

# THE IMPACT OF INFLATION AND POPULATION GROWTH ON INDIA'S ECONOMIC DEVELOPMENT: A QUANTITATIVE ASSESSMENT

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## **Abstract**

*The general public's primary economic concern has been and always will be inflation. In daily language and popular culture, inflation is commonly used interchangeably to mean the general increase in the cost of living. Despite being the most easily observable economic indicator of a price increase, inflation has its own long-lasting and far-reaching effects on society and societal issues. This is the case even though inflation is the most directly relevant economic indicator of a price increase. The reason for this is the common association between inflation and price increases. Inflation may be detrimental to the economy and cause havoc by increasing the tax rate, decreasing national savings, debasing the currency, and driving up the cost of imported goods. Inflation, population growth, and GDP are all discussed extensively in this article, as is the potential that these three trends may come into conflict with one another. This project's study is focused on understanding how India's population and inflation affect the country's gross domestic product (GDP). The growth rate of gross domestic product is the dependent variable, whereas the growth rates of the population and the consumer price index are the independent variables. For this reason, we make use of data from the 1996–1997 school year through the 2015–2016 school year. The data was obtained from secondary sources, such as the financial reports published by the Reserve Bank of India and the World Bank. Since this provides us with the most optimal starting point, we have chosen a 20-year time period to analyse GDP, population, and inflation on a national scale in the Indian economy. The research, conducted*

with the help of the SPSS application, made use of a number of different statistical methods, including correlation, regression analysis, the t-test, and an analysis of variance model.

### Paper Identification



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### INTRODUCTION

The terms GDP and inflation are likely to be thrown around often in debates between financial professionals. Some people may believe that more care should have been taken in analysing this data, as a surgeon would with a patient's map before operating on them. In a particular economic system, national income is the monetary worth of the whole flow of goods and services generated during a certain time frame. Inflation occurs when there is an increase in the money supply. National income is a notion that attempts to quantify the worth of this development. Generally speaking, when inflation rates increase, so do retail prices. Inflation occurs when the supply of money exceeds demand for it. India's inflation rate has been consistently lower than that of other developing countries since 1950. Inflation was held below double digits for the majority of those years because to this policy. Despite inflation's status as a major public concern and a hotly debated subject in Indian politics, the country has consistently had one of the world's lowest inflation rates since 1950. (S. Jamuna, Ph.D. 2016) India's worst inflationary years were 2008 and 2009, with the country seeing both its highest and lowest inflation rates ever within a couple of months. This caused the greatest amount of volatility in the market.

### CAUSES OF INFLATON

The word "inflation" describes a condition in which a general increase in prices reduces the buying power of a country's population as a whole. It's good for the economy when inflation as measured by the annual percentage rate is low. However, an inflation crisis occurs when the yearly percentage rate of inflation rises over a certain level. Inflation might be caused by a wide variety of causes, each of which contributes in its own unique way.

1. When governments release too much money in response to a crisis, via measures like printing more money, inflation may result. Effects and causes As a direct consequence, prices will eventually rise at a very fast rate as businesses and consumers scramble to

keep up with the extra cash. The phrase “demand-pull effect” describes the phenomenon in which the price of a product or service rises in response to an increase in demand from consumers.

2. Rising manufacturing costs are another common factor in pricing hikes. The addition of this part causes an increase in the final cost. For instance, if the cost of raw materials increases, the production cost will also increase, and the business will need to raise prices to keep profits stable. Just as an increase in the price of labour would lead a manufacturer to increase the price of the product it sells, so too would an increase in the cost of raw materials. The rising price of labour is a contributing element to inflation. Most companies, in reaction to wage increases being demanded by their workforce, would rather charge higher prices to their customers.
3. Global lending practises and rising national debt both have the potential to fuel inflation. It's possible that one of these is more important than the other. In order for borrowing nations to keep up with their obligations and repay their loans, interest payments must be made, which in turn drives up prices. Inflation has several causes, and this is one of them. Inflation may also be induced by a major decrease in the value of the currency, since governments will need to alter their monetary policies to account for the consequent changes in the amount of imports and exports. This is due to the fact that the volume of imports and exports is correlated with the value of the currency.
4. An rise in various taxes and surcharges is another potential source of price increases. Cigarettes and petrol, for instance, might see higher federal levies if the government so chooses. The hitch is that once prices go up, they almost never go back down, even if tax revenues fall at a later date. Even if tax income were to decrease, this would still be the case. Whether or whether taxes are ultimately lowered, this will always be the case. Inflation is often attributed to wars due to governments having to make up for lost revenue and repay central bank loans. Simply put, countries that wage war end up repaying more than they borrowed. The cost of living tends to increase up after a war because of the ripple effect it has on several economic factors such as international trade, labour expenses, and consumer demand.

### **Effects of Inflation**

The majority of the impacts of inflation are gloomy, and they can affect the economy in the following ways:

- Fewer beneficial benefits on the national economy will result (when inflation is high, conserving money means seeing your cash steadily lose value, thus people are less likely to save their cash and more likely to spend it on something else).
- The effects will be felt most keenly by those whose incomes are not flexible enough to keep up with rising inflation (those whose wages remain stagnant despite rising costs of living).
- This has resulted in a higher tax band (meaning that individuals' increased income due to inflation will be taxed at a higher rate).
- The depreciation of a currency (reduces the value of a legal tender and may even inspire the creation of new money)
- That leads to a spike in the cost of imported products (because a weaker currency means less money available to spend on overseas markets).

### **GDP and Inflation**

There is a long-standing custom of using money as a vehicle for the storage of value. When people have faith in the worth of their money, they are more inclined to put some of it aside for their future needs. Because the value of each individual unit of money declines with the passage of time and the augmentation of inflation, the usefulness of money as a store of value is lowered as a consequence of inflation. This is because inflation causes the value of each individual unit of money to decrease. As a consequence of this, people are more inclined to spend their money on other things that may serve the purpose of the store of value. Meanwhile, inflation is associated with lower national income and may reduce national savings because of its impact on buying power. This is due to the fact that inflation drives up prices.

### **Effects of Population**

The ever-increasing human population added a new dimension of complexity to the process of extracting value from the earth's natural resources. People have fundamental requirements, such as the need to eat, sleep, and dress themselves; as the human population increases, so does the requirement for food and other commodities. Eventually, the carrying capacity of the ecosystem will be exceeded when more and more land and resources are used, rendering some of them unsuitable or depleting others to the point that they are no longer accessible. In times of extreme economic crisis, this can provide some difficulties. To be more explicit, each succeeding rise in population has led in a bigger number of issues than settlements. This is the case because of the exponential growth in population. One of the negative effects of population increase, which is generated by the phenomena of high population growth rates, is the need of making significant

expenditures in social infrastructure. This is one of the undesirable consequences of population development. As a result of a lack of investment funding, it is anticipated that vital components of the social infrastructure, including education, health care, transportation, and housing, would degrade. This is a natural consequence of the situation. The results of this are going to be increased congestion as well as a drop in the value of the services. Every single year, there is an increase of around 80 million individuals to the total population of the globe. Since 1965, the overall number of the population has increased by more than twice as much, reaching seven billion by the end of 2011. During the third quarter of 2016, India's Gross Domestic Product (GDP) saw a growth of 1.80% when measured against the previous quarter's results. In India, the Gross Domestic Product (GDP) Growth Rate hit an all-time high 5.80 percentage points in the second quarter of 2009, after hitting an all-time low of -1.80 percentage points in the first quarter of 2009. The average annual increase in India's GDP Growth Rate was 1.67 percent for the years 1996 and 2016. (Trading Economics, 2016). By the year 2050, it is projected that there will be 9.3 billion people living around the globe. The carrying capacity of the globe is affected by a variety of factors, including the number of people living on the planet, the amount of economic development necessary to fully utilise its resources, the degree of technical improvement, and the lifestyle choices that individuals make. The collection of precise data on the population is an essential component of any social or economic strategy that has to be developed. Without reliable data on population size, distribution, age distribution, and the net impact of immigration and emigration, governments cannot plan and implement efficient services and infrastructure for their citizens.

## LITERATURE REVIEW

**Tobin**, in his article “Money and Economic Growth” (1965). This research shows that when money is seen as a substitute for capital, higher inflation rates encourage more investment and result in greater production. For a given period of time, a country's national income is the monetary worth of all the commodities and services produced inside its financial system. Inflation may be defined as either a rise in the money supply or a rise in the overall price level. It is this monetary activity whose worth is captured by the concept of national income. Increases in inflation often lead to parallel increases in pricing. Inflation is the name given to this condition.

**E.F. Denison** entitled “International Transactions in Measures of the Nation's Production” (1981). Such net exports must be deflated using an import price index before analysis. Therefore, “Command GDP” is coined to stand in for the true GDI in the USA. There have been no changes made to this metric since its first presentation in the SNA report from 1993. Denison's research

led to the National Income and Product Accounts of the United States adopting his nomenclature and technique for calculating the Command GDP. The findings from Denison's study prompted this action.

The research “Inflation, Volatility and Growth” by **Judson, Ruth, Orphanides, and Athanasios (1996)** found that inflation has a negative impact on growth for a large panel, but that this correlation disappears below 10% when splines are added.

**A. H. Khan & M. A. Qasim (1996)** in their paper “Inflation in Pakistan Revisited” It was determined that the money supply, the value contributed by manufacturers, and the wheat support price in Pakistan would be the elements that would determine the pace at which food prices increased. The key contributors to inflation in the non-food sector are the quantity of money in circulation, real GDP, the cost of imports, and electricity prices. It should not come as much of a surprise, given that wheat goods make up 14% of the food price index, that changes in the wheat support price may have an impact on the overall level of the index. Wheat products make up 14% of the index. On the other hand, this does not always indicate that shifts in the value of a particular item will always cause headline inflation to be inflated. The only elements that have any effect on inflation, according to Khan and Qasim's findings, are the amount of money in circulation, the cost of imports, and the GDP.

**Sarel, (1996)** In his paper titled “Non linear affects of inflation on economic growth,” conducted an experiment with a different empirical examination of the subject matter. This examination also led to the same result, which was that inflation only affects growth if it is above a certain 'threshold' rate of inflation, and that it does not affect growth under any other conditions. Sarel's findings were published in the year 1996. According to his findings, an inflation rate threshold of about 8% for a combined sample from a wide number of nations, one of which being India, serves as an effective common benchmark for the sample as a whole. Among these countries, India is included. It is possible, due to the fact that the common threshold is an estimate based on a combined sample, that if one nation were to apply it in isolation, it may not be the optimal option. This is due to the fact that the estimate was arrived at by merging the samples from a number of different countries. As a consequence of this, it is essential to conduct out yet another empirical investigation on the subject of identifying the threshold at which inflation really starts to undermine economic growth in a particular country.

**Bruno and M. and W. Easterly**, in their work “Inflation Crisis and Long Run Growth” from the year 1998. It was determined that there was no indication of a growth-inflation trade off in a sample that did not include any particular instances of large inflationary crises. This was one of

the findings of the study. This was one of the findings that was uncovered throughout the investigation. On the other hand, there was sufficient data to imply that growth turned dramatically negative when inflation went above a high threshold rate of forty percent per year. This was suggested by the fact that there was a high threshold rate of forty percent per year. Despite the fact that this rate was thought to be a high threshold rate, this was the circumstance that occurred anyway. They further claim that the inability of academics to detect a major correlation between inflation and growth may be due to a stylized quick recovery of production after inflation, which, on average, makes the overall statistical relationship meaningless. This is something that they believe may be the cause of the failure of researchers to uncover a considerable association between inflation and growth. In other words, they believe that this is the reason why investigators have not been successful in finding a meaningful association between inflation and growth in their research.

**Ghosh, Atish, & Steven Phillips, (1998)** In their study titled “Inflation, Disinflation, and Growth,” published their findings. It was shown that there is a link between low inflation rates with economic growth for IMF member states. On the other hand, there was a correlation between high inflation rates and economic development that was unfavourable. The negative association that they discover also has a non-linear structure, which means that the marginal effect is more evident when inflation rates are lower than when they are higher. This is because the marginal impact is proportional to the square of the difference between the inflation rate and the base rate. This is the case as a result of the non-linear character of the negative connection that they discover.

**S. Fischer, M. Feldstein, Lucas, (2000)** in their paper “Inflation and Welfare” explain that the rate of inflation place major financial costs on the market. Numerous studies have shown that a rate of inflation of 10% may result in the misallocation of savings and investments, as well as a loss in the value of real balances, which can lead to a loss of approximately 3% of the real Gross National Product. This loss can be avoided by maintaining a rate of inflation that is lower than 10%. (GNP).

**Khan, Mohsin, & Abdelhak, (2000)** in their paper “Threshold Effects in the Relationship Between Inflation and Growth” demonstrated that there is a significant negative impact of inflation that begins to take place once the inflation rate reaches a particular “threshold” level and endures for all higher rates of inflation. This impact begins to take place once the inflation rate reaches a specified “threshold” level. Inflation has a favourable effect on economy until it

reaches these levels, which are set at 1% for developed countries and 11% for underdeveloped ones. Above these levels, inflation has a detrimental effect on economic expansion.

**R. E. Hall & C. I. Jones (2007)** in their paper “The Value of Life and the Rise in Health Spending” When individuals make efforts to improve their health in order to extend their lifespan, they provide themselves the opportunity to enjoy more productive times of their lives. The marginal worth of a person's life does not decrease with each additional year of life lived. As a direct result of this, the optimal distribution of total expenditures shifts toward health care, and the proportion of total expenditures allocated to health care grows in tandem with income. Additionally, the optimal distribution of total expenditures shifts toward health care as a direct result of this.

**Lokeswar Reddy, (2012)** in his paper “Impact of Inflation and GDP on Stock Market Returns in India” emphasised It is argued that an economy is suffering inflation when there is a higher amount of money chasing a lower number of goods and services. To put it another way, it indicates that there is a greater amount of money that is available in the economy, but that there are fewer products and services available to purchase with that additional money. This can also be stated as “there are less goods and services available to purchase with that additional money.” Due to the fact that there is no real rise in economic output, this inflationary climate does not result in a growth in the production of the economy as a whole. To put it another way, an increasing amount of money is being directed toward a decreasing quantity of goods and services.

According to a study written by **Dr. S. Jamuna (2016)** titled "Inflation and its impact on India," inflation has always been a major issue for the general population and a subject of heated political discussion. In spite of this, it is astounding to take into account that, in comparison to other developing nations, India has maintained one of the lowest inflation rates since 1950. Furthermore, for the bulk of those years, inflation was kept under single-digit numbers thanks to persistent control efforts. It is interesting to note that the most turbulent phase for inflation in India happened in 2008 and 2009, despite the fact that the public has been concerned about inflation for a long time and that it has been the topic of political discussions. During these years, the nation had its greatest inflation rate ever as well as its lowest inflation rate ever within a few months of each other, which resulted in huge market changes.

## **OBJECTIVES**

The following are the goals and objectives of this research project:



- 1) to investigate the degree to which GDP, population growth, and inflation are all related to one another throughout the period 1996-2016.
- 2) to examine how GDP in the Indian economy is affected by factors such as inflation and population increase.

### **RESEARCH HYPOTHESIS**

H<sub>0</sub>A: The Indian economy's gross domestic product (GDP) is not significantly affected by its population.

H<sub>1</sub>A: The GDP of the Indian economy is heavily influenced by the country's population.

H<sub>0</sub>B: The rate of inflation in India has a little effect on GDP.

H<sub>1</sub>B: The Indian economy's gross domestic product is significantly affected by inflation.

### **RESEARCH METHDOLOGY AND DATA**

In this particular investigation, a descriptive research and analytical procedure serves both as the research approach and the examination method. The paper presents an in-depth investigation into the ways in which inflation and rising population have influenced India's gross domestic product over the course of several decades. This test will cover the time period beginning with the 1996–1997 school year and continuing all the way through the 2019–2020 academic year. Both the Reserve Bank of India and the World Bank contributed their financial records, which were then analysed and utilised in the process of compiling the data that was used in the research that was carried out. Because it would give us a strong vantage point from which to view the dynamics between India's Gross Domestic Product (GDP), population growth, and inflation, a time range of twenty years was selected as the time frame to analyse. This was done because of the fact that it would provide us with a strong vantage point from which to view the dynamics. With the aid of SPSS, a variety of statistical studies, such as correlation and regression analyses, in addition to the t test and the analysis of variance, were carried out.

When measured by Gross Domestic Products, inflation, population growth, and overall gross domestic product all expanded at the same rate during the years 1996-1997 and 2019-2020. This trend can be seen in both years. It was demonstrated that the inflation rates rose at a consistent rate of 3 to 4 percent from 1996–1997 to 1999–2000, and that during 2000–2001, they decreased from 306 to 305 during 1999–2000 to 2000–2001. This was after having increased at a steady pace of 3 to 4 percent from 1996–1997 to 1999–2000. The Gross Domestic Product climbed at a rate of 10–15% from 1996–1997 to 2000–2001, where the population growth increased by the rate of roughly 2% at the same time period. The rate of gross domestic product (GDP) decreased below 10 percent between the years of 2014 and 2016. The rate of population expansion stayed

largely unchanged at about 1.27 percent during the course of the last year. In addition to this, the rate of inflation is climbing at a slower and slower pace as time goes on.

**Table1. Gross Domestic Product, Population Growth and Inflation Rate**

year	GDP at Market Prices (in Billion)	Population Growth (in Million)	Inflation, Consumer Price Rate
1996-1997	14192.77	946	256
1997-1998	15723.94	964	264
1998-1999	18033.78	983	293
1999-2000	20121.98	1001	306
2000-2001	21686.52	1019	305
2001-2002	23483.3	1040	309
2002-2003	25306.63	1056	319
2003-2004	28379	1072	331
2004-2005	32422.09	1089	340
2005-2006	36933.69	1106	353
2006-2007	42947.06	1122	380
2007-2008	49870.9	1138	409
2008-2009	56300.63	1154	450
2009-2010	64778.28	1170	513
2010-2011	77841.16	1186	564
2011-2012	87360.39	1220	611
2012-2013	99513.44	1235	672
2013-2014	112727.6	1251	750
2014-2015	124882.1	1267	800
2015-2016	135760.9	1287	835
2016-2017	144821.67	1303	889
2017-2018	152381.87	1331	928
2018-2019	163456.45	1352	972
2019-2020	176576.58	1384	1003

## INVESTIGATING AND DISCUSSING

The following conclusion has been drawn from the data analysis:

**Table 2. Descriptive Statistics**

Variables	Mean	St. Deviation	No. of Observation
GDP at Market Prices	71895.95	53617.59	24
Population Growth	1153.17	129.39	24
Inflation	535.5	254.94	24

When dispersion or variability are being assessed, a common and useful instrument that is utilised quite frequently is called the standard deviation. The mean GDP is found to be 71895.95 with a standard deviation of 53617.59, while the mean population is found to be 1153.17 with a standard deviation of 129.39. This leads one to believe that the disparity in GDP is far greater than the difference in population. In addition to this, the standard deviation of the inflation rate is 254.94, while the average rate of inflation comes in at 535.5 (Table 2). The inference that can be made from this is that inflation is not only unpredictable but also unpredictably unstable.

**Table3. Correlation between GDP, Population and Inflation**

Variables	GDP at Market Prices	Population Growth	Inflation
GDP at Market Prices	1	-	-
Population Growth	0.97	1	-
Inflation	0.999	-	1

(Significant at 5% level of Significance)

Evidence suggests that population and gross domestic product (GDP) have a positive connection (i.e., 0.970), which is statistically significant at a significance level of 5% or above. In addition, there is a high and positive correlation (i.e., 0.999) between GDP and inflation, which indicates a strong association between both variables. This correlation is an indicator of the strength of the relationship. As a result, it is possible to assume that population and inflation both display a strong and positive link, which is a credible observation. This is because population and inflation both demonstrate a positive connection.

**Table 4. Summarized result of Research model**

Model Fit Between GDP and Population				
R-Sqaure	F-test	St. beta	T-test	p value
0.904	169.5	0.97	13.11	0.000*
Model Fit Between GDP and Inflation				
R-Sqaure	F-test	St. beta	T-test	p value
0.997	4785.82	0.999	69.09	0.000*

Results from several statistical methods applied to our suggested model are shown in the table above, which includes Gross Domestic Product, Population, and Inflation figures. Our model's data was compared to those derived from these other statistical methods. The R-Square value was found to be 0.904 for the first model and 0.997 for the second. In other words, inflation accounts for just around 1% of GDP, whereas population explains roughly 90% of GDP. In the table below, we can see the R-Squared value for the first model. Table 4 shows that in both circumstances the beta value is positive, although the population scenario's value is larger. This

indicates that the impact of population growth on GDP is bigger than that of inflation, on average accounting for a smaller share of total GDP. This table's most eye-catching result is the reduced p-value seen in scenarios that account for both population growth and price increases. This demonstrates the importance of population and inflation in determining a country's GDP.

The following conclusions have been reached as a result of the investigation that was carried out earlier on:

- We are unable to subscribe to the null hypothesis  $H_{0A}$  due to the fact that the value of p is lower than 0.05. This suggests that there is a significant positive correlation between the population and GDP in the Indian economy, which implies that this association is a favourable one. It suggests that India's population is a crucial stimulant that is necessary for the advancement of the country's economy.
- Because the value of p is higher than 0.05 but below than.05. This suggests that there is a robust positive correlation between inflation and GDP in the Indian economy, which implies that the null hypothesis  $H_{0B}$  must be rejected since it cannot be supported by the data.

## **FINDINGS OF THE STUDY**

According to the study's findings, population size should be taken into account when estimating GDP. This was the investigation's clinching finding. The empirical evidence suggests that the first model has an R-Square of 0.903, whereas the second model has an R-Square of 0.966. It seems that 90% of GDP is attributable to population growth, whereas only 99% is attributable to inflation. The R-Square value for the first model is much less compared to the R-Square value for the second model. Population growth and low inflation are indicative of economic health, and both contribute to national development and prosperity. Population growth and low inflation rates are good indicators of this. Because a growing economy and a growing GDP are both signs of prosperity. This suggests that the size of the population and the pace of inflation have significant impacts on the Indian economy. This is a really important discovery. Dr. S. Jamuna, who authored both studies, found similar results in his own prior research, which supports the current study's conclusions. The study found that the most dramatic change in inflation occurred between 2008 and 2009, the same time frame in which India saw both its highest and lowest inflation rates on record, occurring within a matter of months of each other. All of this occurred in a few of months. The latest inquiry into this topic also pointed to this being the case. Inflation is therefore not only unexpected but also unstable, as may be seen from this

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