

## **State Fiscal Policy and Inflation in India**

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*An increasing trend in fiscal deficit, especially revenue deficit, of all state governments in India has been noticed since 1987-88. The objective of this paper is to explore the relationship between each state fiscal policy and inflation in India by using panel data during the period 1989-90 – 2009-10. The Granger causality test result suggests that there exists a bi-directional causality between real GDP growth and inflation, and gross fiscal deficit and inflation. However, panel regression fixed effects result confirms that gross fiscal deficit of each state government is positively and significantly influencing inflation in India during the period. The above result suggests prudent state fiscal policies to control inflation in India.*

**JEL Codes:** H70, E31 and C32

### **1. Introduction**

Inflation in India is considered as a severe macro-economic problem since the Third Five Year Plan. Some studies<sup>1</sup> find that inflation in India is mainly because of the rapid increase in central and state governments' fiscal deficit, especially increase in non-plan expenditure on Revenue Account (without any time lag) such as interest payments, defence expenditure on Revenue Account, subsidies, debt relief to farmers, etc. since 1980s. They argue that allocation of more and more resources to the Revenue Account results in less allocation of resources to the Capital Account that creates productive assets. Thus less allocation of resources to Capital Account results in a decline in the creation of productive assets. The fast increase in revenue deficit results in a high fiscal deficit. Financing of fiscal deficit by borrowing from the Reserve Bank of India leads to the creation of money supply and ultimately inflationary situation in the economy as most part of the government borrowing is to finance its revenue deficit. Further, financing of fiscal deficit through borrowing from market crowds out private borrowing as both are borrowing from the same pool. This leads to slow growth in the economy and inflation since private investments are mainly growth oriented. Thus, the alternate ways of financing fiscal deficit lead to either an increase in money supply or slow growth in the economy that results in an inflationary situation and hence, supports Keynes (1936) theoretical view point. However, all these studies have taken either Central Government's or/and all State Governments' combined fiscal deficit figure. When one wants to evaluate the impact of state fiscal policies on inflation in India, one should consider the fiscal and revenue deficit figures of all 28 federal state governments separately by formulating the panel data. Besides, they have taken wholesale price index to measure inflation. But, inflation can be better captured through consumer price index for industrial workers of major cities of different states in order to evaluate the real impact of state fiscal policies on inflation in India. The research findings of this study corroborates with the findings of Bhattacharya (1984), Bhattacharya & Lodh (1990), Bhattacharya & Guha (1992), Ghosh (1987), Buitter & Patel (1992, 1997), Nag & Samanta (1994), Jha et. al. (1995), Prusty (2001),

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Bhattacharya et al. (2008), Agrawal (2011), Basu (2011) with respect to the positive and significant relationship between Central Government gross fiscal deficit and inflation in India. However, the finding of this study is different from previous studies by rejecting the positive and significant relationship between Revenue Deficit (without any time lag) and inflation in India.

The present study tries to fill up this gap by exploring the impact of all 28 state fiscal policies in India on their respective consumer price index for industrial workers (i.e., a measure of inflation). The study is organised as follows. Section 2 discusses the review of literature followed by the methodology and model specification in Section 3. The findings have been analysed in Section 4. The last section summarises the empirical results.

## 2. Literature Review

According to Friedman (1963) Indian inflation should be explained in terms of increase in money stock relative to real income. He suggests this after studying the changes in output and money supply during First and Second Five Year Plan periods. Following this, since the sixties a number of studies have been carried out by using the monetarist approach (Bhattacharya & Lodh, 1990, Chellaiah, 1993, Verma & Kumar, 1994). The results of these studies suggest that reckless spending of public money by deficit financing without corresponding production of wage-goods lead to inflation. Further, the greater emphasis on development of heavy industry is also responsible for high and continuing inflationary trend in India. Thus, the monetary factor, particularly increase in money supply due to deficit financing, is considered as the main cause of the inflationary situation. These studies implicitly assume the existence of a stable money demand function in Indian economy. This implies that money supply increase will affect the price level only, with little effect on output and employment. But, the demand for money function in India cannot be claimed to be a stable one because of the co-movement of prices and velocity (Brahmananda, 1977; Vasudevan, 1977). Hence, Indian inflation can be attributed to imbalance between growth of money supply and supply of basic consumption goods or wage-goods. Moreover, the money supply is positively related to output and employment growth in the long-run as increase in output due to investment creates matching demand for money in the economy. But, the basic structural bottlenecks impose a constraint on the aggregate supply to rise in relation to aggregate demand in the face of expanding market size and population growth. This subsequently leads to a rise in the price level in the economy. The continuous gap between aggregate demand and supply causes a positive price expectation, which plays a very important dynamic role in price determination (Pandit, 1978 & 1984; Bhattacharya, 1984; and Ghani, 1991). The studies by Bhattacharya & Lodh (1990), Balakrishnan (1991), Sengupta (1993), Nag & Samanta (1994), Joshi & Little (1997), Parikh et. al. (1998), Mallick (2008), Bhattacharya et. al. (2008), Agrawal (2011), Basu (2011) find that inflation in India (measured from 'wholesale price index') is mainly caused by a rise in central government expenditure with a resulting expansion in money supply. They also find that the growth of real output or aggregate supply has been very much behind the total expenditure of the central government (i.e., a proxy for aggregate demand). However, these studies ignored the impact of each state gross fiscal deficit and revenue deficit on their respective states' consumer price index (a measure of inflation). We know that state governments' gross fiscal deficits are not same as central government's gross

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fiscal deficit. Moreover, all state governments' are showing deficit in their revenue account since 1987-88 onwards that are simply increasing the purchasing power of the people and aggregate demand. Besides, inflation affects the daily wage earners most. Hence, one should use 'consumer price index' not 'wholesale price index' as a measure of inflation. Chaudhuri & Dasgupta (2006) try to explore the political determinants of fiscal policies in the states of India. However, they have not discussed the impact of fiscal and revenue deficit of state governments on inflation in India.

To sum up, almost all studies except a few, support the demand-pull school of thought with particular reference to the monetarist variant of it. According to these studies, the inflation process starts from public investment financed by central government fiscal deficit. Lack of capital coupled with urge for development compels the government to follow the deficit fiscal policy resulting in monetary expansion and inflation through the multiplier mechanism.

The most important aspects neglected in these studies are recent institutional and structural changes. One among such changes includes continuous upward growth of gross fiscal deficit, especially revenue deficit, of all state governments (aggregate figures) in India since 1987-88 onwards except for the years 2006-07, 2007-08 and 2008-09.<sup>2</sup> The past studies have not explored the research question, i.e. does the gross fiscal deficit, revenue deficit and real output (net state domestic product at factor cost at constant prices) of each state government influence their respective consumer price index for industrial workers<sup>3</sup> (i.e., a measure of inflation)? The present study tries to answer the above research question.

### 3. The Methodology and Model

We have used a sample of all 28 Indian federal states. The basic data set is annual data, which covers the period from 1989-90 to 2009-10. We have taken data from 1989-90 as gross fiscal deficits and revenue deficit data for each state government is available from this year and all state governments were showing revenue deficit since 1987-88 onwards. The study covers period up to 2009-10 as till this year actual data (neither 'revised estimate' nor 'budget estimate') on gross fiscal deficit and revenue deficit of each state government is available. The variables used for our empirical framework are as follows:

The dependent variable in our analysis is the consumer price index for industrial workers (CPI-IW), which is the average CPI-IW for all available cities in the state. We have used the average CPI-IW of the closer neighbouring state if any state's CPI-IW figure is not available. Net state domestic product at factor cost at constant price (NSDPfconp), i.e. real output, is used as an independent variable. Besides, gross fiscal deficit (GFD) and revenue deficit (RD) are also used as independent variables in this study. The data sources for all the above variables are the Budget Documents of the State Governments, Labour Bureau and the Centre for Monitoring Indian Economy (CMIE).

Past studies used Ordinary Least Square (OLS) and cointegration econometric models keeping the annual data in mind. The problem in this case might be not finding the correct result due to less number of observations and aggregate nature of data. Besides Unit Root Test and Granger causality test, the present study uses fixed

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effects OLS specification with time effects on the panel data which is the appropriate econometric model to answer the research question mentioned in the review of literature section. We have used Phillips-Perron – Fisher Chi-square Panel Unit Root Test with intercept to check whether the data series for the variables CPI-IW, NSDPfconp, GFD and RD are stationary or non-stationary. This is essential to ascertain that the concerned series are stationary in order to use Granger causality test and panel regression of fixed effects specification. Here panel regression of fixed effects specification is used in order to soak up all state-specific effects. We know that a substantial percent of the sample variation of the CPI-IW is attributable to cross-section rather than time-series. Thus, as a robustness check, we estimate fixed effects with fixed state (i.e., cross-section fixed) and no time variation (i.e., period none) for annual data on variables such as the average CPI-IW for all available cities in the state, NSDPfconp, GFD and RD that can be expressed in the following general form:

$$CPIIW_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it} . \quad (1)$$

where the dependent variable is CPIIW (i.e., CPI-IW) for the  $i^{\text{th}}$  state at time  $t$ , and the vector of independent variables ( $X_{it}$ ) includes NSDPfconp, GFD and RD. The vector  $\beta$  is the vector of coefficients of independent variables, and  $\varepsilon_{it}$  captures the residual errors. The term  $\alpha_i$  represents the effects of those variables particular to the  $i^{\text{th}}$  individual state in more or less the same fashion over time.

### 3.1 Unit Root Test

Time series theories starts by considering the generating mechanism, which should be able to generate all the statistical properties of the series, or at least the conditional mean, variance and temporal autocorrelations, i.e. “linear properties” of the series, conditional upon past data. A series is stationary, called I(0), denoting “integrated of zero”, when the linear properties exist and are time-invariant. Some series needs to be differenced once to achieve these properties and these will be called integrated of order one, denoted I(1). More generally, if a series needs differencing  $d$  times to become I(0), it is called integrated of order  $d$ , denoted I( $d$ ).

There are many substantial differences between two series, I(0) and I(1). An I(0) series has a mean and there is a tendency for the series to return to the mean, so that it tends to fluctuate around the mean, crossing that value frequently and with rare extensive excursions (Granger, 1986). In an I(0) series autocorrelations decline rapidly as lag increases. On the other hand, an I(1) process without drift will be relatively smooth, will deviate widely and rarely return to an earlier value. For testing causality, it is necessary to ascertain that the concerned series are I(0). To verify this, the Phillips-Perron unit root test is employed.

### 3.2 Phillips-Perron (PP) Unit Root Test

Phillips (1987), and Phillips & Perron (1988) suggested an alternative approach for checking the presence of unit roots in the data. They formulated a non-parametric test to the conventional t-test that is robust to a wide variety of serial correlation and time dependent heteroscedasticity. The PP unit root test requires estimation of the following equation (without trend).

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$$X_t = \mu_t + \sum_{i=1}^T X_{t-i} + u_t \quad \dots(2)$$

The bias in the error term results when the variance of the true population

$$\sigma^2 = \lim_{T \rightarrow \infty} E(T^{-1} S_T^2) \quad \dots(3)$$

Differs from the variance of the residuals in the regression equation:

$$\sigma_u^2 = \lim_{T \rightarrow \infty} T^{-1} \sum_{t=1}^T E(u_t^2) \quad \dots(4)$$

Consistent estimators of  $\sigma^2$  and  $\sigma_u^2$  are:

$$S_u^2 = T^{-1} \sum_{t=1}^T (u_t^2) \quad ; \text{ and}$$

$$S_{Tk}^2 = T^{-1} \sum_{t=1}^T (u_t^2) + 2T^{-1} \sum_{t=1}^k \sum_{t=j+1}^T u_t u_{t-j} \quad \dots(5)$$

Where  $k$  is the lag truncation parameter used to ensure that the autocorrelation of the residuals is fully captured. It can be seen from equation (5) that when there is no autocorrelation the last term in the formula defining  $S_{Tk}^2$  is zero and  $\sigma_u^2 = \sigma^2$ .

The PP test-statistic  $[Z(t_\mu)]$  under the null-hypothesis of  $I(0)$  is

$$Z(t_\mu) = \langle S_u | S_{tk} \rangle t_\mu - \frac{1}{2} (S_{tk}^2 - S_u^2) \left[ S_{tk} \left\{ T^2 \sum_{t=2}^T (Y_t - Y_{t-1})^2 \right\}^{\frac{1}{2}} \right]^{-1} \quad \dots(6)$$

### 3.3 Granger Causality Test

Granger (1969) causality test between  $X_t$  and  $Y_t$  which are stationary, i.e.  $I(0)$  can be expressed as:

$$Y_t = b_0 + \sum a_j X_{t-j} + \sum b_j Y_{t-j} + U_t \quad \dots(7)$$

$$X_t = c_0 + \sum c_j X_{t-j} + \sum d_j Y_{t-j} + V_t \quad \dots(8)$$

Where  $U_t$  and  $V_t$  are mutually un-correlated white-noise series. In order to test the pattern of causality, it is necessary to test the equations (7) and (8) and test the null-hypothesis that  $a_j=d_j=0$  for all  $j$  ( $j = 1, \dots, m$ ) against the alternative hypothesis that  $a_j$  and  $d_j$  are not equal to zero for at least some  $j$ 's. Acceptance of null-hypothesis implies lack of causal relationship between  $X$  and  $Y$ . Just as the acceptance of  $a_j = 0$  implies that  $X$  does not cause  $Y$ , acceptance of  $d_j = 0$  implies that  $Y$  does not cause  $X$ .

#### 4. The Findings

It is pertinent to check the stationarity of data series before using causality and panel regression. The Phillips-Perron (PP) – Fisher Chi-square Panel Unit Root Test Statistic (with intercept) shown in **Table 1** clearly shows that all the variables are stationary at level form and have no unit root (i.e., original data for all the variables used in the study are I(0) series).

**Table 1: Phillips-Perron–Fisher Chi-square Panel Unit Root Test Statistic (with intercept)<sup>#</sup>(Automatic Selection of Lags based on Schwarz Information Criterion:0 to 3)**

Variable	Level Form <sup>§</sup>	Null Hypothesis	Inference
CPI-IW	220.618 <sup>*</sup>	Unit root in CPI-IW data series	CPI-IW data are stationary
NSDPfconp	412.976 <sup>*</sup>	Unit root in NSDPfconp data series	NSDPfconp data are stationary
GFD	322.661 <sup>*</sup>	Unit root in GFD data series	GFD data are stationary
RD	292.092 <sup>*</sup>	Unit root in RD data series	RD data are stationary

**Note:** # Newey-West bandwidth selection using Bartlett Kernel method.

<sup>§</sup> Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution.

<sup>\*</sup> Significant at 1 percent level.

As the data series of all the above variables are stationary at level form, we tried to find out their causal relationship. In general it is better to use more rather than fewer lags, since the Granger causality test is couched in terms of the relevance of all past information. In **Table 2**, we have reported Pairwise Granger causality test results with lags 2 as two period lag is an appropriate lag order chosen in terms of the Akaike Information Criterion (AIC). The results of F-statistic stated in Table 2 reveal that there is bi-directional causality between NSDPfconp and CPI-IW, GFD and CPI-IW, RD and GFD. However, there exists unidirectional causality from NSDPfconp to GFD, and from NSDPfconp to RD. Pairwise Granger causality test reveals the relationship between variables. Hence, the joint influence of independent variables on the dependent variable cannot be captured through Granger causality test. Thus, we used panel regression of fixed effects specification in order to explore the joint influence of real output, gross fiscal deficit and revenue deficit on inflation, and to soak up all state-specific effects.

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**Table 2: Pairwise Granger Causality Test (with lags 2)**

Null Hypothesis	F-Statistic	Inference
NSDPfconp does not cause CPI-IW	6.52*	NSDPfconp causes CPI-IW
CPI-IW does not cause NSDPfconp	47.77*	CPI-IW causes NSDPfconp
GFD does not cause CPI-IW	3.66**	GFD causes CPI-IW
CPI-IW does not cause GFD	22.50*	CPI-IW causes GFD
RD does not cause CPI-IW	0.02	RD does not cause CPI-IW
CPI-IW does not cause RD	0.36	CPI-IW does not cause RD
GFD does not cause NSDPfconp	0.53	GFD does not cause NSDPfconp
NSDPfconp does not cause GFD	3.86**	NSDPfconp causes GFD
RD does not cause NSDPfconp	0.86	RD does not cause NSDPfconp
NSDPfconp does not cause RD	4.75*	NSDPfconp causes RD
RD does not cause GFD	5.64*	RD causes GFD
GFD does not cause RD	9.81*	GFD causes RD

**Note:** \* significant at 1 percent level; \*\* significant at 5 percent level

We know that real GDP of current period is not influencing the current period inflation. This is because there is a time lag between supply and demand. Similarly governments budgeted expenditure and revenue in the Revenue Account may influence CPI-IW at a certain lag. Hence, by using Akaike Information Criterion (AIC), we came to know that NSDPfconp and RD with 2 period lag is appropriate.

First, we examine the results of fixed effects specification with time effects for annual data reported in Table 3 to explore the impact of each independent variable (NSDPfconp with lag 2, RD with lag 2 and GFD) on CPI-IW. The result shows that while gross fiscal deficit and revenue deficit with 2 period lag are positively and significantly influencing CPI-IW, NSDPfconp with 2 period lag is negatively but insignificantly influencing CPI-IW over the period.

Further, we reported in Table 4 the panel multiple regression results of fixed effects specification which states the joint influence of independent variables on the dependent variable. The result reveals that only gross fiscal deficit is positively and significantly influencing CPI-IW. However, the coefficient signs of NSDPfconp and RD with 2 period lag are as per theoretical expectation (Table 4, Column 4), i.e. real out and inflation are negatively related, and revenue deficit and inflation are positively related. When tried to explore by considering only 2 independent variables as shown in Table 4 (Columns 5, 6 & 7), we find that gross fiscal deficit and revenue deficit with 2 period lag are positively and significantly influencing CPI-IW. In this case also NSDPfconp is negatively and insignificantly influencing CPI-IW, thus supports the findings of Bhattacharya (1993) and Keynesian explanation of demand-pull inflation.

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**Table 3: Panel Simple Regressions, Fixed Effects Specification with Time Effects (Cross Section: Fixed; Period: None; Dependent Variable: Consumers Price Index for Industrial Workers)**

VARIABLES	(1)	(2)	(3)
Constant	91.75* (0.267)	91.62* (0.254)	91.81* (0.220)
NSDPfconp2	-0.00000103 (0.00000318)		
GFD		0.0001* (0.0000576)	
RD2			0.0001* (0.0000833)
Observations	499	552	496
Adjusted R-squared	0.979	0.979	0.979
D-W statistic	1.466	1.093	1.453

**Note:** NSDPfconp2 = Net State Domestic Product at factor cost at constant price with 2 period lag; GFD = Gross Fiscal Deficit; RD2 = Revenue Deficit with 2 period lag; Standard errors are reported in parentheses; \* significant at 1 percent level ( $p < 0.01$ ); \*\* significant at 5 percent level ( $p < 0.05$ ). The dependent and independent variables are annual data.

**Table 4: Panel Multiple Regressions, Fixed Effects Specification with Time Effects (Cross Section: Fixed; Period: None; Dependent Variable: Consumers Price Index for Industrial Workers)**

VARIABLES	(4)	(5)	(6)	(7)
Constant	93.48* (0.328)	92.15* (0.275)	93.04* (0.277)	92.97* (0.316)
NSDPfconp2	-0.00000233 (0.00000339)	-0.000002 (0.00000336)		-0.00000104 (0.0000032)
GFD	0.0001** (0.0000646)		0.0001* (0.000063)	0.0001* (0.0000623)
RD2	0.0001 (0.0000915)	0.0001** (0.0000886)	0.0001 (0.000087)	
Observations	449	480	465	468
Adjusted R-squared	0.979	0.979	0.979	0.979
D-W statistic	1.193	1.499	1.167	1.164

**Note:** NSDPfconp2 = Net State Domestic Product at factor cost at constant price with 2 period lag; GFD = Gross Fiscal Deficit; RD2 = Revenue Deficit with 2 period lag; Standard errors are reported in parentheses; \* significant at 1 percent level ( $p < 0.01$ ); \*\* significant at 5 percent level ( $p < 0.05$ ). The dependent and independent variables are annual data.

## 5. Summary and Conclusions

Having discussed the results, it is appropriate to conclude with a discussion of a policy formulation in the background of the findings of the study. The nature and justification of a policy measure can only be obtained from the theoretical mechanism that relates to changes in the policy instruments and its effects on the price level.



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From the foregoing discussion it emerges that the state of inflation in India has become a built-in feature of the economy because of the imprudent fiscal policies of the state governments in recent years. The major cause of inflation in India is the increase in fiscal deficit (especially revenue deficit) of not only the central government but also state governments. The imprudent fiscal policies result a fast increase in money stock as against an increase in real output that ultimately lead to deficit financing incurred by the government and price rise. The slow growth of output could be because of the structural changes that has been taking place in India since 1960s, in the face of the basic rigidities related with inelasticity of agricultural production as well as the instability of export earnings. It may result in increasing pressure on the balance of payments (current account) coupled with increasing size of fiscal deficit, increasing population and growing money supply leading to an inflationary climate in the economy that aggravates the crisis in the process.

The above inflationary situation not only needs reduction in aggregate demand to match with aggregate supply but also requires a balance between demand for and supply of basic wage goods. It, therefore, calls for a judicious mixture of policy instruments aimed at augmenting supplies and simultaneously controlling demand. It is true that artificial scarcity in supply is created by blackmarketeers and hoarders. No amount of economic logic or social concern can bring the desired results unless a vigorous attempt is made to eliminate corruption and nepotism at various levels in society. An inflation fighting kit in India's conditions, therefore, requires not only a proper mix of monetary and fiscal policies, but also income policy regulation, administrative including direct physical controls, planning and, above all, a wage-goods production oriented strategy that can satisfy the demand of a vast majority of population who are below the level of subsistence. No anti-inflationary policy can, therefore, fetch the desired results unless the production and distributional shortcomings of wage-goods are sternly dealt with.

The scope of the study is limited to the evaluation of the impact of state fiscal policy on inflation in India. However, inflation in India might be due to other structural factors such as flood, bad monsoon, crude oil price rise, continuous border tension and increase in defence expenditure, black money, trade policy, etc. that are not captured in this study.

## Endnotes

<sup>1</sup> Bhattacharya (1984), Bhattacharya & Lodh (1990), Bhattacharya & Guha (1992), Ghosh (1987), Buitter & Patel (1992, 1997), Nag & Samanta (1994), Jha et. al. (1995), Prusty (2001), Bhattacharya et al. (2008), Agrawal (2011), Basu (2011).

<sup>2</sup> See Appendix.

<sup>3</sup> Consumer Price Index (CPI) for Industrial Worker is used here as a measure of inflation as CPI for Agricultural Labourers and CPI for Urban Non-Manual Employees figures is not available for the period under study.

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### Appendix

#### Key Deficit Indicators of the State Governments (*Rupees Crore*)

Year	Gross Fiscal Deficit	Revenue Deficit	Net RBI Credit
1974-75	1243	-395	133
1975-76	1102	-972	92
1976-77	1515	-1097	22
1977-78	2038	-1019	142
1978-79	2643	-1135	-418
1979-80	2873	-1548	339
1980-81	3713	-1486	487
1981-82	4062	-1379	789
1982-83	4986	-888	-984
1983-84	6359	-210	38
1984-85	8199	923	1486
1985-86	7521	-654	-1862
1986-87	9269	-170	516
1987-88	11219	1088	-157
1988-89	11672	1807	425
1989-90	15433	3682	255
1990-91	18787	5309	420
1991-92	18900	5651	-340
1992-93	20892	5114	176
1993-94	20364	3872	591
1994-95	27308	6706	48
1995-96	30870	8620	16
1996-97	36561	16878	898
1997-98	43474	17492	1543
1998-99	73295	44462	5579
1999-00	90098	54549	1312
2000-01	87922	55316	-1092
2001-02	94261	60398	3451
2002-03	99727	57179	-3100
2003-04	120631	63407	293
2004-05	107774	39158	-2705
2005-06	90084	7013	2425
2006-07	77509	-24857	640
2007-08	75455	-42943	1140
2008-09	146349	-10701	602
2009-10	199510	32295	-

**Note:** 1. Data for 2008-09 relate to Revised Estimates while 2009-10 are Budget Estimates. Data relate to 28 State Governments.

2. Negative (-) sign indicates surplus in deficit indicators.

3. Net RBI Credit: Data pertain to State Governments having accounts with the Reserve Bank of India.

**Source:** Budget documents of the State Governments & Handbook of Statistics on Indian Economy, Sep 15, 2010.