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Poverty Across the Globe: A Cross-Sectional Analysis of the Underlying Causes

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ABSTRACT

This paper examines the determinants of poverty using a cross section of 50 countries for 2012. The dependent variable is the poverty headcount ratio, which is defined as the percentage of the total population living on less than US $1.90 per day, calculated based on 2011 international prices. The independent variables investigated are divided into two categories: economic and health. Results of the ordinary least squares (OLS) regressions reveal that the most significant variables are the unemployment rate and the percentage of the population with access to an improved drinking water source, which are each significant at the 1% level. The estimated coefficient on the unemployment rate is 0.05, suggesting that for every one-unit increase in this variable, the poverty rate will increase by 0.05%. The estimated coefficient on the percentage of the population with access to an improved drinking water source is -0.58, suggesting that for every one-unit increase in this variable, the poverty rate will decrease by -0.58%.

Keywords: developing countries; development; unemployment;

INTRODUCTION

In 2001, world leaders gathered at the United Nations' Millennium Summit and adopted a plan of action to reduce extreme poverty, with deadlines being set in 2015. These Millennium Development Goals address many different dimensions of poverty, and overall, the success of the plan has far exceeded expectations. In just the 20 years between 1990 and 2010, the percentage of the world population living below the extreme poverty line of US $1.90 per day was cut in half, five years ahead of schedule. Much of this success is due to a number of UN support programs which tackle issues like career counseling, raising wages in the agriculture industry, literacy training, job skills training, and world hunger.

Although world poverty has steadily declined over the past few decades, there are still countries with a high percentage of individuals living below the poverty line. The central problem is not the total percentage of poverty-stricken individuals, but the inequality of wealth between different regions. For example, data indicate that the poverty headcount ratio in the African nation of Madagascar is 77.84% compared to the European nation of Czech Republic, which has a poverty headcount ratio of 0.06%. Among the 50 countries observed in this research, six countries have poverty rates of 25% or higher, and four out of the five highest poverty rates belong to African countries.

It is important to note that this study uses an absolute poverty line as opposed to a relative poverty line. In their research on poverty in developing countries, Garroway and de Laiglesia (2012) discuss the differences between absolute and relative poverty. Absolute poverty lines are based on the cost of a predetermined basket of goods and are best used to measure the extreme poverty of developing nations. In contrast, poverty in advanced countries is better assessed through relative poverty lines, which are set as a share of the average standard of living in the

country. Relative poverty lines better portray social inclusion, or lack thereof, in the country. Thus, because the majority of countries examined in this research are considered to be developing, an absolute poverty line of US $1.90 per day is the best approach for the analysis.

Literature Review

Lanjouw and Ravallion (1995) determined that there is a strong negative correlation between household size and household consumption or income. They used data from Pakistan as a benchmark for all developing countries. The results indicated that typically larger and younger households are poorer than older and smaller ones. However, Visaria (1980) examined poverty in Asian countries and found that the assumption that larger households are poorer is inconsistent. This study included economic, demographic, and human capital investment independent variables. The inconsistencies between Lanjouw and Ravallion (1995) and Visaria (1980) may be due in part to a utility-identification problem within families, which neither study addresses. In other words, different members of a household have different needs. Therefore, distinguishing between adult and child welfare may be important to consider when assessing the relationship between poverty and household size.

In a study by Benfield (2008), data on individual households was obtained from the Jamaica Survey of Living Conditions (JSLC) and tested for determinants of poverty. The focus of the variables in this study was mostly on the heads of households. Subcategories for independent variables included demographics, health and welfare, education of household head, occupation of household head, housing conditions, and ownership of assets. The study also compared the determinants of poverty on a subjective level to the determinants of poverty on an objective level. In other words, the author determined what causes households to classify themselves as poor and compared that to whether and why they actually were poor.

Cross-sectional poverty studies are sparse, and are usually limited to one region. For example, Adeyemi, Ijaiya, and Raheem (2009) examined Sub-Saharan African countries. They used cross-sectional multiple regression analysis to estimate the determinants of poverty in 48 Sub-Saharan African nations in 2003. Because of the unique characteristics of this region, Adeyemi et al. (2009) used independent variables such as HIV/AIDS, lack of access to safe water, and religious conflict. They found that all variables were statistically significant in explaining the increase in poverty in this region. However, outcomes of the variables indicating lack of access to healthcare services, lack of access to Western education, and the poor state of the environment did not match expectations and were relatively insignificant factors in explaining the rising poverty.

One of the few poverty studies that is not limited to a specific region is by Tsai (2006), in which cross-national research on 97 countries revealed a wide range of general determinants for poverty, both economic and non-economic. The theories examined were economic development and openness, geographic and demographic disadvantages, regime characteristics and war, and social policy and human capital enhancement. In this study, poverty was defined as living below an income of US $1.00 or $2.00 per day. Ridge regression modelling was used, and the results revealed that tropics, landlockedness, population growth, and secondary schooling opportunity were all significant determinants of a country's poverty rate. Political factors such as war, democracy, and military spending were weak predictors. No evidence was found to support economic openness as an important factor.

My research expands upon this existing literature by using recent data from 2012 and by including countries from four diverse regions: Europe, Asia, Africa, and the Americas. A complete list of all countries included in this study can be found in Table 1. The inclusion of countries from different

regions is important in understanding factors that impact poverty as a whole. For example, a determinant of poverty for a region with unique characteristics such as Sub-Saharan Africa may not be a significant determinant in another region such as Central America. My study identifies underlying causes of poverty on a global level, which helps in creating worldwide poverty reduction programs. The results of this study could guide policymakers by drawing attention to the most significant factors contributing to the poverty rate such as the unemployment rate, access to an improved drinking water source, and access to an improved sanitation source. In order to reduce poverty, global policymakers and organizations such as the United Nations should consider making these issues their main focus.

Table 1: List of Included Countries

Albania	Congo, Dem. Rep.	Guinea	Lithuania	Phillipines
Argentina	Costa Rica	Haiti	Madagascar	Romania
Armenia	Croatia	Honduras	Mauritius	Slovak Republic
Bhutan	Czech Republic	Hungary	Mexico	Sri Lanka
Bolivia	Djibouti	Indonesia	Moldova	Tajikistan
Brazil	Dominican Republic	Kazakhstan	Mongolia	Thailand
Bulgaria	Ecuador	Kosovo	Montenegro	Turkey
Cambodia	El Salvador	Kyrgyz Republic	Panama	Uganda
China	Estonia	Lao PDR	Paraguay	Uruguay
Colombia	Georgia	Latvia	Peru	Vietnam

METHODS

The sources of my data are heavily influenced by Ferreira and Ravallion (2008). The first similarity is the use of the World Bank's standard poverty line, which was, as of 2011, US $1.90 a day. The Bank obtains their data from household surveys and uses purchasing power parity (PPP) exchange rates for consumption and the country's consumer price index (CPI) to convert the poverty line into local currency. The PPP exchange rate adjusts for the fact that the prices of goods vary from country to country, and the CPI adjusts for inflation. Also similar to Ferreira and Ravallion (2008), I used the World Bank's headcount index as my dependent variable, POVERTY. This index indicates the ratio of individuals with a household per capita income below the standard poverty line to the country's total population. All other data for this research was also obtained from the World Bank, and it is based on household surveys. I chose to use 2012 data because this year provided the poverty headcount index for 50 different countries, which was the largest sample available.

Independent Variables and Hypotheses

The independent variables are grouped into two categories for simplicity: economic and health. In the economic group, LNUNEMP is the natural log of the unemployment rate. I chose to take the natural log of this variable to adjust for skewed data and to normalize the distribution. Visaria (1980) first suggests that unemployment is a luxury that poor people cannot afford, and proceeds to examine this hypothesis. His results refute this assumption as further research shows that there is a strong positive correlation between poverty and unemployment. Therefore, I expect the sign of LNUNEMP to be positive. Also, in the economic group is POPDENS. This is the population density per square mile in each country. Many people in a small area of land could raise sanitation and health concerns, which lead to higher poverty rates. In addition, since more people typically means fewer resources per person, I expect the sign to be positive.

Table 2: Description of Variables and Expected Signs

Variable	Description	Expected Sign
Dependent		
POVERTY	The percentage of the population living on less than US $1.90 a day in 2012. *World Bank.*	**N/A**
Independent		
	Economic	
POPDENS	Midyear population divided by land area in square kilometers in 2012. *World Bank.*	**(+)**
LNUNEMP	The natural log of the percentage of the labor force that is without work but available for and seeking employment in 2012. *World Bank.*	**(+)**
	Health	
INFMORT	The number of infants dying before reaching one year of age, per 1,000 live births in 2012. *World Bank.*	**(+)**
LIFEEXP	The number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life in 2012. *World Bank.*	**(-)**
LNWATER	The natural log of the percentage of the population using an improved drinking water source in 2012. *World Bank.*	**(-)**
LNSANIT	The natural log of the percentage of the population using improved sanitation facilities in 2012. *World Bank.*	**(-)**

In the health group of explanatory variables, INFMORT is the infant mortality rate in each country. I expect the sign of this variable to be positive. LIFEEXP is the average number of years a person is expected to live in each country, and I expect it to have a negative sign. The rationale behind the hypotheses for these two variables is that countries with below average living conditions and shorter lifespans tend to have higher poverty rates. LNWATER is the natural log of the percentage of the population with access to an improved drinking water source, and LNSANIT is the natural log of the percentage of the population with access to an improved sanitation source. I chose to use the natural logs of these variables to remain consistent with Adeyemi et al. (2009). The signs of both variables should be negative. A complete list of variables, descriptions, and expected signs can be found in Table 2.

Descriptive Statistics

Table 3 presents the maximum, minimum, mean, and standard deviation of each of my variables. The highest poverty headcount ratio is Madagascar at 77.84%, while the lowest is Czech Republic at 0.06%. The mean poverty headcount ratio is 10.12%, and the standard deviation is 17.74%. Based on these statistics, it is apparent that there are some outliers in the sample on both the low end and the high end. According to the data, countries in Africa and Latin America have higher poverty rates, while countries in Europe generally have lower poverty rates. POPDENS has a particularly large standard deviation, so there is a possibility that there are outliers within this series as well.

Table 3: Descriptive Statistics of the Sample

Variable	Maximum	Minimum	Mean	Standard Deviation
Dependent				
POVERTY	77.84	0.06	10.12	17.74
Independent				
POPDENS	618.66	1.81	105.88	116.37
UNEMP	0.196	0.002	0.075813	0.047216
INFMORT	80.50	2.90	21.38	17.51
LIFEEXP	79.05	57.10	71.71	5.42
WATER	1.00	0.487	0.892265	0.130853
SANIT	0.991	0.116	0.754653	0.239870

Econometric Model

This study utilizes ordinary least squares (OLS) regression analysis to investigate the determinants of poverty in 50 countries. The general model is shown below.

$$POVERTY_i = \propto + \beta_1 ECON_i + \beta_2 HEALTH_i + \epsilon_i$$

where ECON includes POPDENS and LNUNEMP and HEALTH includes LIFEEXP, INFMORT, LNWATER, and LNSANIT. The estimated coefficient, β_i , is used to measure the impact of the independent variable on the dependent variable. The stochastic error term, ϵ_i , is included to account for any variation in the dependent variable that is not explained by the included independent variables. So as not to violate Classical Assumption II, a constant, $\propto$, is included to absorb any nonzero means of the observations of the error term (Studenmund 2011).

A violation of Classical Assumption VI was of concern due to multicollinearity between LIFEEXP and INFMORT. This issue was addressed with the decision to use two separate models. The purpose of the two models is to identify which of these two independent variables has a greater correlation with the poverty rate, and to examine how the signs and levels of significance of the other independent variables are affected. Model 1

includes INFMORT, but LIFEEXP is omitted from the equation. Model 2 includes LIFEEXP, but INFMORT is omitted from the equation.

After obtaining regression results for the above models, I then tested each model for heteroskedasticity by using the White test. The results showed that both of the models were heteroskedastic, which is a violation of Classical Assumption V. Therefore, I corrected the models with White heteroskedasticity-consistent standard errors.

RESULTS

The results of both models are shown in Table 4. In Model 1, LNUNEMP is significant at the 1% level, LNSANIT is significant at the 5% level, and LNWATER is significant at the 10% level. POPDENS and INFMORT are not significant. The adjusted R-squared is high for cross-sectional data at 0.835131, and the R-squared is 0.852670, indicating that the regression line is a good fit to the data. The signs of all variables are as expected.

In Model 2, LNWATER is significant at the 1% level, and LNUNEMP and LNSANIT are significant at the 5% level. POPDENS and LIFEEXP are not significant. These results are consistent with existing literature, especially with Adeyemi et al. (2009). LNSANIT and LNWATER both are negatively correlated with the poverty headcount ratio. This is to say that the lower the percentage of people with access to improved drinking water and sanitation sources, the higher the poverty rate will be. INFMORT has a positive sign, as expected, and LIFEEXP has a negative sign, as expected. LNUNEMP has a positive coefficient, which is consistent with the findings of Visaria (1980). As the unemployment rate increases, the poverty headcount ratio increases. The substitution of LIFEEXP for INFMORT in Model 2 has little effect on the R-squared and adjusted R-squared, as they are very similar to those of Model 1.

Table 4: OLS Regression Results

Variable	Model 1	Model 2
POPDENS	2.24E-05 (0.402876)	2.35E-05 (0.395714)
LNUNEMP	0.049914*** (2.974432)	0.047023** (2.398346)
INFMORT	0.307609 (1.495942)	
LIFEEXP		-0.001772 (-0.464712)
LNWATER	-0.427634* (-1.757864)	-0.576906*** (-2.763119)
LNSANIT	-0.133017** (-2.490455)	-0.53168** (-2.431695
CONSTANT	0.075195* (1.755488)	0.231493 (0.773205)
R^2	0.852670	0.828489
Adjusted R^2	0.835131	0.808071

Parentheses contain t-statistics based on White heteroskedasticity-consistent standard errors; Significance levels: *** at 1%, ** at 5%, * at 10%.

F-tests were run on both the economic and health groups to determine their joint significance. The results indicate that each group is jointly significant at the 5% level.

Further Analysis

In regards to interpretations of the signs and significance levels, it is important to point out that OLS regression shows correlation between the dependent and independent variables, but does not necessarily imply causation. Expanding the sample to include multiple years would help to address this issue. Other statistical techniques such as a Granger Causality test could then be applied to determine if there is a true causal relationship present. Furthermore, the existence of omitted variable bias could contribute to a causality concern if an omitted variable is influencing an independent variable and/or the dependent variable.

Although POPDENS, LIFEEXP, and INFMORT are statistically insignificant in the models, F-tests indicate that they should be included. I grouped the two economic variables together (POPDENS, LNUNEMP), the four health variables together, (INFMORT, LIFEEXP, LNWATER, LNSANIT) and conducted F-tests for each grouping. The equation that restricts the economic group shows an F-value of 7.43, which exceeds the 5% critical value of 3.23. Therefore, these variables should be included in the model. An F-value of 15.55, which exceeds the 5% critical value of 2.61, indicates that the health group is also essential to the model.

Due to concerns about endogeneity relating to Classical Assumption III, Hausman (1978) t-tests were run for the LIFEEXP and INFMORT variables. The results indicate that neither LIFEEXP nor INFMORT are correlated with the error term. Thus, there is no endogeneity bias present in the estimated coefficients of these variables for OLS.

DISCUSSION

The results of this study indicate that numerous factors have a strong influence on a country's poverty headcount ratio. The unemployment rate in Model 1 is the most significant factor in explaining the poverty rate, and access to an improved drinking water source is the most significant variable in Model 2. The use of separate models for LIFEEXP and INFMORT is supported because, although these two variables are insignificant, the substitution of one for the other influences the significance levels of the other independent variables included in the models. All signs are as expected, and are consistent with the literature (Adeyemi et al. 2009; Visaria 1980) and with the initial hypotheses.

Policy Implications

Reducing unemployment in developing countries depends on both supply and demand of labor. Specifically, increasing the supply of high-skilled laborers and limiting the supply of low-skilled laborers will better meet demand and substantially reduce the unemployment rate. Turnham and Erocar (1990) suggest that education programs should be targeted at low-income young adults who, without the necessary skills for full-time employment, often settle for casual work. They also recommend a reform of migration policies to better control labor force growth.

There are already several programs in partnership with the United Nations Development Programme (UNDP) that have been successful thus far in reducing the unemployment rate. India's Mahatma Gandhi National Rural Employment Program supports landless laborers and marginal farmers by promoting the law passed in 2005 that guarantees them a minimum of 100 paid work days per year (United Nations Millennium Project 2016). In Brazil, the UNDP partnered with Natura Cosméticos in providing sales, computer, and customer service training to over 75,000 low-income sales representatives (United Nations Millennium Project 2016).

As demonstrated by the model, LNWATER and LNSANIT are both significant and negatively correlated with the poverty rate. Funding and support should be directed towards aid for increasing the availability of improved drinking water and sanitation sources. This, too, has been a focus of the UN Millennium Development Goals. Between 1990 and 2015, the percentage of the global population using an improved drinking water source increased from 76% to 91%. However, with over 663 million people still without access, there is room for growth.

My research indicates that the unemployment rate, access to an improved drinking water source, and access to an improved sanitation source are significant factors contributing to the poverty rates of diverse countries across the world. Since most of the development programs, especially those related to unemployment, exist only on a national level, the next step is to expand into other poverty-stricken countries and to develop programs on a global level. This strategy will work faster and more effectively at not only helping to reduce the poverty rates of individual countries, but also the world poverty rate.

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