Stock Market Development, Capital Accumulation and Growth in India since 1950

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Abstract

This study examines whether there exists a long-term relationship between Indian share price movements and growth through capital accumulation over more than half a century period since 1951. Using the Autoregressive Distributive Lag (ARDL) approach to cointegration developed by Pesaran and Shin, our study shows that no long-term relationship exists between the gross-fixed capital formation (total as well as private) as percentage of GDP and nominal or real share price. There is also no relationship between the growth rate and share prices (both nominal and real). There is also no relationship if we consider the growth rates in share price.

Keywords: Globalisation, Liberalisation, Stock Market, India and Development

JEL Classifications: E44, G11, O16

I

Since the early 1950s till the early 1990s, Indian policy makers had been nourishing the goal of Socialist pattern of society. They had been following the development planning strategy of the former Soviet Russia in a mixed economic framework. From July 1991, in the face of an unprecedented foreign exchange crisis, Indian economy started experiencing an IMF-World Bank dictated regime of liberalisation.

One aspect of this is financial liberalisation. There is a move towards privatisation of nationalised banks – these banks are selling their shares in the stock market. Transnational banks are encouraged to operate in the Indian banking sector. Attempts are made to attract foreign direct investment in different sectors. There is an increasing entry of foreign portfolio capital due to stock market liberalisation. People are encouraged to invest in stocks through income tax benefits and abolition of capital gains tax. There is a move to develop a national pension fund which will be invested in different stocks to get returns out of which pension will be provided to retired people. It is expected that boosting up of stock market will accelerate the process of capital accumulation and growth.

Stock market development has been an important part of financial liberalisation in the less developed countries (LDCs). In the pro-liberalisation circle, stock market is assigned to play an important role in the capitalist development of LDCs.

There are many studies supporting the positive link between stock market development and growth. Let us mention some of the recent studies. One important study was undertaken by Levine and Zervos (1998). Their cross-country study found that the development of banks and stock markets has a positive effect on growth. In another study Levine (2003) argued that although theory provides ambiguous relationship between stock market liquidity and economic growth, the cross-country data for 49 countries over the period 1976-93 suggest a strong and positive relationship (see also Levine, 2001). Henry (2000) studied a sample of 11 LDCs and observed that stock market liberalisations lead to private investment boom. Recently, Bekaert et al (2005) analysed data of a large number of countries and observed that the stock market liberalisation 'leads to an approximate 1 % increase in annual real per capita GDP growth'.

There are some economists who are sceptical. Long time back Keynes (1936) compared the stock market with casino and commented: 'when the capital development of a country becomes the by-product of the activities of a casino, the job is likely to be ill-done'.

Referring to the study of World Bank (1993) Singh (1997) pointed out that stock markets have played little role in the post-war industrialisation of Japan, Korea and Taiwan. He argued that the recent move towards stock market liberalisation is 'unlikely to help in achieving quicker industrialisation and faster long-term economic growth' in most of the LDCs.

In this perspective this study examines the nature of relationship between stock market and growth through capital accumulation in India.

II

From the website of IMF, annual macro level data are available for many countries including India in the post-Second World period. In many cases the earliest year for which data are available is 1950. India's stock (share) price and wholesale price index (WPI) data are available over the period, 1950-2004. These are plotted in Figure 1. It shows that the growth in wholesale price index showed a steady growth since the mid-1950s while stock or share price index showed a sharp rise (sharper than price rise) since the mid-1970s after a quarter century of very slow growth. The process slowed down in the 1990s. In real terms (i.e. the ratio of stock price to wholesale price), share price declined till mid-1970s and thereafter rose sharply amidst fluctuations till the early 1990s (Figure 2). The picture doesn't change much if real share prices are derived by deflating the nominal share prices by the consumer price indexes.

Regression analysis shows that the share price rose at a statistically significant rate of 9 percent per annum over the whole period 1950-2004; during 1950-75, the growth was not statistically significant but afterwards there was a rapid growth of 14 percent per annum. In real terms there was no significant growth over the whole period; actually it declined at the rate of 3 percent during 1950-75 followed by a rise of 9 percent per annum in the subsequent period (Table 1).

To ascertain whether share prices are trend-stationary or random walk with drift we have conducted Augmented Dickey-Fuller (ADF) tests and Perron tests (in view of structural shifts), orders being chosen on the basis of the data-dependent General-to-Specific (GS) criterion (for details see Table 1 note 2) as advocated by Ng-Perron (1995) and Perron (1997). In no case can we reject the null hypothesis of unit root with drift.

Behaviour of gross fixed capital formation as percentage of GDP is shown in Figure 3. It has been rising without major structural change. The annual percentage growth of this ratio is about 2 per cent (Table 1). It is found to be a trend-stationary process.

We have also data on gross private fixed capital formation as percentage of GDP available from Government of India (Economic Survey). It also shows a growth of 2 per cent per annum on a trend-stationary growth path (see Table 1 and Figure 4).

Annual growth rate of GDP volume (GDP index in 2000 prices) shows some evidence of growth amidst much fluctuation (Figure 5) so that the adjusted R square is very low although it is a trend- stationary process. Annual growth rate in the volume of industrial production (industrial production index in 2000 prices) is also a stationary process without any significant evidence of growth during 1960-2004 (see Figure 6 and also Table 1).

In the next stage, we seek an answer to the question: is there any link between share market and growth of output and fixed capital formation. More specifically we examine

whether there exists a long-term relationship between share price movement and growth through capital accumulation over more than half a century period for which data are available. For this we shall use Autoregressive Distributive Lag (ARDL) approach to cointegration developed by Pesaran and Shin (1999). This technique can be used to test for the existence of a long run relationship between two variables irrespective of whether they are stationary or stochastic (having unit root). This approach is especially suitable here as the real and nominal share price series exhibit unit root processes while growth and capital accumulation series are stationary.

The ARDL equation fitted here is the following

$$(1) \qquad Y_t = a + b.t + \sum_{i=1}^{n} c_i Y_{t-i} + \sum_{j=0}^{m} d_j X_{t-j}$$

where Y_t is the dependent variable – annual percentage growth rate of real GDP (GRGDP)/ industrial output (GRINDP) or the share of gross fixed capital formation (total or only private) in GDP — log values (LGKFGDP or LPVTIGDP) in period t, X_t is the log of nominal or real share price index in period t (LSHARE or LRSHARE), t is the time trend which captures the effect of other explanatory variables and m, n are unknown lags (with the maximum value = 12) to be determined by Schwarz Bayesian criterion (SBC) as suggested by Pesaran and Shin (1999).

The long run coefficients estimated through the ARDL approach are reported in Table 2.

These show no long-term relationship between (log values of) gross-fixed capital formation – total as well as private as percentage of GDP (LGKFGDP and LPVTIGDP) and (log values of) nominal or real share price (LSHARE or LRSHARE). There is also no relationship between the growth rate (of real GDP and industrial output) and share prices (both nominal and real – log-values). There is also no relationship if we consider the growth rates in share price (by taking the log-difference of share prices).

This finding supports our earlier conclusion (Sarkar, 2006). Our earlier analysis of a sample of 31 less developed countries shows that the cross-country variations in stock market capitalization as a percentage of GDP- an important indicator of stock market development- do not explain the cross-country variations in the growth rates of gross fixed capital formation. Time series analysis of individual country cases shows that in the majority of cases (including India) there exist no meaningful relationship between stock market capitalization as a percentage of GDP and growth of gross fixed capital formation. Thus both of our studies discount the importance of stock market development in promoting industrial growth through capital accumulation in less developed countries such as India.

Table 1

Trends in India's Share Prices, Growth and Capital Accumulation[1] in the Post-Second World War Period

Dependent Variables/ Period & Process	Intercept	Time	Intercept Dummy	Slope Dummy	Adj. R Sq.	D-W Stat.	ADF Stat.[2]
Share Price (Nominal) -Log values (LSHARE), 1950-2004							
OLS	-0.86**	0.09**			0.84	0.09	1.502 (0)
AR (1)	-0.27	0.09**			0.99	1.79	
OLS	0.25*	0.02*	-4.07**	0.15**	0.97	0.45	-2.599 (0)
AR (1)	0.24	0.02	-3.88**	0.14**	0.99	1.84	
Share Price (Real) -Log values (LRSHARE), 1950-2004							
OLS	2.77**	0.02**			0.29	0.11	-1.136 (0)
AR (1)	3.0**	0.02			0.93	1.88	
OLS	3.65**	-0.03**	-3.75**	0.13**	0.87	0.52	-0.05 (10)
AR (1)	3.61**	-0.03**	-3.38**	0.12**	0.94	1.85	
Gross Fixed Capital Formation-GDP Ratio – Log values (LGKFGDP), 1950-2003							
OLS	2.37**	0.02**			0.88	0.65	-2.987# (0)
AR (1)	2.37**	0.02**			0.93	1.8	

Gross Private Fixed Capital Formation-GDP Ratio – Log values (LPVTIGDP), 1950-2003							
OLS	1.83*	0.02**			0.88	1.55	-6.01[@] (0)
AR (2)	1.82	0.02			0.91	2.21	
Annual Growth Rate of Real GDP (GRGDP), 1951-2003							
OLS	3.16**	0.05*			0.06	2.35	-8.372[@] (0)
Annual Growth Rate of Real Industrial Output (GRINDP), 1961-2004							
	5.19**	0.02			-0.02	1.5	-5.04[$] (0)

1. The fitted equation is:

$$Y = a + b.t + c.\ D + d.\ SD$$

where Y is the dependent variable, t = time , D = intercept dummy = 0 for 1950-75 data and = 1 for other data and SD= slope dummy = t.D. Setting the parameters (a, b, c, d) equal to zero alternative regression equations are fitted through the ordinary least square (OLS) technique. A twelve-order Lagrange Multiplier test is conducted to ascertain the lag structure of the autoregressive (AR) error process and the parameters and their t-values are re-estimated through the maximum likelihood process.

2 The data-dependent General-to-specific (GS) criterion is used to choose the optimum lag structure of the error process of the Dickey-Fuller equation as advocated by Ng-Perron (1995) and Perron (1997). Under this process, the specific order is chosen out of the general order (we considered here 12 lags) on the basis of the standard t-tests of significance of the lag terms. If out of 12 lag terms considered here, the 8^{th} lag (say) term is statistically significant but all higher order lag terms are insignificant we run an 8^{th} order ADF equation and check whether 8^{th} order lag is significant. If now (say) the 6^{th} order lag term is significant but the higher order lag terms are insignificant, we fit a 6th order ADF equation and check the maximum order significant lag terms. If the 6^{th} order lag term is significant the appropriate ADF model is taken to be 6^{th} order. If not, the process continues until we arrive at the zero-order ADF (i.e. DF) equation.

* Significant at 5 per cent level.

** Significant at 1 per cent level.

The null hypothesis of unit root is rejected at 10 per cent level (based on 1000 simulations through boot-strapping method).

$ The null hypothesis of unit root is rejected at 5 per cent level. In view of insignificant time trend it is dropped so that the alternative hypothesis accepted is stationarity.

@ The null hypothesis of unit root is rejected in favour of trend-stationary alternative at 5 per cent level.

Table 2

Share Price, Growth and Capital Accumulation: Estimates of Long-term Relationships through ARDL Method[1], 1950/51-2003

Dependent Variable/Period (Lag-structure)	Nominal Share Price – log values (LSHARE)	Real Share Price – log values (LRSHARE)	a	t
I. Gross Fixed Capital Formation-GDP Ratio – log values (LGKFGDP), 1950-2003				
(1,0)	-0.05		2.46**	0.02**
(1,0)		-0.05	2.66**	0.01**
II. Private Fixed Capital Formation-GDP Ratio –log values (LPVTGDP), 1950-2003				
(0,0)	0.03		1.86**	0.02**
(0,0)		0.03	1.76**	0.02**
III. Growth of Real GDP (GRGDP), 1951-2003				
(0,0)	0.49		3.26	0.01
(0,0)		0.32	1.64	0.06
	(log-difference)	(log-difference)		
(0,0)	0.17		2.17	0.08
(0,0)		0.01	2.21	0.07
IV. Growth of Real Industrial Output (GRINDP), 1961-2004				
(0,0)	0.02		3.2	0.06
(0,0)		-0.03	3.13	0.07
	(log-difference)	(log-difference)		
(0,0)	0.72		3.32	0.06
(0,0)		0.01	3.42	0.06

** Significant at 1 per cent level (based on asymptotic standard errors).

* Significant at 5 per cent level (based on asymptotic standard errors).

1 The fitted equation is

$$Y_t = a + b.t + \sum_{i=1}^{n} c_i Y_{t-i} + \sum_{j=0}^{m} d_j X_{t-j}$$

where Y_t is the dependent variable – annual percentage growth rate of real GDP or real industrial output (GRGDP or GRINDP)) or share of gross fixed capital formation (total or private) in GDP– log values (LGKFGDP or LPVTIGDP) in period t, X_t is the log of nominal or real share price index in period t (LSHARE or LRSHARE) and m, n are unknown lags to be determined by Schwarz Bayesian criterion (SBC).

In the cases where we find insignificant time trend, we have also fitted the above equation without time trend but the basic result does not change.

Figure 1: *India's Share and Wholesale Price Indices (log values), 1950-2004 (2000=100)*

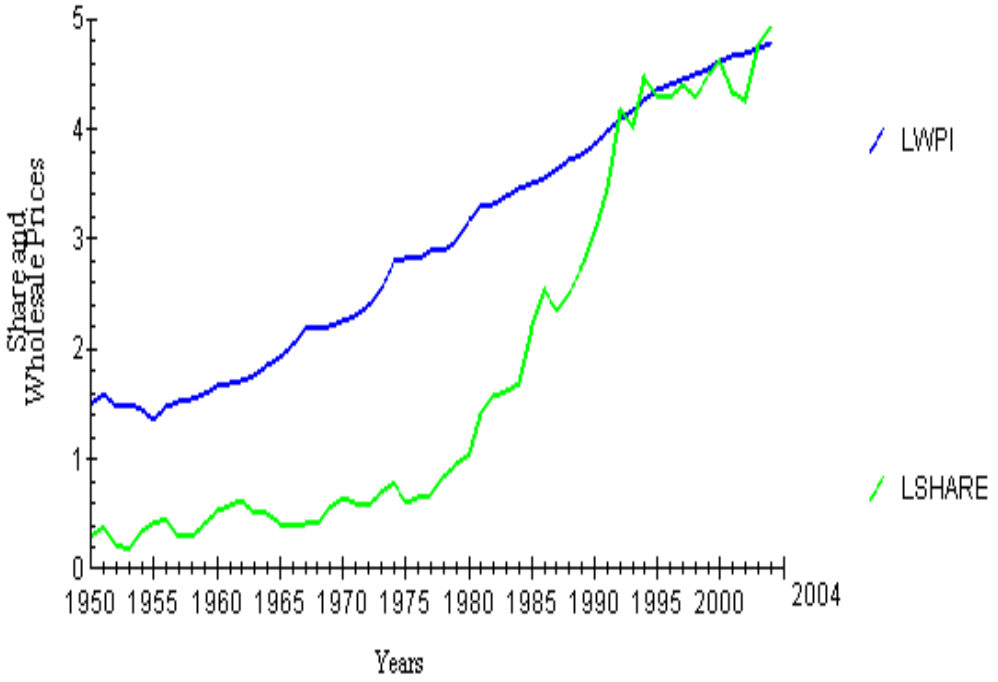


Figure 2: *India's Real Share Prices (log-values), 1950-2004*

(2000=100)

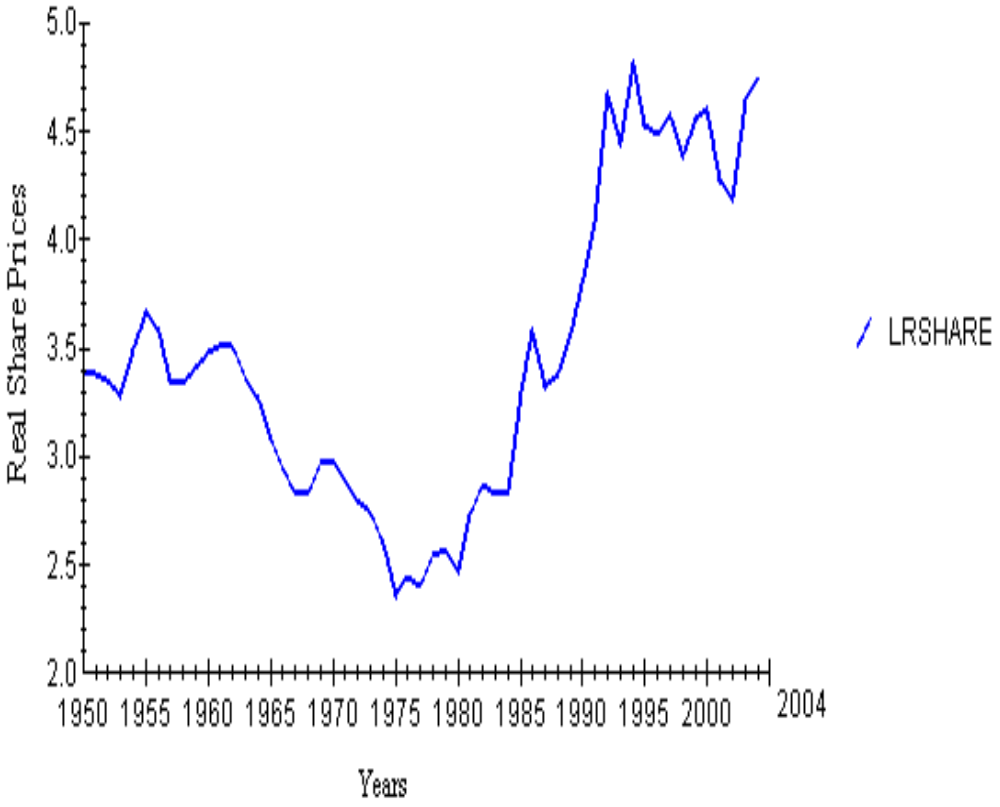


Figure 3: *Share of Gross Fixed Capital Formation in India's GDP (log-values) 1950-2003*

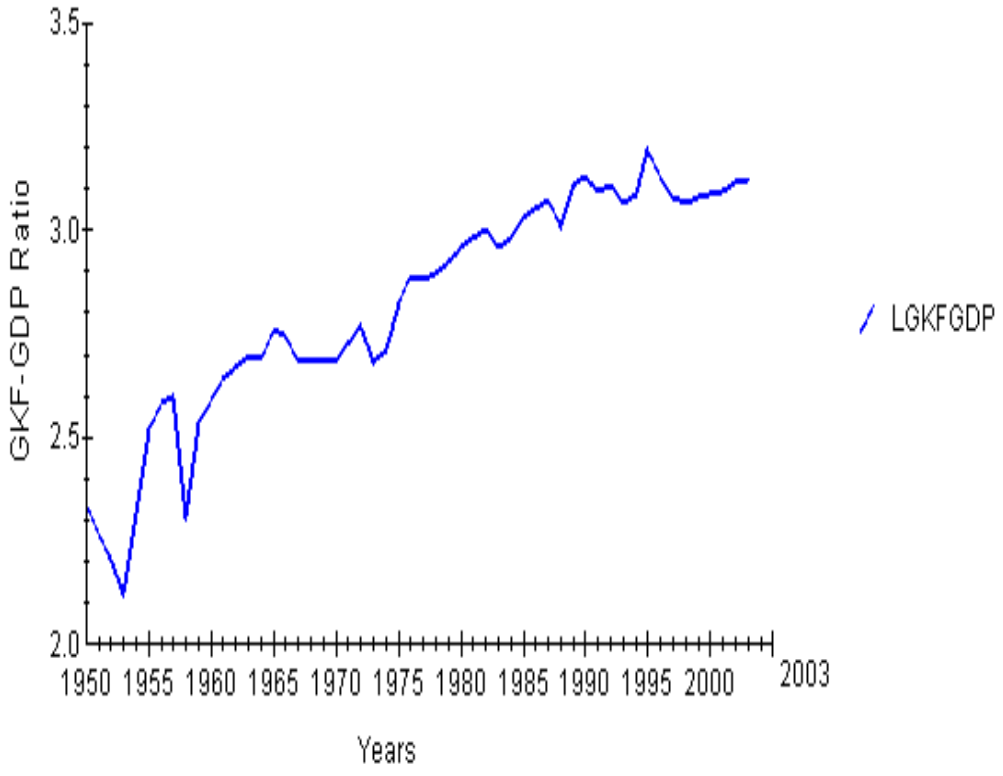


Figure 4: *Share of Gross Private Fixed Capital Formation in India's GDP*
(Log-values)
1950-2003

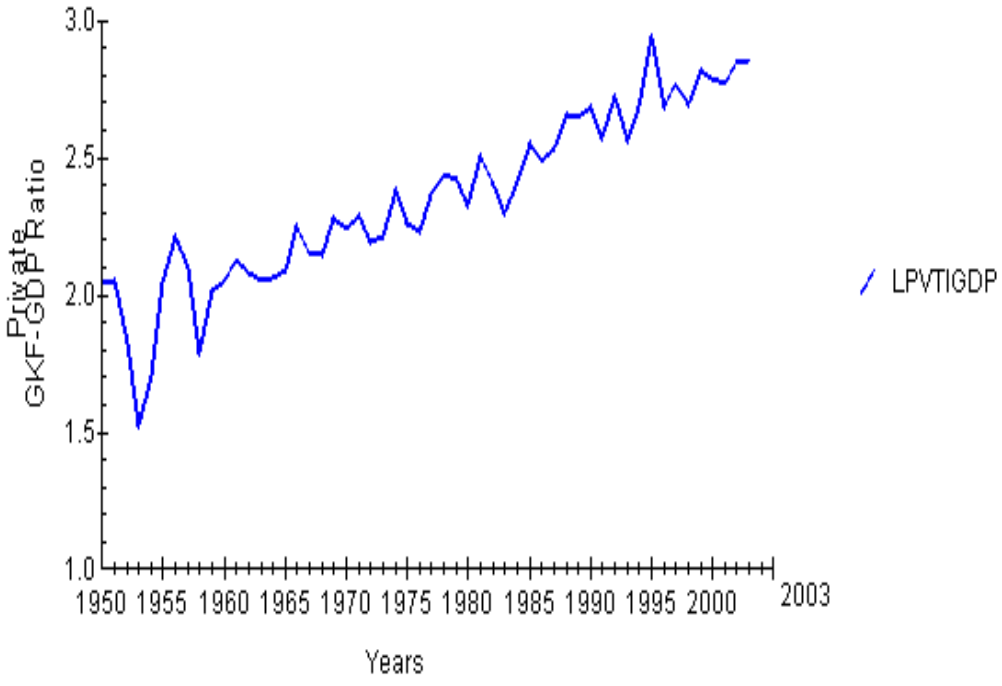


Figure 5: *India's Annual Growth Rate of Real GDP, 1951-2003*

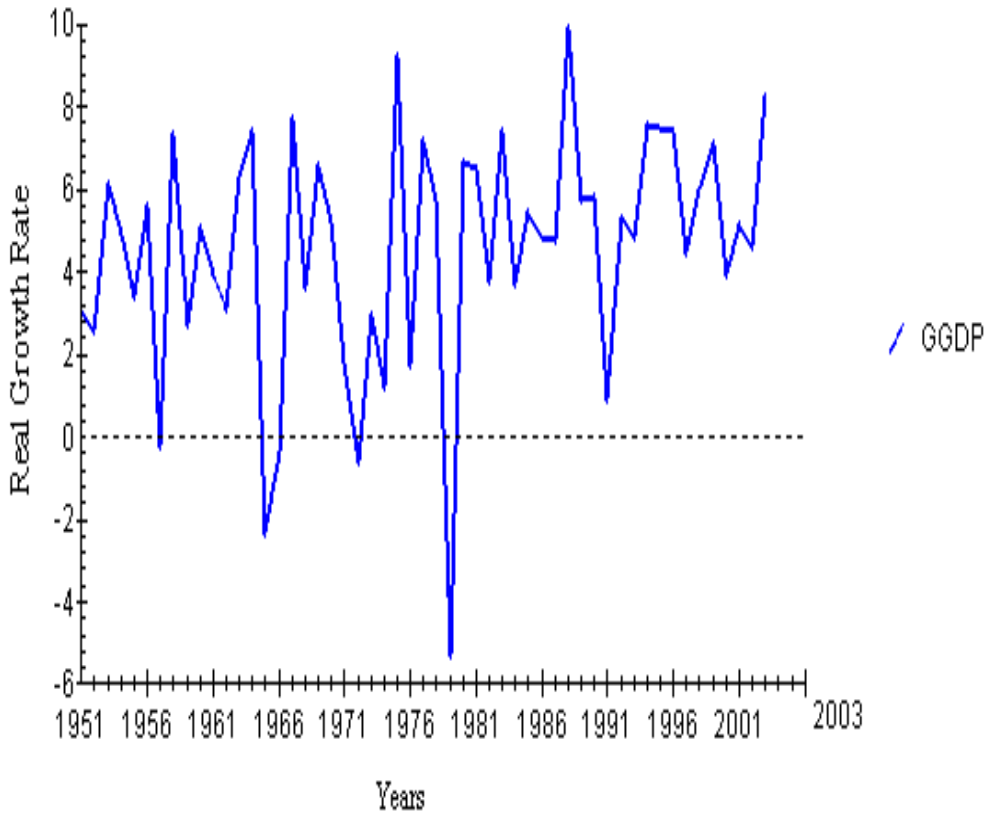
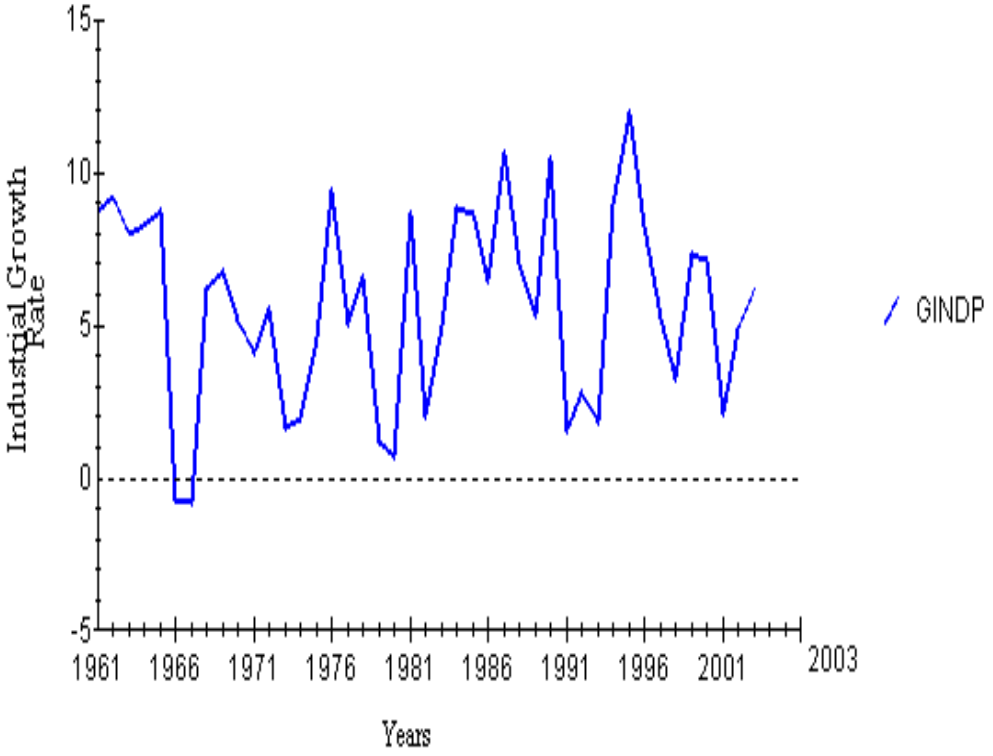


Figure 6: *India's Annual Growth Rate of Real Industrial Output, 1961-2003*



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