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INDIA'S GDP AND VITAL RATES: AN EMPIRICAL STUDY OF INDIAN ECONOMY

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ABSTRACT
Vital rate in India being problematic from past many years, which is affected by many factors prevailing in the country, the study attempts to find out the effect of economic growth on the death and birth rate of the country. GDP is considered as an indicator of economic growth rate of the country for the study. The data regarding GDP, death rate, birth rate have been collected from the secondary sources which are authenticated by the organization of India like RBI which is the foundation from where we had taken the data of death and birth rate. NITIAYOG is the intermediate for the data regarding GDP of the nation. The correlation and regression analysis have been used to find out the temperament for both the death and birth rate correspondingly. A strapping negative correlation is established for in cooperation of death and birth rate with admiration to GDP. Financial statement for GDP is a foundation of revolutionize in the death rate of the motherland which is 95% and for nativity rate of the nation state is 97% that sandwiched between the periods of 2011-2018.

KEYWORDS: *GDP, Birth Rate, Death Rate, Nitiayog, RBI*

INTRODUCTION
GDP is a abbreviation for gross domestic product which is a measure of economic performance of a nation it is one of the most widely used indicator to gauge the health and performance of a countries economy it represents the total monetary value of all goods and services produced within a nations borders over a specific period, usually a year or quarter. GDP in a country is usually calculated by the national statistical agency, which compiles the information from large sources. The international standard for measuring GDP is contained in the system of national account, 1993, compiled by the international monetary fund. [1]

A rising GDP is inductive of a strong economy and benefits almost the whole population of the country. Its growth rate is typically associated with economic prosperity, while negative growth rate indicate economic trouble. Countries with high population pushes GDP up because with more people more money will be spent but individual within the countries it might not be richer which indicates that it is poorer on average. [2]

Death rate is a decisive indictor of a nation health and socio economic situation the death rate offers momentous insights into the helpfulness of public health policies, the impact of diseases and the overall quality of life. [3] Death rate is crucial for formulating effective health intervention and allocating resources efficiently. A lower death rate can lead to a more productive workforce, reduced healthcare cost and improved economic growth. [4]

In the mid 20th century, India's birth rate was reasonably high, obsessed by conventional ancestors configuration and limited access to contraception's. However, from the 1970s onwards, the birth rate began to decline as a result of concerted efforts by the government to promote family planning and improve healthcare services. Urban areas are typically having lower birth rate as compared to rural areas nationally India's birth rate has been decreasing, reflecting broader trends to economic growth and social development.[5] The reproductive age in India is from 15 years to 49 years in which a woman can reproduce live births.

India is the most populous country in the world with 1/6th of the world population. According to estimates from the united nation India has overtaken china as a country with the largest population in the world with the population of 1425775850 at the end of April 2023. In India birth rate is 16.1 births/ 1000, death rate is around 6.6 deaths/1000 life expectancy of India is 72.03 years for males life expectancy is around 70.5 and for females it is 73.6 years.[6]

It is observed that there is a strong negative correlation between the GDP and death rate of the country and also GDP accounts for the 46% of cause of change in the death rate of the country between the periods of 2011 to 2019 [7]. Furthermore, in the study of instability performance of the economy of Nigeria and it is found that there is a positive significant relationship between population and economic growth [8].

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LITERATURE REVIEW

Previous studies have identified the factors affecting the adult mortality in India [9]. In recent research "Socioeconomic inequality in life expectancy in India" It is found that Life expectancy at birth was 65.1 years for the poorest fifth of households in India as compared with 72.7 years for the richest fifth of households. This constituted an absolute gap of 7.6 years and a relative gap of 11.7 % [10].

"Mortality, morbidity, and economic growth" draws a result that reducing mortality and disability adjusted life years (DALYs), promotes per capita GDP growth. The magnitude of the effect is moderate, but non negligible, and it is similar for mortality and DALYs [11].

"Prospective Study of One Million Deaths in India: Rationale, Design, and Validation Results" [12], the author has underline the cause of child and adult deaths but also key risk factors (behavioural, physical, environmental, and eventually, genetic). AGGREGATE INCOME SHOCKS AND INFANT MORTALITY IN THE DEVELOPING WORLD have highlighted that results suggest that economic shocks in the developing world generally lead to more infant deaths, especially of girls, and especially when these shocks are severe [13].

OBJECTIVE

There are three objectives for this study is which are listed below:

1. To identify the relationship between death rate and GDP
2. To identify the relationship between birth rate and GDP
3. Graphically represent highest 5 states death rate , birth rate and GDP
4. Graphically represent lowest 5 states death rate, birth rate and GDP

DATA AND METHODOLOGY

The study aims to study the relationship between the Indian GDP, death rate and birth rate over certain years, this study is based on exploratory research design, the data has been collected from Secondary sources like RBI and Nitiayog. Correlation and regression are the two techniques which are used here to meet the necessities of our objectives. Correlation is a statistics that ensure and articulate the degree to which two variables are linearly related whereas regression analysis is a set of statistical method used for the estimation of relationships between a dependent variable and one or more independent variable.

ANALYSIS

To precede our analysis we have to propose few hypotheses for studying the relationship between GDP, birth rate and death rate in India.

H0: There is positive correlation between GDP and death rate
H0: There is positive correlation between GDP and birth rate
Ha: There is negative correlation between GDP and death rate
Ha: There is negative correlation between GDP and birth rate

Table1: Figures for GDP and death rate of individual years

YEAR	GDP	DEATH RATE
2011	87.36	7.1
2012	92.13	7.0
2013	98.01	7.0
2014	105.28	6.7
2015	113.69	6.5
2016	123.08	6.4
2017	131.45	6.3
2018	139.93	6.2

The Correlation analysis will be applied between GDP and death rate

Table 2: correlation between GDP and death rate

	GDP	DEATH RATE
GDP	1	
DEATH RATE	-0.980420632	1

Table 3: Regression analysis between GDP and death rate

Regression Statistics	
Multiple R	0.980420632
R Square	0.961224616
Adjusted R Square	0.954762052
Standard Error	4.038448619
Observations	8

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	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2425.767384	2425.767384	148.7373464	1.849E-05
Residual	6	97.85440349	16.30906725		

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	464.5469767	28.99440506	16.02195237	3.75547E-06	393.600224	535.49373	393.6002235	535.4937
DEATH RATE	-53.10988372	4.35477114	-12.19579216	1.849E-05	-63.7656248	-42.45414263	-63.76562481	-42.4541

Table4: Data for GDP and birth rate for particular years

YEAR	GDP	BIRTH RATE
2011	87.36	21.8
2012	92.13	21.6
2013	98.01	21.2
2014	105.28	21.0
2015	113.69	20.8
2016	123.08	20.4
2017	131.45	20.2
2018	139.93	20.0

Table 5: Correlation between GDP and Birth Rate

	GDP	*BIRTH RATE*
GDP	1	
BIRTH RATE	-0.990574751	1

Table 6: Regression analysis between GDP and birth rate

Regression Statistics	
Multiple R	0.990574751
R Square	0.981238338
Adjusted R Square	0.978111394
Standard Error	2.809132125
Observations	8

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2476.274448	2476.274448	313.801087	2.07847E-06
Residual	6	47.34733976	7.891223294		

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	715.6586464	34.12745431	20.97017375	7.66019E-07	632.1517741	799.165519	632.1517741	799.1655186
BIRTH RATE	-28.94813875	1.634155664	-17.7144316	2.07847E-06	-32.9467736	-24.949504	-32.9467736	-24.94950389

Table 7: Top 5 States with highest GDP

states	2011	2012	2013	2014	2015	2016	2017	2018
Maharashtra	12.80	13.57	14.51	15.43	16.54284	18.07046	18.88706	19.57381
TAMIL NADU	7.51	7.91	8.51	8.93	9.67562	10.36762	11.25793	12.04667
Uttar Pradesh	7.24	7.58	8.02	8.34	9.08241	10.115	10.56399	10.97353
Karnataka	6.06	6.43	7.04	7.48	8.3133	9.41774	10.19708	10.85101
West Bengal	5.20	5.42	5.58	5.74	6.09545	6.53416	6.94981	7.3892

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Table 8: Top 5 States with highest Birth Rate

states	2011	2012	2013	2014	2015	2016	2017	2018
Maharashtra	16.7	16.6	16.5	16.5	16.3	15.9	15.7	15.6
Tamil Nadu	15.9	15.7	15.6	15.4	15.2	15.0	14.9	14.7
Uttar Pradesh	27.8	27.4	27.2	27.0	26.7	26.2	25.9	25.6
Karnataka	18.8	18.5	18.3	18.1	17.9	17.6	17.4	17.2
West Bengal	16.3	16.1	16.0	15.6	15.5	15.4	15.2	15.0

Table9: Top 5 States with highest Death Rate

states	2011	2012	2013	2014	2015	2016	2017	2018
Maharashtra	6.3	6.3	6.2	6.0	5.8	5.9	5.7	5.5
Tamil Nadu	7.4	7.4	7.3	7.0	6.7	6.4	6.7	6.5
Uttar Pradesh	7.9	7.7	7.7	7.4	7.2	6.9	6.7	6.6
Karnataka	7.1	7.1	7.0	6.8	6.6	6.7	6.5	6.3
West Bengal	6.2	6.3	6.4	6.1	5.9	5.8	5.8	5.6

Table10: Top 5 States with lowest GDP

states	2011	2012	2013	2014	2015	2016	2017	2018
Andaman and Nicobar Islands	0.03978	0.04156	0.04488	0.04742	0.05092	0.05752	0.06464	0.06867
Mizoram	0.07259	0.07778	0.09038	0.11261	0.12324	0.13595	0.14758	0.161
Arunachal Pradesh	0.11063	0.11299	0.12339	0.14383	0.1424	0.14893	0.15572	0.16668
Sikkim	0.11165	0.11421	0.12114	0.13071	0.1437	0.15397	0.17673	0.18625
Nagaland	0.12177	0.12868	0.13793	0.14399	0.1466	0.1565	0.1644	0.16868

Table 11: Top 5 States with lowest Birth Rate

states	2011	2012	2013	2014	2015	2016	2017	2018
Andaman & Nicobar Islands	15.1	15.0	14.6	14.7	12.0	11.7	11.4	11.2
Mizoram	16.6	16.3	16.1	16.4	16.2	15.5	15.0	14.8
Arunachal Pradesh	19.8	19.4	19.3	19.2	18.8	18.9	18.3	17.9
Sikkim	17.6	17.2	17.1	17.1	17.0	16.6	16.4	16.3
Nagaland	16.1	15.6	15.4	15.3	14.8	14.0	13.5	12.9

Table 12: Top 5 States with lowest Death Rate

states	2011	2012	2013	2014	2015	2016	2017	2018
Andaman & Nicobar Islands	4.6	4.6	4.6	4.6	5.0	5.2	5.1	5.3
Mizoram	4.4	4.4	4.3	4.3	4.2	4.2	4.0	4.1
Arunachal Pradesh	5.8	5.8	5.8	6.6	6.0	6.2	6.1	6.0
Sikkim	5.6	5.4	5.2	5.1	5.0	4.7	4.5	4.5
Nagaland	3.3	3.2	3.1	3.1	3.0	4.5	3.6	3.5

RESULT AND DISCUSSION

Negative correlation has been observed in both the cases. GDP increases death rate and birth rate decreases respectively. The figures have shown the collision of GDP and death rate is 95% that shows GDP is very successful to diminish death rate with the incidence of other factors. The data have shown the impact of GDP and birth rate is 97% that shows GDP is very effective to decrease birth rate with the presence of other factors. Therefore major steps should be taken into account to elevate the GDP of the homeland. Healthiness state of affairs for the nation will be improved as we can disburse more on wellbeing and medical. Birth and death rates are majorly pretentious by the factors such as financially viable conditions, healthcare access, education and enlightening norms privileged GDP makes circumstances favorable for nation. In this learning we had bring into being the uppermost five states with their individual GDP, death and birth rate similarly, we had come across lowest five states and UT's with their particular GDP, death and birth rate. The economic environment of the inhabitants improves the mortality in the inhabitants has declined and the global run of the mill fruitfulness

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rate has halved from around 5 in the 1960 to around 2.4 in 2021 which shows beg to be excused in fertility rate. The decline of the fertility rate is one of the most elementary revolutionize that happened in the human narration the steady decline in fertility rate over the period is might be due to the significant gains in the women's freedom such as tackling forced marriage and child marriage, access to contraception's, equal access to education and increased socioeconomic opportunities.

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