</th>
<th>Im, Pesaran and Shin W-Stat</th>
<th>ADF-Fisher Chi-Square</th>
<th>PP-Fisher Chi-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level/1&lt;sup&gt;st&lt;/sup&gt; difference</td>
<td>Probability</td>
<td>Probability</td>
<td>Probability</td>
<td>Probability</td>
</tr>
<tr>
<td>Ln HDI</td>
<td>level</td>
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<td>0.7063</td>
<td>0.7043</td>
<td>0.1685</td>
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<tr>
<td>Lag HCR</td>
<td>level</td>
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<td>1.0000</td>
<td>1.0000</td>
<td>0.9874</td>
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<tr>
<td>Lag GCF</td>
<td>level</td>
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<td>0.2396</td>
<td>0.8062</td>
<td>0.9522</td>
</tr>
<tr>
<td>Lag GINI</td>
<td>level</td>
<td>0.8509</td>
<td>0.9722</td>
<td>0.9719</td>
<td>0.2071</td>
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<tr>
<td>Lag DCF</td>
<td>level</td>
<td>0.0017</td>
<td>0.4422</td>
<td>0.3687</td>
<td>0.8074</td>
</tr>
</tbody>
</table>

*Exogenous variables: Individual effects, without trends  
Source: Authors’ Formation

Null hypothesis: Unit root exist

Lag X = Log_X_( -1)

Specified Lags = 1

The Null hypothesis in panel unit root tests states the presence of unit roots while the Alternative hypothesis indicates towards the absence of unit roots, which imply that the variables are stationary. For Granger causality and Co-integration tests, it is a precondition that the variables must be stationary. If the p-value is less than 0.05, we reject the null hypothesis inferring that no unit roots are found in our panel variables. The results show that the data series at levels are not stationary. As it was expected, all the panels became stationary at their first differences. Results of Unit Root Tests have shown that in order to make the variables stationary, we have to take the variables at their first difference.

Null hypothesis: Unit root exist

Lag X = Log_X_( -1)

Lags interval = 1

5.2. Panel Co-integration Tests

From the results obtained from panel unit root tests, it is observed that all the panel variables are integrated of order (1), therefore we will apply the co-integration analysis to ascertain whether there is a long-run relationship between poverty reduction and economic development or not, using mainly the Johansen Fisher co-integration test.
(Maddala & Wu, 1999). Although 3 different types of Johansen Co-integration tests exist (Kao, 1999), (Pedroni, 1999) and Fisher co-integration test (Maddala & Wu, 1999) but for this study we will use only Johansen Fisher test because Pedroni and Kao tests are one way co-integration whereas Johansen estimates co-integration for the whole panel set. Two panel-variables are said to be co-integrated if there exists a long run relationship between them.

Firstly, we selected our desired variables, LnHDI, an indicator for economic development and lagged value of LnHCR, a proxy variable to measure poverty reduction to undergo the Johansen’s Fisher test. The lag length used for this study is 1 which is considered to be the best lag length as determined by Schwartz Information Criteria (SIC). If the probability is less than 0.05, then we reject the null hypothesis and if it is greater than 0.05 than we accept the null hypothesis. In the case of Johansen Fisher Co-integration test, the first null hypothesis states that co-integration does not exist. But since the probability value is less than 0.05, so this hypothesis is rejected which implies that co-integration does exist between the two variables. The second hypothesis states that only one co-integration equation exists in the data series. As the probability value is less than 0.05 so we will again reject the hypothesis implying that more than one co-integration equation exists.

5.3. Pairwise Granger Causality Test

Since the co-integration relationship only tells us about the presence of long-term causal relationship but does not tell anything about the direction of the causality, so we employ the most commonly used pairwise (Engle & Granger, 1987) test to detect the causality. The pairwise Granger-causality testing method is a perfect test to empirically investigate different predictions about the direction of the causality existing between two variables. According to Granger causality test, 2 co-integrated variables, for instance, Poverty Reduction and Economic development, are said to have causality if the history or lagged value of one of the 2 variables successfully predicts the value of the other variable; Poverty reduction Granger causes economic development or vice versa. The lag length selected is 6 on the basis of Akaike Information Criterion (AIC) and Final Prediction Error (FPE). Generally, the null hypothesis used in this test is: Poverty reduction does not Granger causes Economic development or Economic development does not Granger causes poverty reduction. The causality, in this case, is determined by looking at the significance of probability value, if the value is less than 0.05 then the null hypothesis is rejected otherwise we accept the null hypothesis.

The results show that the causality has been found to run from poverty reduction to economic development, which means the relationship is uni-directional. On the other hand, the hypothesis stating the absence of causality from economic development to poverty reduction has been accepted because of the higher p-value than 0.05. The lag length that is selected consists of 10 lag intervals. The results found as a result of Pairwise Granger causality, are in conformity with the previous studies that have been conducted on the causal link between poverty reduction and economic development. Hence, it shows the causality running from poverty reduction to economic development.
**Table 2: Unit Root Test Statistics at 1st difference**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Test of Unit Root</th>
<th>Levin, Lin &amp; Chu</th>
<th>Im, Pesaran and Shin W-Stat</th>
<th>ADF-Fisher Chi-Square</th>
<th>PP-Fisher Chi-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stationary at Level/1st difference</td>
<td>Probability</td>
<td>Probability</td>
<td>Probability</td>
<td>Probability</td>
</tr>
<tr>
<td>Ln HDI</td>
<td>1st difference 0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Lag HCR</td>
<td>1st difference 0.0001</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Lag GCF</td>
<td>1st difference 0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Lag GINI</td>
<td>1st difference 0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Lag DCF</td>
<td>1st difference 0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Exogenous variables: Individual effects, without trends  
Source: Author’s Formation

**Table 3: Johansen Fisher Panel Co-integration Test**

<table>
<thead>
<tr>
<th>Hypothesized N of CE (s)</th>
<th>Fisher Stat* (From Trace Test)</th>
<th>Probability</th>
<th>Fisher Stat* (From Max-Eign Test)</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>99.60</td>
<td>0.0000</td>
<td>84.54</td>
<td>0.0009</td>
</tr>
<tr>
<td>At most 1</td>
<td>83.98</td>
<td>0.0010</td>
<td>83.98</td>
<td>0.0010</td>
</tr>
</tbody>
</table>

**Table 4: Pairwise Granger Causality Test**

<table>
<thead>
<tr>
<th>Pairwise Hypothesis</th>
<th>F-Statistic</th>
<th>Probability</th>
<th>Inference</th>
<th>Type of Causality</th>
</tr>
</thead>
<tbody>
<tr>
<td>LagHCR → LnHDI</td>
<td>2.32473</td>
<td>0.0344</td>
<td>Reject H₀</td>
<td>Uni-Directional</td>
</tr>
<tr>
<td>LnHDI → LagHCR</td>
<td>1.38529</td>
<td>0.2224</td>
<td>Accept H₀</td>
<td>No Causality</td>
</tr>
</tbody>
</table>

5.4. Granger Causality Test based on VEC Model

After applying the Pairwise Granger causality test, we then applied Granger Causality test based on VEC Model to obtain more accurate and efficient results. The Vector Error Correction Model holds great significance as it is capable of correcting any disequilibrium found in the data set and thus gives more accurate and efficient results. It tells us about the short run dynamics of the relationship between our desired variables, for instance, poverty reduction and economic development in the case of our study.
These results also imply that Poverty headcount ratio (a proxy for Poverty Reduction) directly effects HDI (an indicator for economic development) because the null hypothesis that states HCR does not Granger causes HDI, is also rejected in case of VECM. The Granger causality test based on VEC Model has been applied to all the panel variables collectively which gives the same results as, poverty reduction causing economic development. The lag interval on the basis of lag selection criterion has been selected as 10 lag intervals.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Chi-Sq</th>
<th>Lag Interval</th>
<th>Probability</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(Log HCR)</td>
<td>28.93629</td>
<td>10</td>
<td>0.0013</td>
<td>Reject H0</td>
</tr>
<tr>
<td>D(Log GINI)</td>
<td>21.62897</td>
<td>10</td>
<td>0.0171</td>
<td>Reject H0</td>
</tr>
<tr>
<td>D(Log GCF)</td>
<td>31.53556</td>
<td>10</td>
<td>0.0005</td>
<td>Reject H0</td>
</tr>
<tr>
<td>D(Log DCF)</td>
<td>15.99155</td>
<td>10</td>
<td>0.0999</td>
<td>Accept H0</td>
</tr>
</tbody>
</table>

Source: Author’s Formation

Hence Vector Error Correction model has also proved causality running from poverty reduction to economic development. The effect of other variables on economic development has also been expressed by VECM.

6. Conclusion and Recommendations
This study attempts to empirically study the long-run causal relationship between poverty reduction and economic development based on the econometric techniques for panel data; Panel unit root tests, Co-integration analysis, and Pairwise Granger causality test followed by VECM. Determination of the relationship between poverty reduction and economic development is very important for the countries because the development policies, to be implemented by any country, are highly influenced by this relationship. The results obtained from this study show the existence of the causal relationship running from poverty reduction to economic development. This finding will thus, lead to the formulation of policies aimed at alleviating poverty. For this reason, we conducted an empirical analysis to find the causality of this relationship for 26 developing countries for the period from 1994 to 2015.

Firstly this study reviews the theoretical evidence based on the causality between our two variables, HDI and Poverty headcount ratio provided in the initial section of this paper. Before applying Pairwise Granger Causality test among the variables, firstly panel unit root tests are employed followed by panel co-integration tests. Four different types of panel unit root tests when applied; Levin, Lin, and Chu, Im, Pesaran and Shin, PP–Fisher Chi-square statistic and ADF–Fisher Chi-square show that all the panel variables selected are stationary at first difference which means that they are integrated for order 1. The result of Johansen Fisher panel co-integration test reveals that the
selected variables, HDI, an indicator for economic development and headcount ratio, a proxy for poverty reduction are co-integrated thus confirming the theoretical link between the two. Then the Pairwise Granger Causality analysis revealed that poverty alleviation plays a causal role in economic development. And these results have also been confirmed by Granger Causality test based on VEC Model. Thus it is concluded that poverty reduction cause economic development for the selected developing countries.

Hence the first alternative hypothesis stating a unidirectional causality directing from poverty reduction to economic development has been proved by the empirical analysis that this study has employed. However, the second alternative hypothesis suggesting a bi-directional causality between poverty reduction and economic development has been rejected based on the empirical tests that this study has employed.

Investigating whether poverty reduction in India is accompanied by improvements in the quality of life or not, (Dreze & Sen, 2002) studied a steady reduction in poverty followed by substantial improvement in education, health, and their nutrition level. He concluded that poverty reduction that India has experienced in the past few years is followed by a better standard of living and economic growth thus giving rise to economic development. Hence, this study supports our study that poverty reduction has a significant enhancing effect on economic development by quoting the example of India. The evidence for the positive effect of poverty reduction on economic development has been deduced from the panel empirical analysis and proves to be a guideline for the policymakers, to formulate such policies that aim at efficiently allocating resources to fight poverty.

The public expenditure should be designed to be explicitly pro-poor, for instance increasing the expenditures on health and education. When we will invest in children in the form of the providence of good education, proper health, and nutrition, we are basically investing in our future generation and through this, we are hindering the widespread transmission of intergenerational poverty. This will result in higher productivity thus causing greater growth. Innovation is indeed stimulated by higher rates of better education quality.

So we should employ more and more resources to curb poverty, thus leading to higher economic development.
APPENDIX

Table 1: List of Selected Countries

<table>
<thead>
<tr>
<th>Code</th>
<th>Country Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Armenia</td>
</tr>
<tr>
<td>2</td>
<td>Belarus</td>
</tr>
<tr>
<td>3</td>
<td>Bolivia</td>
</tr>
<tr>
<td>4</td>
<td>Brazil</td>
</tr>
<tr>
<td>5</td>
<td>Bulgaria</td>
</tr>
<tr>
<td>6</td>
<td>Colombia</td>
</tr>
<tr>
<td>7</td>
<td>Costa Rica</td>
</tr>
<tr>
<td>8</td>
<td>Dominican Republic</td>
</tr>
<tr>
<td>9</td>
<td>Ecuador</td>
</tr>
<tr>
<td>10</td>
<td>El Salvador</td>
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<tr>
<td>11</td>
<td>Georgia</td>
</tr>
<tr>
<td>12</td>
<td>Honduras</td>
</tr>
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<td>13</td>
<td>Indonesia</td>
</tr>
<tr>
<td>14</td>
<td>Kazakhstan</td>
</tr>
<tr>
<td>15</td>
<td>Russia</td>
</tr>
<tr>
<td>16</td>
<td>Kyrgyz Republic</td>
</tr>
<tr>
<td>17</td>
<td>Mexico</td>
</tr>
<tr>
<td>18</td>
<td>Moldova</td>
</tr>
<tr>
<td>19</td>
<td>Argentina</td>
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<tr>
<td>20</td>
<td>Panama</td>
</tr>
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<td>21</td>
<td>Paraguay</td>
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<td>22</td>
<td>Peru</td>
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<td>Romania</td>
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<td>24</td>
<td>Ukraine</td>
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<td>25</td>
<td>Thailand</td>
</tr>
<tr>
<td>26</td>
<td>Turkey</td>
</tr>
</tbody>
</table>

References


Olinto, P., Beegle, K., Sobrado, C., & Uematsu, H. (2013). The state of the poor: Where are the poor, where is extreme poverty harder to end, and what is the current profile of the world’s poor. *Economic Premise*, 125(2).


