

Causes of Human Population Growth: A Quantitative Study

Mohammad Alshalalda

Faculty sponsor: Dr. Andrew Ziegler

Department of Political Science

Abstract

This study employed a quantitative and comparative data to examine the factors that correlate to population growth. The study was conducted using the Microcase global file (Le Roy, 2013).

The major findings were that social factors—such as education, child marriage, contraception use, and religion—correlate most strongly to population growth. Educated couples tend to have fewer children. People who are more religious tend to have more children. Economic variables, such as GDP per capita are influential, but not as much as the social variables. A political variable, political stability, has the weakest correlation to population growth.

As policy makers in different countries pursue their agendas in regard to population growth, these findings may be useful to achieve the desired results efficiently. For a government that wants to increase population, this research identifies factors that have the strongest link to population growth. The research findings may also be valuable to governments that wish to reduce population.

Introduction

In the last two centuries, population growth has been an important subject for policy makers internationally, as the world witnessed a significant increase in the population. The human population is growing by about 83 million annually. According to the UN Department of Economic and Social Affairs, human population grew from one billion in 1800 to about 7.5 billion in 2018, and it is expected to reach about 11 billion by 2100 (“World” 2018). Many nations with high population growth have low standards of living, and many nations with low population growth have good standards of living. Intellectuals have debated this matter: Some warn of severe consequences, and others argue that people will be able to deal with the problems.

One of the prominent early intellectuals to warn of population growth was Thomas Malthus (1798). Malthus was an English scholar, influential in the fields of demography and political economy. In his influential book *An Essay on the Principle of Population*, published in 1798, Malthus argued that population grows geometrically, whereas food supplies grow arithmetically. At some point, the food production will not meet the needs of the population, leading to massive famines that will kill millions of people. Despite the remarkable progress that people have made so far, poverty is still prevalent. As

stated by the Food and Agriculture Organization of the UN, 925 million people go hungry every day (“925 Million” 2010).

Other intellectuals, such as Ester Boserup, opposed Malthus’s views (1965). Boserup was a prominent French and Danish economist. While Malthus (1798) said that the growth of population depends on agricultural methods and food supply, Boserup (1965) argued the opposite: Agricultural methods depend on the size of population. In the view of Malthus, when the food supply is insufficient, the excess population will die. Boserup's counter argument was that people under pressure will always find ways to increase food production.

Population growth is regarded as one of the biggest threats to the environment. People use fossil fuels to power their machinery; population growth means higher demand for gas, oil, and coal. When these fuels are burned, more carbon dioxide is emitted to the atmosphere, leading to global warming. Moreover, increased population means more consumption of non-renewable resources, which will cause conflict for future generations.

Population grows at different rates in different countries because of factors like birth rate, mortality rate, fertility rate, and net migration. Fertility rate and birth rate can be influenced by social factors, including religion, race, level of education, access to abortion and contraceptive methods, child labor, immigration, social security for elders, the cost of raising children, and government programs to support or discourage childbearing.

Population growth comes with substantial economic, social, and political implications. For instance, low-income countries do not produce enough food to match their population growth, leading them to be more dependent on expensive grain imports and thus to incur more debt. In addition, rapid population growth leads to slow economic development, which widens the gap between poor and rich people and nations. For example, unemployment grows at a higher rate in less developed countries because of the increase in the working-age population. Unemployment contributes to higher rates of alienation and crime, thus greater social problems. Finally, fast population growth makes it hard for governments to maintain adequate public services for everyone. In countries where people are struggling for employment opportunities and public services, conflict is more likely to arise, causing more instability.

Population growth increases the likelihood of poverty, conflict, extremism and destruction of the ecological system. This research aims to provide a better understanding of the problems, ascertaining different factors that affect the growth of population, and recommends policy measures and grassroots solutions to resolve the issue. Quantitative methods are used in this research. Data on 177 countries will be used from the Global file of MicroCase (Le Roy 2013). To address the issues discussed above, this research examines the following research question: “What are the factors that correlate to population growth in different countries?” The paper is organized into sections on literature review, methodology, and findings and analysis.

Literature Review

The topic of overpopulation has been controversial. Some scholars express acute concern about this phenomenon and consider it a big problem. Scholars such as Thomas Malthus (1798) and Paul R. Ehrlich (1968) have argued that overpopulation leads to famine

and starvation. Other scholars regard overpopulation as a major cause of environmental crises, and even more consider it a cause of poverty and low standards of living

On the other hand, some scholars have taken the opposite stance on the issue. For instance, Ester Boserup (1965) was one of Malthus's biggest opponents, arguing that humans have a great capacity to adapt to changing conditions and will always find the means to fulfill their needs. In 1981, Julian Simon published the *Ultimate Resource*, in which he agreed with Boserup. Others argued that the famines of the past century occurred because of poor management of resources, not a lack of resources.

Recently, fewer scholars express concern about overpopulation, perhaps because of credible predictions that the population will fall at some point in this century. Japan, South Korea, Romania, and other countries are examples of falling birth rates. Furthermore, policies put in place to counter overpopulation have brought criticism, as some of these policies deprived people of their personal freedom. Overall, scholarly perspectives on overpopulation can be divided into two schools of thought: "overpopulation is a problem," and "overpopulation is not a problem."

Overpopulation Is a Problem

Malthus (1798) claimed, "Population, when unchecked, increases in a geometrical ratio. Subsistence increases only in an arithmetical ratio. A slight acquaintance with numbers will shew[sic] the immensity of the first power in comparison of the second" (12). This quotation from *An Essay on the Principle of Population* articulates Malthus's essential point: Population increases geometrically, but food production grows arithmetically. Therefore, population growth has to be checked. Otherwise, food production will lag behind the population's needs, which will lead to famine and starvation.

One of the most prominent neo-Malthusians in the 20th century was Paul Ehrlich (1968), the Bing Professor of Population Studies at Stanford University and president of Stanford's Center for Conservation Biology. In 1968, he and Anne H. Ehrlich, his wife, published the best-selling book *The Population Bomb*. The book warned of massive starvations in the 1970s and 1980s, and called for immediate action to limit population growth. The book attracted criticism for its inaccurate predictions and alarmist tone. The Ehrlichs manifested their pessimism in this statement: "the battle to feed humanity is already lost, in the sense that we will not be able to prevent large-scale famines in the next decade or so" (Ehrlich 1968, 36). That prediction led them to call for reducing population growth to zero or even a negative rate. The Ehrlichs' claims were even more dire than Malthus's, but the primary concern of both was famine.

The factors affecting fertility rate can be either economic or social, such as education level and religion (Ermisch 1983). Ermisch discussed the social implications of overpopulation. One of his main points was that poverty can be a cause of overpopulation and a result at the same time. He explained how a large family could mean a lower standard of living because parents with many children may struggle to provide a good life for the family. Ermisch argued that a large working-age population could mean higher unemployment, thus a greater burden on the government to provide enough jobs and public services for the whole population. Unemployment, in turn, has negative consequences, such as the rise of conflict and higher crime rates.

The concern of environmentalists has been the consequences of human overpopulation for the environment. Carl Reidel (1988), the Daniel Clarke Sanders

Professor of Environmental Studies and the director of the Environmental Program at the University of Vermont, argued that overpopulation is one of the most pressing environmental issues. In his thinking, overpopulation drives environmental pollution, global warming, intensive farming practices, the sixth mass extinction, and the consumption of non-renewable resources, such as arable land, fossil fuels, and freshwater. The solution he proposed is to implement a global birth control strategy (Reidel 1988).

Overpopulation Is Not a Problem

Despite the negative predictions of the consequences of human overpopulation, many have presented optimistic views and promising scholarly predictions. In response to Malthus's views (1798), Boserup (1965) argued in her book *The Conditions of Agricultural Growth* that the intensity of agricultural production is driven by population change. She endorsed the adage that "necessity is the mother of invention," asserting that people's needs will drive them to come up with efficient means of food production.

People have the capacity to handle the demands of overpopulation, wrote Julian Simon (1981), formerly a professor of business administration at the University of Maryland. He devoted his book *The Ultimate Resource*, published in 1981, to this proposition. He argued that "the most important benefit of population size and growth is the increase it brings to the stock of useful knowledge. Minds matter economically as much as, or more than, hands or mouths" (Simon 1981, 12). From his perspective, population growth creates more resources. The resource of more brains means more innovative production.

Moreover, the Ehrlichs' prediction of famines due to human overpopulation turned out to be false, according to Dan Gardner (2010), a *New York Times* best-selling author about psychology and decision-making. The Ehrlichs (1968) warned that famines would kill hundreds of millions in the 1970s, but such famines did not come to pass. These predictions received much criticism; however, Paul Ehrlich continued to take same stance, that if population growth is not controlled, famines will happen sooner or later (Gardner 2010).

It used to be believed that world population would continue to grow forever, and that is why many scholars advocated measures to slow its growth. However, the case seems to be different today, and for various reasons birth rates are falling in different parts of the world. Eastern Europe and Japan make good case studies. Billingsley (2010) explained the fertility decline in eastern Europe as a result of urbanization and attainment of education, particularly female education (13). Citing the *Independent*, Simon (2017) asserted that the number of births in Japan dropped by a million in 2016 only. Patrick Imam (2013) discussed the problems associated with this decline and described how the decline has already affected different sectors of Japanese life, especially the economic sector. He also reported on the government's struggles in its attempts to resolve this issue, a critical problem for Japan.

Furthermore, policies to counter overpopulation have garnered criticism, as some of these policies violated human rights, such as China's one-child policy. That policy, according to Connie Oxford (2017), violated the right of self-determination. People were subject to punitive fines when they had more than one child. Sterilization and forced abortion were not uncommon practices. When parents learned their unborn child was female, they often sought abortion, which led to a wide gender imbalance in China

(Oxford 2017). Whether China did the right thing by this policy is debatable. The policy prevented 400 million births according to Parkinson (2015). Some see the policy as a favor that China did for the world, and others see it as a human rights violation.

Summary

The topic of human overpopulation is complicated and therefore widely debatable. This topic is not new in international politics: It was brought up over 200 hundred years ago. Thomas Malthus (1798) was one of the first scholars to open the debate. He warned of massive famines if the population continued to grow in the same pattern. Other prominent scholars disagreed and argued that more population meant more creativity and more efficient means of food production. These scholars believed that people have the capacity to handle such a problem. Furthermore, birthrates are falling in places such as Eastern Europe and Japan. Some scholarly predictions show that world population will reach its peak in this century and start to decline, which raises its own concerns.

To explore the causes of human population growth, the next section will examine several variables and their correlation to population growth.

Methodology

This section presents the methodology used to answer the research question: “What are the factors that affect human population growth?” The dependent variable chosen for this study from the Microcase Global File is the average annual population growth from 2000 to 2005, labeled (Pop Growth) in this database. The seven independent variables chosen for this study are the following: mean years of school among 25year-olds (Education); percentage of children in child marriage (Kid Wed); percentage of women using contraception (Contracept); percent of those who say that they get comfort and strength from religion (Religion Comfort); the globalization index, which measures the overall average level of economic, political, social, and technological engagement across nation-state borders (Global); GDP per capita based on purchasing power parity (GDPCAP PPP); and environmental governance, institutions, political stability, and absence of violence (Stable.Pol). In order to answer the research question, this study will use the Global file from the MicroCase software (Le Roy 2013).

Concepts and Variables

To help define population growth as the dependent variable, this research uses POP GROWTH, variable 33 from the Global file. The variable has a ratio level of measurement and gives the average annual population growth rate, by country, from the year 2000 to 2005. The variable provides data on 172 countries and is the only dependent variable.

The chosen independent variables will help explain why human population grows at different rates in different countries. The following variables were selected: education, religion, child marriage, contraceptive use, globalization index, GDP per capita, and political stability. These variables will be further analyzed below. The numbers in parentheses are the variable numbers for the Microcase Global data file.

Social Variables

1. (404) EDUCATION shows the mean years of school among adults 25 and older in 165 different countries. The data are presented based on a range of 0.16 - 0.99. Higher rank means more years of school.
2. (385) KID WED gives information on the percentage of children in child marriage in 64 countries. The data are presented based on a range of 5 - 65. Higher rank means more cases of child marriage.
3. (109) CONTRACEPT measures the percentage of women who use contraception in 116 different countries. The data are presented based on a range of 4.0 - 84.0. Higher rank means more contraceptive use.
4. (458) RELIGION COMFORT presents the percentage of those who say that they receive comfort and strength from religion in 77 different countries. The data are based on a range of 27.1 - 100.0. Higher rank means a higher percentage of people who gain strength and comfort from religion.

Economic Variables

5. (272) GLOBAL provides information on the globalization index of countries. The globalization index measures the overall average level of economic, political, social, and technological engagement across nation-state borders. The data are presented based on a range of 7.25 - 56.00. Higher rank means greater globalization.
6. (138) GDPCAP PPP provides information on countries' GDP per capita based on purchasing power parity (PPP). The data are presented based on a range of 496 - 57741. The value reflects the actual GDP of a country.

Political Variables

7. (261) STABLE.POL gives information on the nature of governance and institutions in a country based on the country's political stability. The data is presented from worst governance to best on a range of 0.58 - 100.00. Higher rank means better governance.

Hypotheses

Social Variables

Hypothesis 1: There is a negative relationship between population growth and education. Educated couples tend to want fewer children than those who are less educated.

Hypothesis 2: There is a positive relationship between population growth and child marriage.

Hypothesis 3: There is a negative relationship between population growth and contraceptive use.

Hypothesis 4: There is a positive relationship between population growth and the degree of comfort derived from religion.

Economic Variables

Hypothesis 5: There is a negative relationship between population growth and the level of globalization.

Hypothesis 6: There is a negative relationship between population growth and GDP per capita.

Political Variable

Hypothesis 7: There is no relationship between population growth and political stability.

Research Method

This research is based on secondary analysis from the Global file, which covers data on 172 countries. In conjunction with the *Methods in Political Science: An Introduction to Using Microcase* (Le Roy 2013), the data was compiled in the Microcase program. In the file, 483 variables are based on answers to survey questions given to survey takers.

This analysis uses scatterplot graphs to depict the relationship between dependent and independent variables in each country. The dependent variable goes on the y-axis (vertical), and the independent variables is placed along the x-axis (horizontal). In the analysis, a regression line will represent the direction of the relationship, whether it is negative or positive. The more points near the regression line, the stronger the relationship.

In addition, to distinguish the strength of the relationship between the independent and dependent variables, the researcher calculated statistical significance, the probability of the relationship occurring by chance. If the probability is less than 0.05, then the relationship is considered statistically significant as there is less than a 5% chance that the relationship occurred by chance.

In addition to probability, the researcher has determined the strength of these relationships by the measure of association, which is dependent on the specific variable. All chosen variables have the ratio measurement; therefore, they are measured using Pearson's correlation coefficient. If Pearson's is less than 0.25, the relationship between the variables is too weak to be meaningful. If it is between 0.25 and 0.34, the relationship is weak. If it is between 0.35 and 0.39, the relationship is moderate. If Pearson's is 0.40 or above, the relationship is strong.

Findings and Analysis

The following analysis tests all the hypotheses presented in the methodology section. Following the tests, all of the findings will be analyzed and presented in this section. Based on all of the statistical findings, the researcher has determined whether the hypotheses are supported or not supported by the data.

Social Variables

Population Growth by Education

The first hypothesis proposes a negative relationship between population growth and level of education. In Figure 1, the scatterplot shows population growth, the dependent variable, along the y-axis. The regression line indicates a negative relationship between the two variables. To examine statistical significance, the probability value (prob)

was found to be 0.00, which means that the relationship between population growth and education level is statistically significant.

The Pearson's correlation coefficient is -0.627, indicating a strong negative relationship between the two variables. It is not surprising that such high correlation exists between these two variables. The reasons for such a result will be discussed below.

Figure 1 shows that, in countries where people are highly educated, birth rates tend to be low. Western European countries, such as Germany and Finland, have low birth rates and also a high level of education among adults. Couples in countries like Mali and Niger have fewer years of education among adults, thus higher birth rates. On the other hand, countries like United Arab Emirates and Qatar are outliers, having a good level of education but the highest population growth; one of the main reasons may be the high immigration into these two countries. If these two outliers were removed, r would increase from -0.627 to -0.699, making the relationship between the two variables stronger.

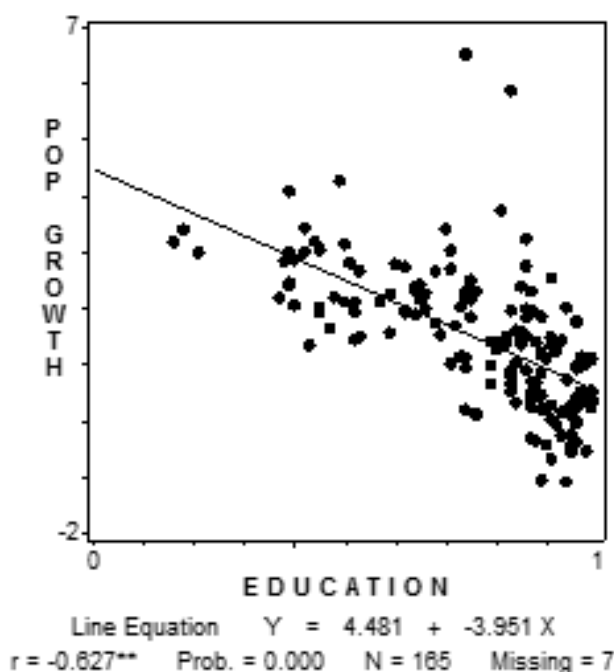


Figure 1: The Relationship Between Population Growth and Education

Population Growth by Child Marriage

The second hypothesis proposes a positive relationship between population growth and child marriage. Figure 2 supports this hypothesis. The graph shows that a higher rate of child marriage corresponds to a higher population growth. Chad and Mali have both a high rate of child marriage and high population growth. On the other hand,

South Africa and Thailand have low rates of child marriage and lower birth rates. Outliers include countries like Central African Republic and Trinidad and Tobago, which have high rates of child marriage but low population growth. Trinidad and Tobago has a low fertility rate, perhaps due to the high contraceptive use among women in the country. The Central African Republic has a high infant mortality rate, likely because of the lack of a good healthcare system.

Furthermore, Pearson’s correlation coefficient is 0.439. Since the value of r is above 0.40, the relationship between population growth and child marriage is strong. The probability is found to be 0.000, meaning that this relationship is statistically significant. If the two outliers mentioned above were removed from the plot, the value of r would jump from 0.439 to 0.534, indicating a much stronger relationship between the two variables.

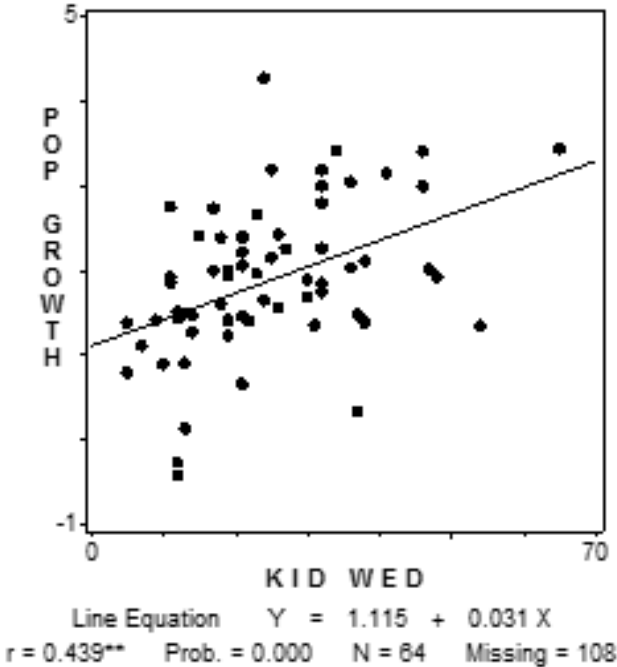


Figure 2: The Relationship Between Population Growth and Child Marriage

Population Growth by Contraceptive Use

The third hypothesis posits a negative relationship between population growth and contraception use. Figure 3 suggests the same result. The graph shows that countries with higher contraceptive use have lower population growth. China and the United Kingdom have the highest rate of contraceptive use, at 84, and they have among the slowest rates of population growth, with rates of 0.65 and 0.34 respectively. On the other hand, Gambia and Angola have some of the lowest measures of contraceptive use, 10 and 6 respectively,

along fast growing populations, growing at rates of 2.85 and 2.83. Outliers include Qatar and the United Arab Emirates, which were also outliers for the hypothesis linking more education to lower population growth rates. Both countries have moderate contraceptive use, yet the fastest growing populations, probably due to high immigration.

In addition, Pearson's correlation coefficient is 0.555, which implies a strong relationship between the two variables, population growth and contraception use. Probability is found to be 0.000, meaning that this relationship is statistically significant. If the two outliers mentioned above were removed from the plot, the value of r would jump from 0.555 to 0.599, yielding a much stronger relationship between the two variables.

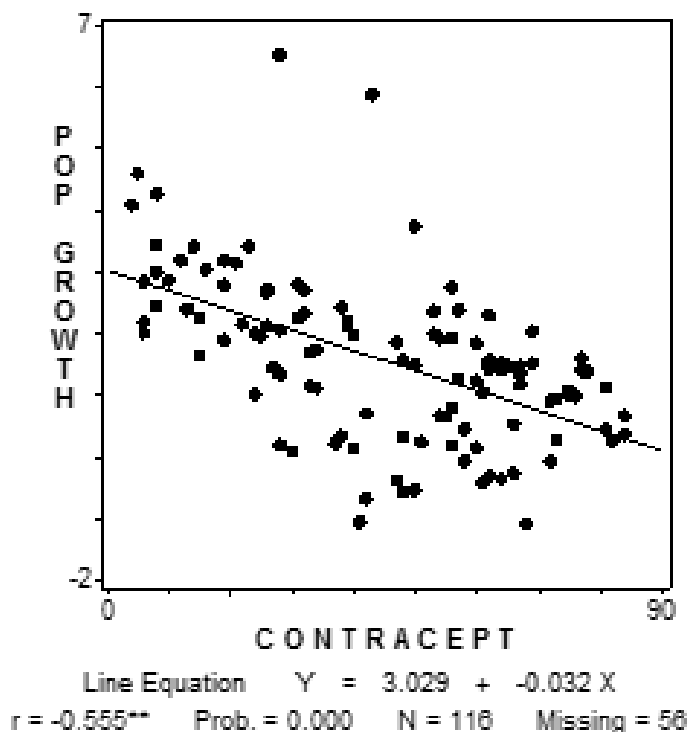


Figure 3: The Relationship Between Population Growth and Contraception Use

Population Growth by Religion

The fourth hypothesis predicts a positive relationship between population growth and religion. The results shown in Figure 4 seem to agree with the hypothesis. The graph shows that countries where people are more religious have higher population growth. Indonesia and Morocco are two countries with highly religious people and rapidly growing populations. Japan and the Czech Republic, two of the least religious countries, have very low population growth. Outliers include Vietnam, which ranks among the least religious

but still has a high population growth. In the case of Vietnam, it may be that, following the Vietnam War, people desired to make up for the millions of war casualties by having more children. In addition, the country used to be more agricultural, so people wanted more children to help with farming. However, recently, Vietnam has been developing rapidly and population growth has been declining.

Furthermore, Pearson’s correlation coefficient is 0.527, which implies a strong positive relationship between the two variables, population growth and contraception use. Probability is found to be 0.000, meaning that this relationship is statistically significant. If Vietnam, the outlier, were removed from the plot, the value of r would increase from 0.527 to 0.564, implying that religion has a strong link to population growth.

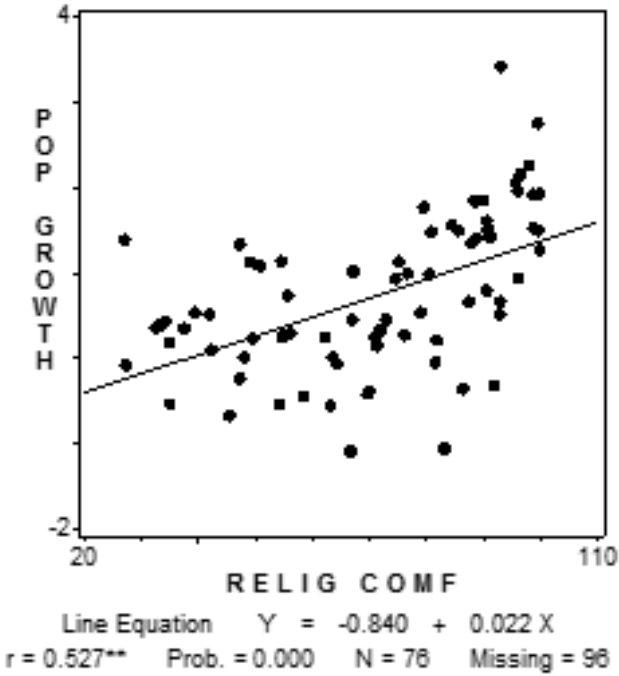


Figure 4: The Relationship Between Population Growth and Religion

Economic Variables

Population Growth by Globalization

The fifth hypothesis proposes a negative relationship between population growth and the level of globalization. Figure 5 supports the hypothesis. However, the relationship is not as strong as predicted. Overall, the graph shows that more globalized countries tend to have lower population growth. Austria and Netherlands have the highest level of

globalization on the graph, and both have low population growth. India and Indonesia have a low level of globalization and high population growth.

Outliers include Russia, which has a relatively low level of globalization yet has one of the lowest population growth rates. Russian culture may explain the deviation from the hypothesis: relatively high gender equality, the prevalence of working women, and a sense of the European lifestyle, in which couples want to enjoy the good things of life and make sure they can provide a good life and good education to their children. Ukraine and Uganda are two other outliers.

Pearson's correlation coefficient is -0.391 , implying a moderate negative relationship between the two variables. Probability is found to be 0.000 , which means that this relationship is statistically significant. If Russia, Ukraine, and Uganda were removed from the plot, the value of r would jump from -0.391 to -0.491 , and the relationship would be stronger.

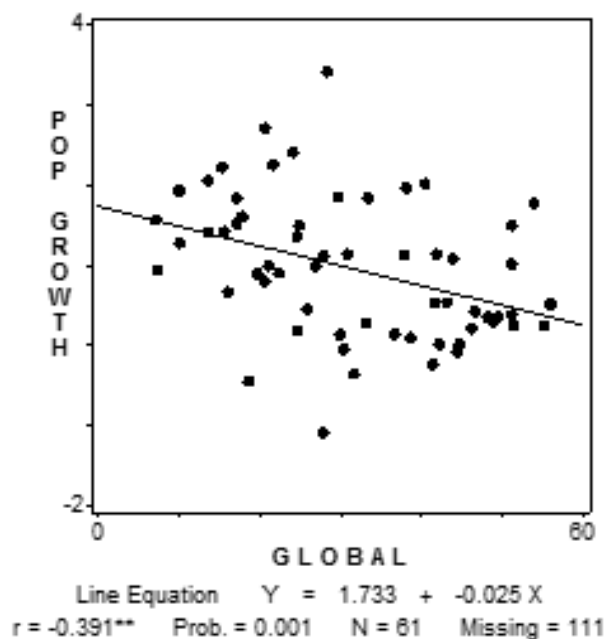


Figure 5: The Relationship Between Population Growth and Globalization

Population Growth by GDP Per Capita

The sixth hypothesis suggests a negative relationship between population growth and GDP per capita. Figure 6 tends to confirm the hypothesis. Points on the graph are concentrated along the y-axis, but overall the graph shows a negative relationship. Countries with high GDP per capita, such as Denmark, Norway, and Austria, have the lowest birth rates. Countries with low GDP, such as Zambia and Cameroon, have higher population growth. Outliers include Luxemburg, which has the highest GDP per capita yet

a population growth rate similar to that of Cameroon and Zambia. The reason for Luxembourg's population growth may be high immigration into the country.

Pearson's correlation coefficient is -0.398, indicating a moderate, almost strong negative relationship. Probability is found to be 0.000, which means that this relationship is statistically significant. If Luxembourg alone were removed from the plot, the value of r would shift from -0.398 to -0.435, and the relationship would be stronger.

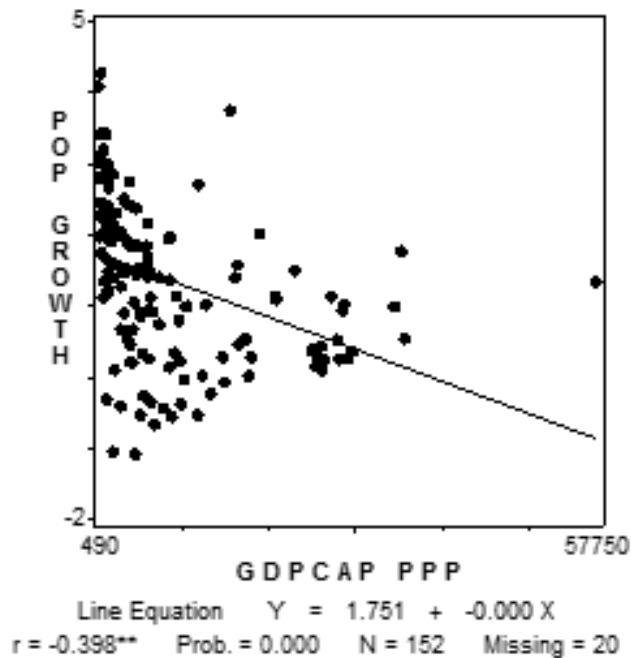


Figure 6: The Relationship Between Population Growth and GDP Per Capita

Political Variable

Population Growth by Political Stability

The seventh hypothesis indicates no relationship between population growth and political stability. Figure 7 disagrees with the hypothesis. It shows an overall negative relationship: the more politically stable the country is, the lower its population growth. For instance, Malta and Iceland are very stable politically, and they have low population growth. On the other hand, Sudan and Nepal are politically unstable, and they have high population growth. Outliers include the United Arab Emirates and Qatar. These two countries are stable politically, yet they have very high population growth. These two countries appeared as outliers previously, in the analysis of levels of educational attainment and contraceptive use, and the reason for their high population growth is immigration.

Pearson's correlation coefficient is -0.335, which implies a moderate relationship. Probability is found to be 0.000, meaning that this relationship is statistically significant. If the two outliers were removed from the plot, the value of r would change from -0.335 to -0.423, making the relationship a strong one.

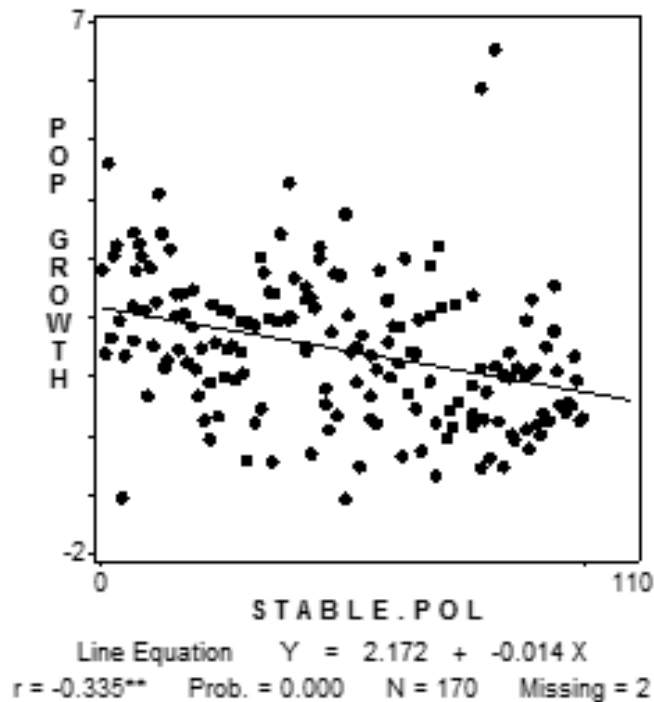


Figure 7: The Relationship Between Population Growth and Political Stability

Table 1 lists the independent variables examined in this study and presents their respective levels of association with the dependent variable of population growth.

Conclusion

The research presented in this paper explores the various factors that correlate and may contribute to population growth. The topic of population growth has been controversial. Some scholars are optimistic, and others are pessimistic about the problems of continuing population growth. To solve the controversy, it is important to know the factors affecting population growth. Following the literature review, seven factors were classified into three groups: social, economic, and political. All seven hypothesis were tested using the MicroCase 2013 Global file.

Many believe that population growth has caused or will cause massive problems, such as famines and starvation through an inability to meet the essential needs of the

Table 1: Measures of Association

Variables	Measure of Association	Interpretation
Social Variables		
Education	$r = -0.627$	Strong Relationship
Child Marriage	$r = 0.439$	Strong Relationship
Contraception Use	$r = -0.555$	Strong Relationship
Religion	$r = 0.527$	Strong Relationship
Economic Variables		
Globalization	$r = -0.391$	Moderate Relationship
GDP Per Capita	$r = -0.398$	Moderate Relationship
Political Variable		
Political Stability	$r = -0.335$	Weak Relationship

growing population. Other consequences, it is argued, include climate change. More population means more consumption of fossil fuels, thus faster global warming. Furthermore, overpopulation makes it hard for a government to provide a good quality of life for everyone, and it can also lead to higher unemployment, which leads to higher crime rates. The findings were examined by group and individually. Within the group of social factors were four variables: education, child marriage, contraception use, and religion. The finding of this research for this particular group of variables is that countries that are less religious, have a good education system, have a low rate of child marriage, and have a high contraception use have the lowest population growth. Among the four social variables, education has the strongest correlation: the better the education system, the lower population growth is going to be. Educated couples contribute equally to society; they want to have time for themselves and enjoy a good lifestyle, as well as make sure that their children are well educated and have a good quality of life. For an educated couple, it is about the quality of their own and their children's lives, not the quantity.

Within the economic group of variables, the research tested how globalization and GDP per capita correspond to population growth. Findings in this group suggest that countries that are more open to the world economically, culturally, and socially, thus more globalized, are more likely to have a low population growth. The findings also suggest that countries with a high GDP per capita have low population growth. The results tend to confirm the original assumption that poorer countries have greater population growth. The reasoning was that in poor countries people have less access to a good education, less knowledge of contraception use, higher unemployment and underemployment, and less gender equality—all factors that tend to correlate to high population growth.

Finally, within the political sphere, the research tested the variable of political stability. The findings suggest that, as hypothesized, there is no relationship between political stability and population growth.

The findings on social variables offer some interesting implications for national governments and international institutions that strive to control population growth, whether by increasing or decreasing it. The results suggest that cultural and social factors are the key to motivate people in regard to population growth. For example, for policy makers in countries like Japan, Russia, or Italy, who desire to promote population growth, effective strategies can focus on manipulating social variables to encourage people to have more children, such as emphasizing the idea through the education system or reducing encouragement for contraception use. Similarly, for countries like China that try to reduce population, the study offers another implication: perhaps the best way to solve the controversy of population growth is by having in place concrete ways that strive to keep population growth at a steady and balanced level.

Given that social factors seem to have the highest correlation to population growth, further research into social factors may help with developing effective ways to set population growth at a balanced and steady level. In addition, more predictions of population growth in different countries can be helpful in understanding the problem and envisioning the future impact of population trends. Finally, additional study of political variables could help determine whether and how political factors influence population growth.

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