CHAPTER: 6

GROWTH-INFLATION TRADE OFF IN MANIPUR
Growth – Inflation Trade off in Manipur

6.1 Introduction

In the 1950s and 1960s the growth costs of inflation were not considered a serious issue. For a long time and up to the late 1960s the relationship between inflation and growth was considered either innocuous or even positive\(^1\). However the persistence of high inflation and low growth in the 1970s prompted economists to review the relationship. In India also in the early stages of economic growth after independence, inflation was not considered a major problem. Over time high inflation rate came to be considered a major problem in India. It has become a central concern of policy makers due to the undertaking of reforms in the Indian economy since July 1991. Weakening export competitiveness due to high inflation rate in the domestic market, unproductive activities of business preoccupied with inflationary gains and the growing frustration of workers confronting a widening disparity in the distribution of income and wealth seem to undermine the growth potential of a developing country like India. The views now range from “inflation however low or high only adversely affects growth” to “inflation adversely affects growth only during extreme inflationary periods”. There is yet an intermediate position, which argues that inflation, affects growth only if it breaches a specific ‘threshold’ rate of inflation but not otherwise.\(^2\)

In the case of economic growth, the widespread prevalence of regional disparity has prompted researchers to work at the regional level looking for region-specific correlates of economic growth. However the issue of inflation has generally been discussed at the highest aggregate level i.e. at the national level. Chakravarty Committee Report (1985) pointed out that efforts to contain inflation have been thwarted by undue reliance on analysis at the aggregate levels. The report added that there would be more room for agreement as to policy actions at a disaggregative level. So for analysis of inflation at the disaggregative level has meant disaggregation at the


\(^2\) Sarel, M. (1996) “Non-linear Effects Of Inflation On Growth” IMF staff papers vol. 43 No.1
broad commodity level such as Foodgrains, Primary articles other than foodgrains, other essential commodities, luxury items, agro-based industrial raw materials, imported industrial raw materials, agricultural inputs, other industrial raw materials and other manufactured items.  

Disaggregation over space i.e. Study of inflation at sub-national level (or state level in India) is rare partly because correlates of inflation such as money supply, exchange rate, interest rate etc. are better understood at the national level. State level estimates of money supply, an important correlate of inflation in economic theory, are practically non-existent. After Velayudham & Menon (1984) no attempt seems to have been made in this direction. Price-rises have different intensities on different sections of the population affecting more adversely the poor than the rich. Thus inflation and its correlates may be meaningfully studied also at the sub-national level given the diversity in regional development.

In this Chapter, a selective survey of literature on inflation-growth trade-off will be followed by discussion of the following issues.

1. How does the inflation experience of Manipur compare with that of India?
2. What has been the nature of relationship between economic growth and inflation rate in Manipur?

6.2 A Selective Survey of Literature:

The experience of inflation varies greatly both across countries and over time. Some developing countries e.g. Bahrain, Singapore have average inflation rates in recent decades that are similar to the experience of industrialized countries e.g. Germany and Japan. Some countries have recently experienced hyperinflations. In Argentina prices rose by a factor of 600 between May 1989 and March 1990. Many other countries have experienced triple digit annual inflation. The all-time record inflation appears to have occurred in Hungary between August 1945 and July 1946 when the price level rose by a factor of approximately $10^{22}$. During the peak month of this inflation, prices on average tripled daily.

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1 Nag, A.K. & G.P. Samanta (1994) "Inflation in India during the 80's: An analytical Review" Economic & Political weekly vol. XXIX no.8 Feb 19
3 RadhaKrishna, R. & A.Sarma (1976) "Inflation and Disparities in the level of living" Indian Economic Journal vol. 23, No.4
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Many of the countries that have experienced hyperinflation or very high inflation have also had extended periods of low inflation. The wide range of inflation rates experienced by a variety of highly dissimilar economics in the world during the past three decades is also associated with almost equally divergent GDP growth rates.

It is often conjectured that a mild inflation is conducive to growth. Some development theories suggested situations in which inflation might be useful for the growth through a forced saving mechanism. Israel grew at around 10 percent per annum throughout 1948-1973 with an inflation rate of around 6/7 percent per annum. The higher, largely anticipated, inflation was considered a price for growth as widespread indexation of wages, effective exchange rates and savings minimized the distortionary costs of inflation\(^7\). Development economists argued that inflation could have a favourable effect on real growth since it would induce forced saving, provide inflation – tax revenue to government to finance investment, shift income distribution to generate higher saving and increase profit rate to give incentive to higher investment. Brahmananda (1980) argued that inflation is initiated by a high rate of growth of bank credit to the industrial commercial sector. Liberal Credit Policies help entrepreneurs and innovators. Changes in technology are initiated and speeded up by liberal credit policy leading to innovations and productivity improvements\(^8\). The proposition of non-neutrality of money, a key element of the Keynesian revolution, advances the view that an increase in money supply, by raising price level, can reduce real wages. It brings about an improvement in real economic activity over the underemployment level. This gave rise to an apparent trade – off between price stability and growth \(^9\). EPW Research Foundation (1995) pointed out that a higher rate of economic growth within a distorted socio – economic structure will require a higher level of inflation\(^10\).

Thinking on growth and inflation began to change after the 1970s and 1980s provided several instances of high and hyper-inflation accompanied by growth collapse. This period witnessed high inflation co-existing with sharp deceleration in their employment and growth levels for prolonged periods of time. The rational expectation approach also argues that under flexible markets, repeated monetary


shocks meant to facilitate growth can lead to ever increasing levels of inflation in the long run.

Inflation produces a number of distortions in the economy in the form of adverse trade balance in a fixed exchange rate regime, food price controls due to the political power of urban workers and disintermediation due to the official rigidity of nominal interest rates paid by financial intermediaries. These structural distortions create inefficiencies to retard the pace of economic growth. The rationale for adverse effects of inflation on economic growth in the neo-classical tradition are as follows:

(i) All nominal prices do not change quickly in response to the inflationary pressure because of the cost of adjustment. Many sectors face a decline in their real prices, which also lower their output.

(ii) Inflation enhances uncertainty in which risk—adverse economic agents face a higher cost for their allocative decisions. This leads to a decline in real output and economic growth.

(iii) Another cost of inflation is the decline in the real value of money balance caused by the increase in the nominal interest rate. The attempt to economise the use of money in transactions leads to a decline in real output.

In structural models of inflation there is a trade-off between growth and inflation. This is not due to Phillips type wage change—unemployment rate relationship but due to differential growth of output and demand between sectors. With the Phillips curve, the higher the rate of wage inflation the lower would be the rate of unemployment. This model of inflation is inappropriate in developing countries particularly because organised labour market forms a minor segment of the total labour market in such countries. In the unorganised sector wage rate has no direct relationship with productivity of labour and is not significant in the determination of goods price.11

De Gregorio (1993) presents compelling evidence of the deleterious effects of high inflation on economic growth. In an endogenous growth model De Gregorio studied the effects of inflation on the rate of investment and on the

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10EPW Research Foundation (1995) “Myth of Inflation Control” EPW Jan 7,

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productivity of investment in the context of 12 Latin American Countries for the period 1950-85.\textsuperscript{12} In periods of inflation speculative investment in real estate crowds out productive investment in manufacturing industries. It also lowers physical and human capital accumulation. Empirical evidence in the cross-country framework generally supports the proposition that a high and volatile inflationary environment adversely effects capital accumulation and productivity growth. It brings down the growth potential.\textsuperscript{13}

Fisher (1993) found stronger negative association between inflation and growth in cross sectional and times series studies.\textsuperscript{14} Dornbusch & Fisher (1993) also found that disinflation from moderate inflation to low e.g. in Ireland, Korea and Spain was achieved at a significant cost to output.\textsuperscript{15}

Bruno & Easterly (1995) is critical of the conventional assumption of a linear or log-linear functional form for inflation and growth. Conventional tests of the inflation – growth relationship are jointly testing the hypothesis that inflation matters for economic growth with the hypothesis that a priori implausible functional form holds between the two variables.\textsuperscript{16} They use the non-parametric approach which is robust to any monotonic functional relationship between inflation and economic growth as well as to threshold functions in which only high inflation matters. They found that there was no conclusive answer as to whether growth was already below normal prior to an inflation crisis. Growth was found to be significantly below normal during the period of the inflation crisis. Growth was also above normal after a crisis was over. The threshold for an inflation crises according to them, was annual consumer price index inflation at or above 40 percent measured December to December for two consecutive years or more. The case for an inflation-growth trade-off was firmly established by examining the temporal association of growth with discrete high inflation crisis. The case for growth effects of low to moderate inflation rates was found to be ambiguous. These results support the view that the costs of inflation – relative price variability, uncertainty, loss of information content of prices,

\textsuperscript{12} De Gregorio, J.(1993) "Inflation, Taxation and Long-Run Growth" Journal of Monetary Economics 31 (2)
\textsuperscript{13} Rangarajan, C. (1998) "Development, Inflation and Monetary Policy" in I.S. Alluwalia & I.M.D. Little (ed) "India's Economic reforms and development" P-59
\textsuperscript{14} Fisher, S.(1993) "the Role of Macro- Economic Factors in Growth" Journal of Monetary Economics 32(3)
\textsuperscript{16} Bruno, M. & W. Easterly (1995) op. cit. p-1
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destruction of the credit selection process- only become significant at relatively high rates of inflation.

Economic growth recovered strongly following successful reduction of high inflation. The quick reversion to the trend may explain why the inflation- growth correlation has been elusive in the pure cross-section analysis. An inflation crisis that leaves its impact on the country's long run average inflation rate may not have any impact on its long run average growth rate if there was sufficient time to recover from the crisis in the period over which one is averaging. With complete reversion to trend, inflation crisis has a temporary effect on output but no permanent effect on output growth. The permanent effect related inference is also supported by the fact that the alumni of post world war II high inflation include two of the fastest growing industrial countries (Greece and Italy), two socialist countries that had relatively rapid growth compared to other socialist countries (Hungary and Romania) and some of the East Asian miracles (China, Japan, Korea and Taiwan).\(^{17}\)

Olson (1982) argued that growth will accelerate after crisis because crisis results in the destruction of the old rent-seeking coalition that inhibit growth.\(^{18}\)

On the other hand Levine & Zervos (1993) showed that the cross-section correlation between inflation and growth depended on a few extreme inflation, low growth countries. They found the inflation- growth relation to be extremely fragile.\(^{19}\)

Yet Stanners (1993) in a study based on 53 countries found no evidence to "support the notion that a low rate of inflation has in the past and in various countries been associated with improved growth rate, to support thus the statement that low or zero inflation is an essential or very important condition for high and sustained growth".\(^{20}\)

Developing countries are more prone to inflation than developed countries. Over the period 1967-76 the weighted average rate of inflation in developing countries was approximately three times greater than that of developed countries. In the 1980s this gap widened still further. Even within the developing countries the

\(^{17}\) Ibid. P-21

\(^{18}\) Olson, Mancwe (1982) "The Rise and Decline of Nations: Economic Growth, Stagnation and Social Rigidities"

\(^{19}\) Levine, Ross & Sara J. Zervos (1993) "What we have learned about policy and growth from cross-country Regression " American Economic Review.


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Latin American developing countries appear to have higher rates of inflation than Asian countries. Very few developing countries experience steady rates of inflation.\(^{21}\)

The international evidence on the relationship between inflation and growth suggests that inflation beyond a threshold rate has significant adverse implications for growth. The adverse effect of inflation on economic growth tends to rise at a non-linear rate with the increasing rates of inflation. The estimates presented by Sarel (1996) show that this threshold inflation rate is close to 8 percent beyond which adverse effects of inflation on output tend to rise.\(^{22}\)

In India, the average rate of inflation during 1950-51 to 1997-98 was 6.7 percent. The average decadal growth rates during the 50's, 60's, 70's and 80's were 1.7 percent, 6.4 percent, 9.0 percent and 8.0 percent respectively. During 90-91 to 97-98, there was a resurgence of inflation at around 10 to 15 percent.\(^{23}\) These rates can not be described as high enough to generate a crisis. Rangarajan (1998) worked with growth rates of real GDP, WPI based inflation rate and money supply for the period 1970-71 to 1995-96. The correlation between inflation rate and growth of real GDP was \(-0.33\). For three-yearly moving average it was \(-0.5\). These results showed that there was some degree of negative association between inflation rate and economic growth.\(^{24}\)

Brahmananda (1980) argued that the link between innovation and credit was weak in India. Credit creation and subsequent inflation help to augment nominal savings by bringing in an element of forced saving. His contention was that the growth effects of inflation due to credit expansion were uncertain.\(^{25}\) Bhattacharyya & Lodh (1990) found a very weak relationship between inflation rate and real GDP.

The Chakravarty Committee (1985) suggested an inflation rate of 4 percent per annum as an optimum level for the Indian economy to facilitate changes in relative prices necessary to attract resources to growth sectors. Zero inflation rates were not considered conducive for balanced growth of the economy. Rangarajan (1998), Vasudavan (1998) have suggested that an inflation rate of no more than 6 percent should be the optimum level for the Indian economy. Kannan & Joshi (1998) found that the inflation rate threshold for India is at a level of about 6 percent.

\(^{21}\) Jha, R. (1994) "Macroeconomics for developing countries" Pp211-213
\(^{22}\) Sarel, M. (1996) op. cit.
\(^{25}\) Brahananda, P.R. (1980) op. cit. P-201
Inflation rates higher than this optimum level can have adverse consequences for GDP growth. A sharper rate of deceleration in the growth occurs after the rate of inflation exceeds 8 percent per annum. Sub-optimum inflation rates may thus have positive effect on growth.

6.3 Comparative Profile of Inflation in Manipur and India

Data: We have consumer price index numbers for urban- non- manual Employees for Imphal (1984-85=100) and consumer price index for Agricultural labourers for the period Jan. 1980 to Dec.1998. The latter includes Assam, Meghalaya and Tripura. CPI for Agricultural labourer in respect of Manipur has been constructed from Nov. 1995 with 1986-87 as the base year. The linking factor between 1960-61=100 and 1986-87 =100 for General index would be

\[ I_0 = 5.89 \times [0.8126 \times \text{INA} + 0.0491 \times \text{INMA} + 0.0645 \times \text{INME} + 0.0738 \times \text{INT}] \]

where

- \( I_0 \) = Old index
- INA = New Index, Assam
- INMA = New Index, Manipur
- INME = New Index, Meghalaya
- INT = New Index, Tripura

However due to the non- availability of data for other states, no attempt has been made to present the entire data in a spliced form with either as 1960-61=100 or 1986-87 =100. Data for the period Jan. 1980 to Oct. 1995 have 1960-61 –100 and the remaining data have 1986-87 =100. In the case of CPI number for urban Non-manual Employees, data upto Dec.1987 have 1971=100. The remaining data have 1984-85 =100. The data were then spliced with 1984-85=100.


Inflation rates have been worked in the following manner.


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\[ \text{Index for 1991 Jan. - Index for 1990 Jan.} \]
\[ \frac{\text{Index for 1990 Jan.}}{\times \text{100}} \]

Fig 6.1 to 6.3 shows the comparison between inflation rates based on CPI of urban non-manual employees (1984-85=100) for Manipur and all India. Fig. 6.1 gives a comparative inflation profile for the period 1981 Jan-1998 Dec. Fig. 6.2 & Fig. 6.3 are for the periods 1981 Jan-1990 Dec. and 1991 Jan. - 1998 Dec. respectively. All the graphs reveal the higher variation in Manipur, which is further, confirmed by table 6.1
FIG. 6.1
INFLATION RATE BASED ON CONSUMER PRICE INDEX OF URBAN NONMANUAL EMPLOYEE (1984-85=100)

ICPINMM: INFLATION RATE IN MANIPUR
ICPINNMI: INFLATION RATE IN INDIA

Month
FIG. 6.2
INFLATION RATE BASED ON CPI OF NON MANUAL EMPLOYEES (1984-85 = 100) 1981 JAN. TO 1990 DEC.

ICPINM = INFLATION RATE OF MANIPUR
ICPINM = INFLATION RATE OF INDIA
FIG. 6.8
INFLATION RATE BASED ON CPI OF NON-MANUAL EMPLOYEES (1984-85 = 100) 1991 JAN. TO 1998 DEC.

ICPINHI: INFLATION RATE FOR INDIA
ICPINHM: INFLATION RATE FOR MANIPUR

Month
## Table 6.1

<table>
<thead>
<tr>
<th>Period</th>
<th>Coefficient of Variation for Inflation rate based on CPI for urban non-manual employees in Manipur (ICPINMM)</th>
<th>Coefficient of Variation for Inflation rate based on CPI for urban non-manual employees in India (ICPINMI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 1981- Dec 1998</td>
<td>63.27</td>
<td>24.73</td>
</tr>
<tr>
<td>Jan 1981- Dec 1990</td>
<td>67.34</td>
<td>20.69</td>
</tr>
<tr>
<td>Jan 1991- Dec 1998</td>
<td>55.96</td>
<td>26.88</td>
</tr>
</tbody>
</table>

Thus non-manual urban employees in Manipur had a much larger variation in their standard of living than their All India counterparts.

During the sub-period 1981 Jan –1990 Dec., ICPINMM even touched negative value. Such fall in inflation rate was not observed during the sub-period 1991 Jan.-1998 Dec. The graph reveals that during this later sub-period ICPINMI exceeded ICPINMM for most of the period inspite of higher coefficient of variation of ICPINMM.

Fig.6.4 to 6.7 give the comparative inflation profile for Manipur and All India based on CPI of agricultural labourers. Table 6.2 has estimates of coefficient of variation, a measure of dispersion. It shows that over the entire period Jan. 1981 – Dec. 1995, inflation rate in India had a higher variation than that of Manipur. During the sub-period e.g. Jan. 1981 – Dec. 1990, the variation in inflation rates was higher. However during the sub-period Jan. 1997- Dec. 1998, the dispersion in inflation rate in Manipur was almost double that of all India.
FIG. 6.5
INFLATION RATE BASED ON CPI OF AGRICULTURAL LABOURERS (1960-61=100) 1981 JAN. TO 1990 DEC.

ICPIALMH: inflation rate for Manipur
ICPIALINE: inflation rate for India

Month
FIG. 6.6
INFLATION RATE BASED ON CPI OF AGRICULTURAL LABOURERS (1960-61=100) 1991 JAN. TO 1995 DEC.

ICPIALM = INFLATION RATE FOR MANIPUR
ICPIALINE = INFLATION RATE FOR INDIA
FIG. 6.7
INFLATION RATE BASED ON CPI OF AGRICULTURAL LABOURERS
(1996-97=100) 1997 JAN. TO 1998 DEC.

ICPIALM = INFLATION RATE IN MANIPUR
ICPIALI = INFLATION RATE IN INDIA

Month
Table 6.2

<table>
<thead>
<tr>
<th>Period</th>
<th>Coefficient of Variation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inflation rate based on CPI of Agricultural labourers in Manipur</td>
<td>Inflation rate based on CPI of agricultural labourers in India.</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan 1981-Dec 1990</td>
<td>63.31</td>
<td>61.81</td>
</tr>
<tr>
<td>Jan 1991-Dec 1995</td>
<td>41.2</td>
<td>53.09</td>
</tr>
<tr>
<td>Jan 1981-Dec 1995</td>
<td>63.27</td>
<td>67.84</td>
</tr>
<tr>
<td>Jan 1997-Dec 1998*</td>
<td>63.96</td>
<td>39.35</td>
</tr>
</tbody>
</table>

* at 1986-87 = 100

The problem of choice of price index arises when the association between inflation rate and growth rate of GDP is investigated. In this connection Edgemand (1983) writes

"The implicit price deflator for GNP is a measure of the prices of all final goods and services produced in the nation's economy during a given period. It is, therefore, a measure of the general price level and is the most comprehensive of the indexes (CPI, WPI etc.)"27

Implicit price deflator = \[
\frac{\text{Nominal GNP}}{\text{Real GNP}} \times 100
\]

The advantage of WPI, the usual index for calculation of inflation rate, is the frequency of publication. CPI and implicit price deflator are calculated monthly and annually whereas WPI is a weekly index. However implicit price deflator has been chosen because of its comprehension.

In this exercise Implicit price deflator = \[
\frac{\text{Nominal NSDP}}{\text{Real NSDP}} \times 100
\]

Inflation rates and growth rates of real NSDP and per capita real NSDP have been worked out for the period 1972-1996.

Fig.6.8 shows the association between inflation rate and growth rate of real NSDP of Manipur. There is no clear trend for the entire period. Lower inflation rates are found to be associated with an upward trend in growth rate of real NSDP. However as inflation rate increases, a downward trend appears to become operational.


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FIG. 6.8
GRAPH OF INFLATION RATE VS GROWTH RATE OF REAL NSDP OF MANIPUR (1973-96)
A similar picture emerges in Fig. 6.9 when inflation rate is plotted against growth of per capita real NSDP. Table 6.3 gives the correlation matrix of inflation rate, growth of real NSDP and per capita real NSDP, it shows a negative long-term association between inflation rate and growth rates of real NSDP and per capita real NSDP. Since economic growth is measured by growth of per capita income, it shows the fragile relationship between inflation rate and economic growth.

<table>
<thead>
<tr>
<th></th>
<th>Inflation rate</th>
<th>Growth rate of real NSDP</th>
<th>Growth rate of per capita real NSDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation rate</td>
<td>1.00</td>
<td>-0.1632</td>
<td>-0.0669</td>
</tr>
<tr>
<td>Growth rate of real NSDP</td>
<td>-0.1632</td>
<td>1.00</td>
<td>0.9695</td>
</tr>
<tr>
<td>Growth rate of per capita real NSDP</td>
<td>-0.0669</td>
<td>0.9695</td>
<td>1.00</td>
</tr>
</tbody>
</table>

The weak relationship is further corroborated by the results of regression of rate of growth of real NSDP (YGROWTH) and per capita real NSDP (PCYGR) on implicit price deflator – based rate of inflation (INFR).

\[
YGROWTH = 6.5617 - 0.1178 \text{ INFR} \\
(-0.776)
\]

\[
\bar{R}^2 = 0.0176 \quad DW = 1.852
\]

\[
PCYGR = 3.2987 - 0.04605 \text{ INFR} \\
(-0.315)
\]

\[
\bar{R}^2 = 0.041 \quad DW = 1.631
\]

Figures in parentheses refer to corresponding t-values. The adjusted coefficients of determination are uniformly low and none of the regression coefficients are found to be statistically significant.

The investigation of impact of inflation on growth was studied using the model of Kannan & Joshi (1998). The model is as follows:

\[
GWGDP_{it} = f (\text{INVEST}_{it}, GWAGR_{it}, TOT_{it}, \pi_{it}, EXTRAs_{it})
\]

\(^{28}\) Kannan, R. & H. Joshi (1998): op-cit. p-2724
FIG. 6.9

GRAPH OF INFLATION RATE VS GROWTH RATE OF PER CAPITA INCOME OF MANIPUR (1973-96)
FIG. 6.10
GRAPH OF INFLATION RATE AND GROWTH OF PER CAPITA INCOME AND REAL NSDP OF MANIPUR (1973-1996)
Where GWGDRP, INVEST, GWAGR, TOT and \( \pi \) are real GDP growth, total investment to GDP ratio, real agricultural growth, net terms of trade and WPI (1981-82=100) based inflation rate respectively and EXTRA is defined as \(\text{EXTRA} = \text{Dummy} \times \log \pi_t - \log (\pi_t^*)\)

\[ \pi_t^* = \text{Experimental threshold rate of inflation and Dummy is 0 if } \pi_t < \pi_t^* \]
\[ 1: \text{Otherwise} \]

The growth equation was estimated for a series of \( \pi_t^* \) and the regression with the largest \( R^2 \) is chosen for analysis and inference. Due to the paucity of data, some variables only were retained for Manipur. Our model is

\[ \text{GRNSDPR} = f (\text{REAL}, \text{GRYAGRI}, \text{INFR}, \text{EXTRA}) \]

Where:

GRNSDPR stands for growth rate of real NSDP

\[ \text{REAL} = \frac{\text{Total Real Capital expenditure}}{\text{Real NSDP}} \]

GRYAGRI : Growth rate of real income originating in agricultural sector.

INFR : NSDP deflator based inflation rate

EXTRA : The same variables as in Kanna & Joshi's work.

We have no data for terms of trade (TOT) and total investment. Total investment thus has been proxied by total real capital expenditure.

In order to study the nature of output growth under conditions of accelerating inflation, the model is further modified by adding a square term.

\[ \text{GRNSDPR} = f (\text{REAL}, \text{GRYAGRI}, \text{INFR}, \text{EXTRA}, \text{EXTRASQ}) \]

Where \( \text{EXTRASQ} = \text{Dummy} \times \log \pi_t^2 \)

The threshold level chosen for the original model is 11 percent. The model estimated is:

Growth equation for 11 percent threshold inflation rate (1973-74 to 1996-97)

\[ \text{GRNSDPR} = 4.3703 - 6.981 \times \text{REAL} + 0.407 \times \text{GRYAGRI} + 0.18 \times \text{INFR} - 8.614 \times \text{EXTRA} \]

\[
\begin{align*}
(-0.351) & \quad (5.57) & \quad (0.868) & \quad (-1.556) \\
\text{DW} = 1.9135 & \quad F(4,19) = 17.146
\end{align*}
\]
REAL, INFR and EXTRA are found to have no significant impact on GRNSDPR. INFR however has positive impact. The positive significant coefficient of GRYAGRI is consistent with the economic rational that growth rate of NSDP depend on growth rate of agricultural income. It is not proper for giving any inference on threshold level of inflation as the coefficient of both INFR and EXTRA are found to be insignificant.

The threshold level chosen for the modified model, which includes EXTRASQ, is 7 percent per annum. The estimated growth equation for 7 percent inflation rate is:

\[
\text{GRNSDPR} = 4.2195 - 0.0953 \text{REAL} + 0.416 \text{GRYAGRI} - 0.057 \text{INFR} + 5.6778 \text{EXTRA} - \\
(-0.005) \ 
(5.702) \ 
(-0.178) \\
(1.026) \ 5.719 \text{EXTRASQ} \\
(-1.631)
\]

DW = 2.018 \quad F (5,18) = 13.3789

In the modified specification also, only GRYAGRI is found to have significant positive impact on GRNSDPR. None of the other variables have any significant impact.

Table 6.4

<table>
<thead>
<tr>
<th>Threshold inflation rate</th>
<th>$\bar{R}^2$</th>
<th>Original model</th>
<th>Modified model</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0.7251</td>
<td></td>
<td>0.7135</td>
</tr>
<tr>
<td>3</td>
<td>0.7283</td>
<td></td>
<td>0.7132</td>
</tr>
<tr>
<td>4</td>
<td>0.7218</td>
<td></td>
<td>0.7116</td>
</tr>
<tr>
<td>5</td>
<td>0.7113</td>
<td></td>
<td>0.7113</td>
</tr>
<tr>
<td>6</td>
<td>0.7088</td>
<td></td>
<td>0.7199</td>
</tr>
<tr>
<td>7</td>
<td>0.7054</td>
<td></td>
<td>0.7291</td>
</tr>
<tr>
<td>8</td>
<td>0.705</td>
<td></td>
<td>0.7266</td>
</tr>
<tr>
<td>9</td>
<td>0.7205</td>
<td></td>
<td>0.7208</td>
</tr>
<tr>
<td>10</td>
<td>0.7303</td>
<td></td>
<td>0.7219</td>
</tr>
<tr>
<td>11</td>
<td>0.7374</td>
<td></td>
<td>0.7240</td>
</tr>
<tr>
<td>12</td>
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<td></td>
<td>0.7220</td>
</tr>
<tr>
<td>13</td>
<td>0.7371</td>
<td></td>
<td>0.7228</td>
</tr>
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</table>
6.4 Conclusion:

Inflation rates based on CPI for urban non-manual employees in Manipur were more widely dispersed than that of all India both for the entire period and sub-periods. It is the other way round when inflation rates are worked out on the basis of CPI of agricultural labourers. However during the later phase i.e. Jan.1997 – Dec. 1998 the dispersion of inflation rates in Manipur exceeded that in all India substantially. On the basis of correlation analysis, there was negative association between inflation rate based on implicit NSDP deflator and economic growth. However the negative association was found to be insignificant, both for rate of growth of real NSDP and per-capita real NSDP. There is no evidence of any threshold level of inflation. However non-linear relationship has not been investigated.