A Comprehensive Analysis of Fiscal Deficit, GDP, Money Supply and Inflation in India

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Abstract
This paper is to analysis the complex relationship between fiscal deficit, money supply, GDP growth, and inflation in India, Research has given more importance on these factors for economic stability and growth during 1970- 2020. Fiscal deficit occurs when the government revenue is less than expenditure made by the government, the result of which is an increase in the national debt. Government borrowings will leads to an increase in the money supply that will result to inflation introduce the purchasing power government uses fiscal and monetary policy to prevent and control the inflation and to support the growth of the economy. From 1971 to 2020, India's GDP growth, inflation, and money supply were volatile. Ordinary Least Squares applied the long-run model to estimate the relationship between variables. Due to the risk of spurious results from unit root issues, further analysis was conducted using Augmented Dickey-Fuller test. ADF test results showed that GDP and inflation were stationary at their levels, and the money supply was stationary at its first difference. The ECM indicated that any short-term disequilibrium in GDP growth adjusts back towards its long-run path over time. The finding show a significant result which leads to confirmation that change in inflation and money supply has a significant impact in Indian economic growth in terms of short run and long run.
Keywords: Fiscal Deficit, Inflation, Economic Growth, Monetary Policy

Introduction

In a developing countries like India, it faces several economic challenges. One of the most important issues is managing the fiscal deficit, which is the gap between the government's revenue and its expenditure. A high level of fiscal deficit will lead to a higher debt level, the repercussion will lead to burden on this shoulder of future generation. This also has impacts on the GDP of the country, which is the major indicators of the economy. When the government spends more than what governments earn it will lead to borrowed money which leads to disturbing the private investment and moreover slowing down the growth of the economy which leads to the Domino effect. Money supply ministry total amount of the money which is available is one of the crucial factors if the money supply grows quickly it can lead to inflation also simultaneously its lead will lead to rising price and the purchasing power of money will decrease. Inflation will affect every corner of the economy especially the poor section, as it will reduce their ability to buy goods and services. There is a complex and dynamic relationship between the fiscal deficit, GDP growth, money supply and inflation all the variables are interconnected. A high fiscal deficit can lead to a higher money supply if the government prints more and more money to finance its deficit. This will

cause inflation controlling this fiscal deficit to stabilize the inflation and money supply it will lead to steady economic growth. The Indian government has been making efforts to manage this economic variable through various policies. The dynamics between fiscal deficit, GDP, money supply, and inflation play a crucial role for policymakers to make decisions that promote sustainable economic growth. The research analysis aims to provide larger picture and understanding of these variables in the context of the Indian economy. The study will give emphasis on how change in one variable can impact on the other variables and what measures can be taken for a healthy economy. Study will also focus on the historical data to identify the patterns and trends which can provide valuable insights into the future.

Co-Relation between Variables

An ample amount of study shows inter relation between this variables which is further examine in this research paper. Inflation is rise very fast in the overall price level of an economy over a certain period of time. A low or moderate level of inflation is considered to be good for the economy. An excessive level of inflation raises a number of issues. It lowers the currency's value, leads to economic instability and also affects the economy's productivity. As inflation and economic growth are linked with each other, these macroeconomic indicators also play a very significant role in the decisions of governments and central banks with respect to various issues related to the economy. It is a very normal thing for inflation to slightly increase with an increase in gross domestic product (GDP) over time. When inflation increases beyond a desirable level, the central bank uses monetary policy as a tool to tackle inflation and keep the economy on the path of development. Monetary policy is the part of economic policy that seeks to achieve the broad objectives of the policy (like employment, price, and growth of economic) by controlling the monetary system and operating on money supply, interest rate structure and other conditions affecting credit availability. In developing countries such as India, monetary policy is essentially and systematically designed to avoid an excessive increase in the money supply while simultaneously meeting the real credit needs of the primary economic sectors (agriculture, industry, infrastructure, coal, electricity and transport).

In general, the money supply is the total quantity of money circulating in an economy over a specified period of time. The money supply is composed of money in circulation and money deposits. In India, the classification of measures of money supply includes M0, M1, M2, M3 and M4; this was introduced in April 1977 by the RBI. An increase in the money supply leads to a reduction in interest rates; this stimulates investments and also puts additional money in hands of the people, further leading to increased spending and generation of more demand, in response to which the producers increase the production and this, in turn, increases demand for labour. Some macroeconomic schools of thought with a strong emphasis on money supply are Irving Fisher's quantity theory of money, monetarism and Austrian business cycle theory. M1 (narrow money) has been used to analyse the effect of money supply over inflation, along with Public debt and GDP.

In India, the total government expenditure (GE) has increased by an aggregate of 10.17% from 2010 to 2020. The inflation (CPI, base 2010 = 100) has increased at an aggregate of 6.34% and the GDP (at factor cost, base 2011–2012) has increased at an aggregate of 7.69% for the same decade. It is evident from the statistics that these three macroeconomic variables have shown an increasing trend, which is quite obvious in economic literature.

Review of Literature

(Rangarajan and Arif) studied on econometric model in which study was carried out covering the period from 1961-62 to 1984-85 of the Indian economy to examine the interrelationship among money supply, output and prices. The results found that a rise in credit facilities leads to the rise in money expansion which again leads to rise in inflationary pressure and this inflationary impact of money expansion is neutralized by the increase in the additional Output through the monetary transmission mechanism with the partial adjustment over time.

(Brahmananda and Nagaraju) have attempted to examine the relationship between money supply and price level by using the simulation equations models containing regression equations of various

forms. In their study the linear functions and the double logarithm function and the Auto-regressive equations of first order (AR1) was used. The study found there exist a direct and proportionate relation between the quantity of money and the price level.

(Ramachandran) examined the causality test and used the time series data covering the period from 1951-52 to 2000-01 and established the long term relationship between money, income and prices. There was no granger causality from Real income to prices and money nor was Granger causality from prices and money to real income.

(Mishra et al.) examined the annual data covering the period from 1950-51 to 2008-09 and he found that there exist a bi-directional causality relation between money supply and output, but there exist a unidirectional causalities from price to money supply, and from price to output.

Problem Statement

The research problem gives emphasis on understanding the dynamics between GDP growth, money supply inflation, and fiscal deficit. The previous literature there were many conflicting views of classical economics and monetarists economics some of the study finding shows that money supply only affects price not the real economic output, while other study shows that there is a complex relationship. The study will find the result using most recent data with economic model which provide a clear picture of these variable in the context of Indian economy

Research Gap

There has been an ample amount of study which explores the relationship between the GDP growths, inflation, and monetary supply but there has been no study which interlinks these variables with the fiscal deficit. Moreover, the previous literature focussed a short-term period and excluded significant events such as the global financial crisis and COVID-19 pandemic. Studies like Nachane and Nadkarni and Rangarajan et al. mainly examined the pre-reform era, leaving out the post-liberalization period, which saw significant changes in fiscal policy and monetary regulation. The study will feel the gap by doing the analysis both in the long term and short term and find the relationship between the variables using the data from 1970 to 2020.

Research Questions

1. To analyse the short-term link between fiscal deficits, inflation, money supply, and GDP growth.
2. To identify the long-term relationship between money supply, Inflation, and GDP growth.

Data Source and Econometric Methodology

This research deals with the time series data 1972-2020, spurious regression might arise if the variables have unit roots. This techniques are designed to handle non-stationary data and examine both long-term and short-term relationships more effectively. The (OLS) model for long-run analysis it is used for simple interpretation of data. OLS is a used econometric technique that provides efficient and unbiased estimates under certain conditions, such as stationarity and absence of multicollinearity. Proposed the Following Model

$$Y_t = \beta_0 + \beta_1 CPIINFL + \beta_2 BROMON + \mu_t \quad (1)$$

Here Y is the GDP growth; CPIINFL denotes CPI inflation and BROMON denotes Broad Money

There is co-integration, the error correction model (ECM) representation is specified as:

$$\Delta Y_t = a_0 + \sum^{p}_{(i=1)} a_{1i} \Delta Y_{t-i} + \sum^{q}_{(i=1)} a_{2i} \Delta CPIINFL_{t-i} + \sum^{q}_{(i=1)} a_{3i} \Delta BROMON_{t-i} + \lambda ECT_{t-1} + e_t \ldots \quad (2)$$

Period of Study

Research is based on Secondary Data and taken from RBI and World Bank database. It is based on annual data of Indian Economy from 1970-2020 and data is taken from RBI, World Bank database.

Results and Discussion

Fiscal Deficit of Centre and States in India

The data from 1990-1991 to 2017-2018 shows the fiscal deficits of the central and state governments in India. Over these years, the central government's fiscal deficit fluctuated significantly, starting at Rs. 37,606 crore (6.42% of GDP) in 1990-1991 and reaching Rs. 5,46,532 crore (3.24% of GDP) in 2017-2018. Notable peaks occurred in 2009-2010 at Rs. 4,18,482 crore (6.46% of GDP), reflecting after the global financial crisis.

Fiscal Deficit of Centre and States in India (1990-1991 to 2017-2018)						
	Fiscal Deficit (Rs. in Crore)			Ratio to GDP (In %age)		
Year	Centre	States	Combined Fiscal Deficit of Centre and State Governments	Centre	States	Combined Fiscal Deficit of Centre and State Governments
1990-1991	37606	18558	53320	6.42	3.17	9.1
1991-1992	30844	18942	45849	4.58	2.81	6.8
1992-1993	35909	20917	51643	4.64	2.7	6.67
1993-1994	55257	20126	70310	6.2	2.26	7.89
1994-1995	48030	27350	70739	4.59	2.62	6.77
1995-1996	50253	31993	77400	4.1	2.61	6.31
1996-1997	56242	37490	86650	3.96	2.64	6.11
1997-1998	73204	44688	110289	4.66	2.84	7.01
1998-1999	89560	74810	157910	4.97	4.15	8.76
1999-2000	104717	91555	184596	5.18	4.53	9.12
2000-2001	118816	84898	194915	5.46	3.9	8.95
2001-2002	140955	92736	223165	5.98	3.94	9.47
2002-2003	145072	98387	231763	5.72	3.88	9.14
2003-2004	123272	120990	233452	4.34	4.26	8.22
2004-2005	125794	105130	233051	3.88	3.24	7.19
2005-2006	146435	87608	237187	3.96	2.37	6.42
2006-2007	142573	79979	220617	3.32	1.86	5.14
2007-2008	126912	75690	199375	2.54	1.52	4
2008-2009	336992	127320	439908	5.99	2.26	8.17
2009-2010	418482	194962	610851	6.46	3.01	9.43
2010-2011	373591	158374	529594	4.8	2.03	6.8
2011-2012	515990	171798	688434	5.91	1.97	7.88
2012-2013	490190	198076	683418	4.93	1.99	6.87
2013-2014	502858	252331	753974	4.48	2.25	6.71
2014-2015	510725	316627	825895	4.1	2.54	6.62
2015-2016	532791	422158	953886	3.87	3.07	6.93
2016-2017	534274	565807	1091364	3.54	3.75	7.24
2017-2018	546532	538374	1075840	3.24	3.2	6.39

Source: Reserve Bank of India

The state governments' deficits also varied, beginning at Rs. 18,558 crore (3.17% of GDP) in 1990-1991 and rising to Rs. 5,38,374 crore (3.2% of GDP) in 2017-2018, with the highest percentage of GDP observed in 1999-2000 at 4.53%. The combined fiscal deficits of the central and state governments showed a notable increase from Rs. 53,320 crore (9.1% of GDP) in 1990-1991 to a peak of Rs. 10,91,364 crore (7.24% of GDP) in 2016-2017, followed by a slight decrease to Rs. 10,75,840 crore (6.39% of GDP) in 2017-2018. Observations include the impact of economic reforms in the early 1990s, which initially reduced the fiscal deficit, and the significant rise in deficits due to the global financial crisis in 2008-2009. Post-crisis, efforts towards fiscal consolidation are evident, with both central and state governments working to reduce deficits. In recent years the increasing state deficits are indicating the need for improved fiscal management at the state level particularly.

Financing of Gross Fiscal Deficit of Central Government in India

Financing of Gross Fiscal Deficit of Central Government in India (1980-1981 to 2023-2024) (Rs. in Crore)							
	Gross Fiscal Deficit Receipts	Gross Fiscal Deficit Expenditure	Gross Fiscal Deficit	Financing of Gross Fiscal Deficit			
				External Finance	Internal Finance		
Year					Market Borrowings	Other Borrowings	Draw Down of	Total
1980-1981	12373	20672	8299	1281	2679	1862	2477	7018
1981-1982	15016	23682	8666	964	2913	3389	1400	7702
1982-1983	17434	28061	10627	1258	3771	3942	1656	9369
1983-1984	19711	32741	13030	1338	4038	6237	1417	11692
1984-1985	23466	40882	17416	1452	4085	8124	3745	15964
1985-1986	28035	49893	21858	1449	4884	10209	5316	20409
1986-1987	33083	59425	26342	2024	5532	10525	8261	24318
1987-1988	37037	64081	27044	2893	5862	12473	5816	24151
1988-1989	43591	74514	30923	2460	8418	14468	5642	28463
1989-1990	52296	87928	35632	2595	7404	15041	10592	33037
1990-1991	54954	99586	44632	3181	8001	22103	11347	41451
1991-1992	69069	105394	36325	5421	7510	16539	6855	30904
1992-1993	76089	116562	40173	5319	3676	18866	12312	34854
1993-1994	75405	135642	60257	5074	28928	15295	10960	55183
1994-1995	96591	154394	57703	3382	20926	32834	961	54121
1995-1996	111527	171770	60243	318	34001	16117	9807	59925
1996-1997	126734	193468	66733	2087	19093	31469	12184	63746
1997-1998	134798	223735	88937	1091	32499	54257	-910	87846
1998-1999	155359	268707	113349	1920	68988	42650	-209	111429
1999-2000	183206	287922	104716	1180	62076	40597	864	103537
2000-2001	194730	313546	118816	7505	73431	39077	-1197	111311
2001-2002	204952	345907	140955	5801	90812	46038	-1496	135354
2002-2003	233985	379057	145072	11934	104126	50997	1883	157006
2003-2004	280785	404038	123273	13488	88870	51833	-3942	136761
2004-2005	310415	434209	125794	14753	50840	61562	-1461	111041
2005-2006	348658	495093	146435	7472	106241	53610	-20888	138963
2006-2007	434921	577494	142573	8472	114801	14782	4517	134101
2007-2008	580659	707571	126912	9315	130600	14168	-27171	117597
2008-2009	540825	877817	336992	11015	248975	35168	43834	325977
2009-2010	597392	1015874	418482	11038	394371	14460	-1386	407444
2010-2011	811317	1184908	373591	23556	326599	17206	6430	350035
2011-2012	769525	1285515	515990	12448	484111	35421	-15990	503542
2012-2013	905122	1395312	490190	7201	507445	26556	-51012	482989
2013-2014	1044092	1546950	502858	7292	475626	39111	-19171	495566
2014-2015	1139209	1649935	510725	12933	457817	37485	77752	497884
2015-2016	1237157	1769948	532791	12748	414931	91942	13170	520043
2016-2017	1421946	1957564	535618	17997	338149	188368	-8895	517622
2017-2018	1535278	2126340	591062	7891	450728	128312	4091	583131
2018-2019	1647842	2297060	649418	5519	422735	222485	-1321	643899
2019-2020	1734363	2668014	933651	8682	473968	446030	4971	924969
2020-2021	1671817	3400108	1818291	70180	1032907	722392	-7188	1748111
2021-2022	2184544	3769064	1584521	36147	704097	841734	2543	1548374
2022-2023	2408413	4163732	1755319	23874	1108183	626503	-3241	1731445
2023-2024	2693281	4480097	1786816	22118	1189911	595575	-11787	1764699

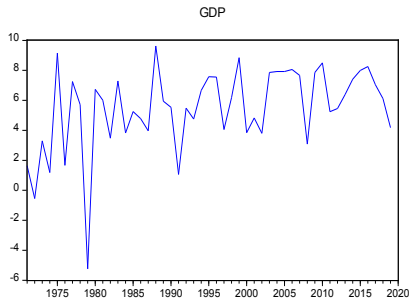
Source: Reserve Bank of India

This data shows the fiscal situation of the central government of India from 1980 to 2024. It lists the government's total receipts, expenditures, and the resulting fiscal deficit each year. The fiscal deficit is financed through external sources like loans from foreign institutions, and internal sources like market borrowings (selling government bonds), other borrowings, and drawing down cash reserves. Over the years, the government's expenditure and fiscal deficit have grown significantly, reflecting increasing financial needs and spending. In 1980-1981, the fiscal deficit was □8,299 crore, financed mainly through market borrowings and other borrowings, whereas by 2023-2024, the deficit increased to □17,868 crore, with a significant portion financed by market borrowings. The internal borrowing methods have played a larger role in financing the deficit over time, particularly market borrowings. The figures suggest that while the economy has grown, the government has increasingly relied on borrowing to meet its fiscal needs.

Graphical Analysis

The figures 1-4 show that GDP growth, inflation, and money supply appear to be too volatile during the period from 1971 to 2020. In 1975 there was a sharp increase in GDP growth to 9.1% and a fall in CPI inflation to -8.1% then there was some stability in growth till 1979 when it witnessed a fall of -5.2% and the inflation rate reached 13% in 1980. In the year 2000 there is some fall in the growth and inflation rates and then some consolidated phase is witnessed 2000 to 2006. The GDP growth rate averaged 5.472% during the period 1971 and 2020.

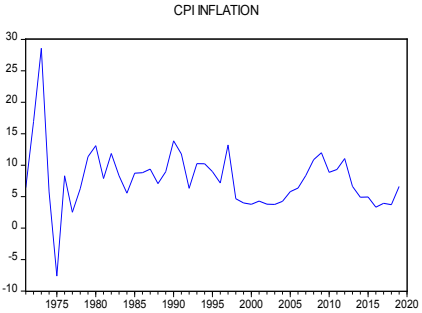
Figure 1 GDP Growth Rate In India, 1971-2020



Source: Eviews graphs analysis

In 2020, GDP growth in India was -8 %. Although GDP growth fluctuated substantially in recent years, it tended to increase through 1971 - 2020 period ending at -8 % in 2020 and one of the major reason for this fall is pandemic. Inflation rate is based on the consumer price index (CPI). The CPI inflation rates are presented on a yearly basis and between 1971 and 2020, the average inflation is 7.865%, which has a doubts about non-stationary or stationary of both series, further tests had to be conducted.

Figure 2 Inflation (Consumer Prices) Rate of Growth in India, 1971-2020



Source: Eviews software analysis

M3 is a measure of broad money and M3 includes M1 plus Time deposits with commercial banks (Fixed deposits, Recurring deposits). Whereas M1 includes Currency with the public, Demand deposits in all banks (e.g. current account, savings account), and other deposits with RBI and in 2019, broad money (% of GDP) for India was 76.1 %. Broad money (% of GDP) of India increased from 21.4 % in 1970 to 76.1 % in 2019 growing at an average annual rate of 2.71%. Broad money growth (annual %) in India was reported at 12.48 % in 2020, according to the World Bank collection of development indicators. From figure 3 it is evident that the money supply as % of GDP have increased drastically from 23% in 1971 to 76% in 2019.

Figure 3 Broad Money (% of GDP) in India, 1971-2020

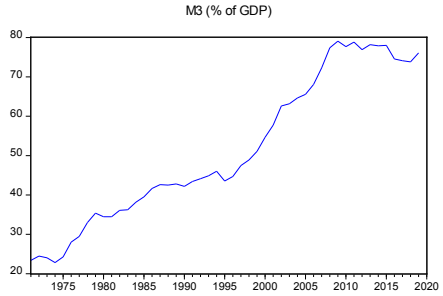
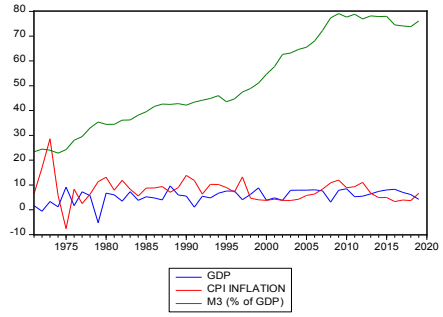


Figure 4 Inflation, Money Supply and GDP Growth Rate in India, 1971-2020



Source: Eviews software analysis

Unit Root Test

Table 1 and Table 2 shows the results of the ADF Unit Root Test for GDP growth, CPI INFLATION. The results show that the null hypotheses H1 and H2 that GDP and CPI INFLATION have unit roots can be rejected since the critical P-value is less than 0.05 respectively at first difference I(0) and I(1) at 5 percent significance level. For GDP, the t-value

is -12.37330, which is lower than the computed ADF critical value (-2.925169) at 5 percent level of significance. Similarly, in case of inflation, the t-value is -10.34460 which is also smaller to the calculated ADF critical value (-2.928142) at 5 percent level of significance. It come to the conclusion that GDP and Inflation time series do not have unit root problem.

Table 1 ADF Unit Root Test for GDP Growth in India, 1971- 2019

Particulars	t-statistics	GDP		P-Value
		Critical value		
At level	-6.582240	1%	-3.574446	0.000
		5%	-2.923780	
		10%	-2.599925	
At first difference	-12.37330	1%	-3.577723	0.000
		5%	-2.925169	
		10%	-2.600658	

Table 2 ADF Unit Root Test for CPI Inflation in India, 1971- 2019

Particulars	t-statistics	Inflation		P-Value
		Critical value		
At level	-4.950288	1%	-3.577723	0.0002
		5%	-2.925169	
		10%	-2.600658	
At first difference	-10.34460	1%	-3.584743	0.0000
		5%	-2.928142	
		10%	-2.602225	

Table 3 ADF Unit Root Test for Broad Money in India, 1971- 2019

Particulars	t-statistics	Broad money		P-Value
		Critical value		
At level	-4.950288	1%	-3.577723	0.0002
		5%	-2.925169	
		10%	-2.600658	
At first difference	-10.34460	1%	-3.584743	0.0000
		5%	-2.928142	
		10%	-2.602225	

Similarly, Table 3 shows that the results of the ADF Unit Root Test for Money Supply. The results show that the null hypotheses H3 that Money Supply has unit roots can be rejected since the critical P-value is less than 0.05 respectively at first difference I(1) at 5 percent significance level. The t-value is -4.628870, which is lower than the computed ADF critical value (-2.925169) at 5 percent level of significance. It is therefore concluded that GDP and Inflation time series are stationary at I(0) and I(1) but the Money Supply is stationary at I(1). This means that there is combination of I(0) and I(1).

Conclusion and Policy Implications

This study investigates the complex relationships between public debt, government spending, and public investment, along with how these factors interact with the money supply, job creation, income, expenses, inflation, and the broader economy. A high fiscal deficit, when the government spends more than its revenue, necessitates borrowing, increasing public debt. From 1980 to 2024, India's central government fiscal deficit rose from □8,299 crore to □17,868 crore. Initially financed mainly by borrowings, over time, internal market borrowings became the dominant financing method, reflecting growing reliance on debt. This borrowing can expand the money supply, which in turn often leads to inflation, reducing the purchasing power of money and affecting economic stability. The ADF Unit Root Test results for GDP growth and CPI inflation in India show that both GDP and inflation do not have a unit root problem. For GDP, the t-value is -12.37330 (lower than -2.925169 critical value), and for inflation, the t-value is -10.34460 (lower than -2.928142 critical value), with p-values below 0.05 at a 5% significance level. This indicates that the rising CPI has not impacted the GDP growth of the country during 1971-2020 of study.The study finds that while moderate inflation can promote economic growth by encouraging spending and investment, excessive inflation often fueled by an uncontrolled increase in the money supply creates economic instability and disproportionately impacts the lower-income population. Government Fiscal policy has the main aim to reduce fiscal deficit significantly through fiscal consolidation to manage inflation by the help of monitory policies and tools it plays a significant role in maintaining the balance of these variables. The findings show that between 1971 to 2020 GDP, fiscal deficit inflation has increased significantly by various economic policy and several global events.

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