

EMPLOYMENT IN DAIRY SECTOR IN INDIA DURING PRE- AND POST-REFORM PERIODS

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ABSTRACTS

This paper endeavors to examine trends in employment in dairy industry in India during pre- and post-reform periods. The growth rate of employment is found to be more during pre-reform period than in post-reform period. During pre-reform period, growth of employment in dairy industry in India is found to be highest in the State of Haryana, Maharashtra and Rajasthan. But during post-reform period the growth of employment is found to be more in the state of Karnataka, Kerala and Rajasthan. But during both periods under consideration Haryana, Rajasthan, Kerala and Maharashtra have shown considerable improvement. The information at national level highlights that the relation of employment with output is found to be positive and negative with wages. Both are found to be statistically significant at 10 per cent level of significance. The state-wise information further shows that the relation of employment with output is found to be positive in all states under consideration except in case of Bihar and Kerala. On the other hand, relation of employment in wages is found to be negative in all the states, except in the states of Gujarat, Maharashtra, Punjab and Rajasthan. To increase in employment and productivity in dairy industry, financial assistance should be provided on liberalized terms and conditions. Encouragement should be given to rural youth to start dairy farming business. Constant interaction between farmers involved in dairy business, experts in the field of dairy industry and policy makers can go a long way in boosting the productivity of milk and dairy industry in India. Moreover, modern technology should be made available to people involved in dairy sector as well as dairy industry at reasonable prices.

Employment in the organized manufacturing sector in India remained virtually stagnant in the 1980s. In sharp contrast, there has been a substantial increase in employment in this sector in the 1990s. Between 1980-81 and 1990-91, employment in organized manufacturing sector grew the rate of only 0.53 per cent per annum. In the next five years, 1990-91 to 1995-96, the growth rate was much higher at 4.03 per cent per annum, comparing favourable with the

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growth rate achieved in the 1970s (about 3.8 per cent per annum between 1970-71 and 1980-81). In the period 1990-91 to 1997-98 (the last year for which data are available), the growth rate of employment in organized manufacturing was 2.69 per cent per annum, well above the growth rate achieved in the 1980s and higher than the growth rate of the labour force.

Since a process of major economic reforms was initiated in India in 1991, the marked acceleration in employment growth in organized manufacturing in the 1990s may be thought to be a result of the economic reforms. There is some basis for taking such a view because, in certain ways, economic reforms are expected to have a favourable effect on the growth of employment in industries. The favourable effects may arise from greater labour market flexibility and increased trade orientation leading to changes in the structure of industries in favour of labour intensive industries and techniques of production [Singh 1993]. It needs to be pointed out, however, that in certain other ways economic reforms are expected to have an adverse effect on industrial employment.

Thus, the new liberal economic policy regime, marked by increased competition on the one hand and greatly improved access to foreign technology and imported capital goods on the other, should create among the industrial firms a drive towards the adoption of advanced technology which is likely to lead to increasing capital intensity of production [Ghose 1994]. Also, as competition intensifies, industrial firms may try to save cost and become more competitive by cutting down employment, especially those firms (e.g., public sector units) which had, at the time the reforms began, a good deal of overstaffing. It needs to be emphasized that these adverse effects may be quite strong and may even outweigh the favourable effects of economic reforms on industrial employment mentioned above.

Indeed, most studies that have dealt with the likely effects of economic reforms on the employment situation in India have been pessimistic about the prospects of employment growth in the post-reform period [Mundle 1992, 1993; Deshpande 1992; Bhattacharya and Mitra 1993; Agarwal and Goldar 1995; Kundu 1997]. The impression one would gather from these studies about the prospects of employment growth in manufacturing in the post reform period have in some respects been proven wrong by the marked acceleration that has taken place in employment growth in organized manufacturing in the 1990s.

Unemployment has grown at a substantial rate in India during the last three decades. It may be because of the fact that the growth in agriculture facilitated by irrigation was labour intensive in the initial stages but became capital intensive later and was accompanied by reduced labour absorption.

Moreover the pressure of population land is already high and increasing and has already resulted in a large surplus of labour in rural areas.

It has been argued that the industrial sector is the next alternative where additional employment can be created through larger investments. In line with this, and also by taking into consideration the Western Economic Development which was accompanied by a drastic decline in the proportion of labour force engaged in agriculture, the Government of India has been trying to achieve rapid industrialization in the country through various five year plans since its independence.

In this paper an attempt has been made to pursue the following objectives:

- To examine the trends in employment in dairy industry in India.
- To analyze the relationship between wages, output and wages during pre- and post-reform periods taken together.

SECTION – II

Measurement of Employment Growth–The Model

The impact of industrial liberalization and deregulatory policies on the productivity growth of dairy industry has been captured by computing and subsequently comparing the growth rates between sub-periods (i.e. Pre- and Post-reforms periods). In literature, there are two basic approaches to obtain the growth rates for sub-periods: (i) discontinuous trend lines approach; and (ii) kinked exponential model. In the former approach, the separate exponential trend lines are required to be fitted by Ordinary Least Squares (OLS) to each segment of the time series for estimating the growth rates for distinct sub-periods. In case of kinked exponential model, we make use of information regarding the values of the dependent variable in question throughout the time series for estimating the growth rate for a given sub-period using dummy variables. For the estimation and comparison of past growth rates, kinked exponential model represents a distinct improvement over discontinuous trend lines method [Boyce (1996)]. Goldar and Seth (1989), Seth and Seth (1994), Pardhan and Barik (1998) and Burange (2001) utilized kinked exponential models for estimating growth rates of sub-periods in their empirical studies. In kinked exponential model, we utilize a linear spline function as developed by Poirier (1974) for estimating the growth rates of distinct sub-periods.

Assuming that there are only two distinct sub-periods (Pre-reforms and Post-reforms periods), the following piecewise log-linear (PWLL) model has been utilized for estimating the annual growth rate for each sub-period:

$$\log Q_t = \alpha + \beta_1 Z_{1t} + \beta_2 Z_{2t} + u_t \quad (6)$$

where

$$Z_{1t} = D_{1t}t + D_{2t}t_1$$

$$Z_{2t} = D_{2t}t + D_{2t}t_1$$

Here t is a trend variable representing time and t_1 denotes the first break in the time trend. In present study, t_1 refers to the year 1991-92. The OLS estimate of β_i gives the exponential growth rate for the variable Q for the sub-period t . The annual growth rate, g_i , for the sub-period i can be obtained using the following equation:

$$g_i = 100\% [\exp(\beta_i) - 1] \quad (7)$$

Data and Variable: Measurement Issues

Measurement of labour input

The Annual Survey of Industries (ASI) provides three distinct measures of labour input:

- Man-hours worked;
- Numbers of workers; and
- Number of employees (which include both workers and persons other than workers such as supervisors, technicians, managers, clerks, etc.)

Ahluwalia (1991), Balakrishnan and Pushpangadan (1991), Rao (1996), and others, used the number of employees as a measure of labour input in their studies on productivity and elasticity of substitution in Indian manufacturing. The present study also uses 'number of employees' as a measure of labour input. The main reason for disfavoured the first two measures is that these measures do not take into account the services of persons other than workers who are as much important for getting the work done as the workers who operate the machines. The main drawbacks of 'man-hours' series provided in ASI are: (1) the 'man-hours' series does not actually measure man-hours worked because the computation of 'man-hours' series in ASI has been done by multiplying the number of workers in a shift by eight and not the actual duration of the shift 'man-hours' series covers only workers and leaves out persons other than workers.

A serious limitation of 'number of employees' as a measure of labour input is that it treats 'workers' and 'persons other than workers' as perfect substitutes. In present study, no attempt has been made to correct labour data

for quality change arising out of age, sex, skill and educational composition of the labour force.

Measurement of Output

The 'Annual Survey of Industries' publishes the series on net value-added (NVA) by using following relation:

$$NVA = XO - IX - D \quad \dots(4.3.1)$$

Where XO and IX represent output and input, respectively and D stands for depreciation. The main drawbacks with NVA series are : (i) figures on XO, XI and D are at current prices, and (ii) the value of depreciation, D, is taken as book value which seldom represents true capital consumption because the figures on depreciation, that are presented in ASI are at the rates allowed by income tax authorities.

In the present study, gross value-added figures are used as a measure of output. Following Jayadevan (1995) and Goldar (1986), we preferred gross value-added as a measure of output in place of net value-added because depreciation charges in the Indian industries are known to be highly arbitrary, fixed by income tax authorities and seldom represent true/actual capital consumption. In order to get the gross value-added figures at constant prices, we added real net value-added and depreciation figures at constant prices, we added real net value-added and depreciation figures at constant prices. The 'wholesale prices index for manufacturing products' (base 1970-71=100) and 'wholesale price index of machinery and machine tools' (base 1970-71=100) have been used for arriving at real figures of the net value-added and depreciation, respectively.

In the present study, the wage rate (w) is determined as a ratio of real value of emoluments (W) to number of employees (L). The series of real value of emoluments has been constructed by deflating a series of emoluments at current prices by 'index number of consumer prices for industrial workers' (with base 1970=100). In order to obtain a series of return on capital (r), we divide difference between real gross value-added and real emolument by gross fixed capital stock, i.e. $r = (V - W)/K$.

SECTION – III

Relationship Between Employment, Wage and Output

New classical economics presents a negative relationship between employment and wage. Wage plays an equilibrating mechanism to bring employment to equilibrium. However, in a labour-surplus developing

economy, such a mechanism may not hold, primarily due to the fact that labour supply is elastic at any given point of wage rate. As employment growth declined drastically in the 1990s, it would be of interest to ascertain whether wage rate had caused the fall in employment, as argued by the neo-classicals, or there was no association between them.

We have probed the association between employment, wage and output using ASI rounds of NSS, viz., 38th round (1983), 43rd round (1987-88), 50th round and 55th round (1999-00) across one digit industry level. The relationship is estimated by regressing wage and output on employment. The relationship between employment, wage and output can be examined through either a labour demand or labour supply function. In a labour surplus economy like India, supply of labour is not a problem. And we have also examined the low growth of employment vis-à-vis output. In this paper, therefore, we examine this from the point of view of demand for labour. We postulate a basic labour demand function as follows:

$$L = f(O, W,)$$

where, 'L' refers to labour, 'O' to Output and 'W' to Wage.

In reality, however, employment depends not merely on output and wage rate. A host of other factors-socio-economic factors and labour laws-determine the actual employment behaviour. But in this study, we confine ourselves to output and wage effects on employment, as employment in India is basically determined by output and wage.

We estimate this function in log-linear form for each of the four NSS rounds and across industries in 14 major states. The equations are estimated by ordinary least squares using panel data. In some cases, notably mining and quarrying we have observed the problem of heteroscedasticity. Similar problems were also observed in agriculture and manufacturing in the quinquennial round of 1999-00. However, there are no problems of heteroscedasticity in other equations. The elasticity obtained from the result relates to only partial elasticity, the proportionate change in employment corresponding to proportionate change either to wage or output. This should not be compared to simple elasticity obtained by dividing the employment growth rate by output growth rate.

We estimate the relationships by ordinary least squares method for each industry (seven industries and all-industry) separately. The estimated equation is as follows:

$$E_j = \alpha + \beta O + \gamma W + U_i$$

Empirical Results

Employment Growth in Dairy industries in India

This section present an analysis of inter temporal comparison of employment growth in dairy industries of 14 major states. This attempt is made to evaluate the impact of regime of liberation on employment growth the variation in the growth rates of employment in dairy industries during two periods.

1. Pre- Liberalization Period (1980 to 1991)
2. Post liberalization Period (1991 to 2001)

Table 1
Employment Growth in Dairy Industries in India:
Inter-state Analysis

<i>States</i>	<i>Pre-reforms period</i>	<i>Post-reforms period</i>	<i>Entire study period</i>
Andhra Pradesh	4.91	2.63	4.12
Assam	4.15	3.03	3.87
Bihar	2.56	4.25	3.72
Gujarat	7.33	2.20	5.11
Haryana	10.48	4.82	8.2
Karnataka	5.49	6.10	6.01
Kerala	6.58	5.20	6.24
Madhya Pradesh	6.56	4.57	5.79
Maharashtra	8.73	4.26	6.48
Punjab	4.49	4.82	5.02
Rajasthan	7.87	5.57	7.01
TamilNadu	6.90	1.78	4.43
Uttar Pradesh	4.68	4.79	5.02
West Bengal	6.01	4.72	5.51
All-India	5.31	4.26	5.23

Source: Author's calculations.

The organization of state has been done on the basis of employment growth is categorized into following three distinguish group.

Group I – Bihar, Karnataka

Group II – Andra Pradesh, Assam, Gujarat, Haryana, Kerla, M.P.,
Maharastra, Rajasthan, Tamilnadu, West Bengal.

Group III– Punjab, U.P.

Group I

Group I comprises those states which have less employment growth rate during pre-reform period but increased during post-reform period. The employment growth in dairy sector has shown the increasing effect in the state of Bihar and Karnataka in Post reforms period as compared to the pre-reform period. But after deregulator policy a significant u turn has been observed in the growth pattern of employment growth in these states and the dairy sector of these state achieved high growth rates during 1991-2001 in comparison of growth rates during 1980 to 1991. The employment growth rates grew at rate of 4.25 per cent per annum in the state of Bihar and 6.10 per cent per annum in the state of Karnataka.

Group II

Group II incorporates of those state which have high employment growth during pre-reform period. But after reform process, two states showed a down fall in growth of employment (Haryana and Tamil Nadu). The state of Haryana has observed decline in growth rate from 4.82 per cent per annum in pre-reform period to 10.48 per cent per annum in post-reform period and Tamil Nadu also observed decline in rate of growth from 7.87 per cent per annum during pre-reform period to 5.57 per cent per annum during post-reform period. While states of Andhra Pradesh, Assam, Gujarat, Kerala, M.P., Maharashtra, Rajasthan and West Bengal have also observed a decline in rate of growth in employment.

Group III

In Group III there are only two states out of 14 major states which have shown approximately and equal growth rate of employment in dairy sector with a very minor difference. These states are Punjab and U.P., Punjab observed increase in growth rate from 4.49 per cent per annum to 4.82 per cent per annum and U.P. from 4.68 per cent per annum to 4.79 per cent per annum.

In nut shell of Indian economy, dairy sector at disaggregate and aggregate levels i.e. state levels registered increasing and decreasing employment growth during post liberalization period in comparison with pre-liberalization period. There is a need to formulate policies which should encourage the growth of dairy industry in India. For the successful growth of dairy industry, it must go for backward integration of industry. Dairy industry must have their own dairy farms, which should be managed on scientific lines. It will help in increasing the input for dairy industry. Moreover, the cost of collecting milk from far off places will be curtailed to a

considerable extent. Training should be provided to farmers involved in dairy business. Information should be given to the farmers about the rearing of milch animals. It will boost the output of milk. Financial assistance should be provided to farmers on liberal terms and conditions, who want to setup dairy business. Constant interaction between farmer, experts in the field of dairy industry and policy makers can go a long way in boosting the productivity of milk and dairy industry in India. Modern technology available to farmers be demonstrated through various trade fairs and this technology be available to farmers at low price.

Table 2
Elasticity of Employment with Respect to Output

<i>State</i>	<i>Intercept</i>	<i>LnO</i>	<i>LnW</i>	<i>Adj R²</i>
Andhra Pradesh	18.28 (8.90)*	0.13 (-1.27)	-0.67 (-4.27)*	0.72
Assam	7.81 (2.60)*	0.37 (-1.32)	-0.11 (0.51)	0.56
Bihar	27.89 (11.88)*	-0.12 (0.840)	-1.38 (-4.48)*	0.67
Gujarat	9.99 (2.79)*	0.3 (2.55)*	1.45 (-0.15)	0.78
Haryana	16.24 (11.76)*	0.48 (5.34)*	-1.04 (-8.42)*	0.82
Karnataka	15.25 (4.67)*	0.75 (14.0)*	-1.4 (-3.26)*	0.97
Kerala	15.04 (10.02)*	-0.12 (1.35)*	-0.3 (1.63)	0.53
Madhya Pradesh	13.94 (7.56)*	0.45 (2.36)*	-0.75 (1.71)	0.4
Maharashtra	7.95 (5.84)*	0.04 (-0.22)	0.18 (-0.56)	0.48
Punjab	-31.31 (-3.93)*	2.61 (5.67)*	0.22 (-0.6)	0.94
Rajasthan	-2.61 (0.37)	0.95 (2.26)*	0.17 (-0.33)	0.58
Tamil Nadu	11.43 (6.65)*	0.16 (1.79)*	-0.06 (0.32)	0.92
Uttar Pradesh	9.97 (8.51)*	0.08 (-1.38)	0.23 (-1.7)	0.68
West Bengal	11.15 (11.53)*	0.37 (6.75)*	-0.37 (-2.41)	0.81
All-India	12.92 (7.54)*	0.36 (3.69)*	-0.46 (-1.58)	0.89

Source: Author's calculations.

Notes: 1. Figures in original brackets are t-values.

2. *Represents significance of 10 per cent level.

3. Cochrane–Oscutt procedure has been used to avoid the problem of anti-correction.

4. Shazam version – 9

Table 2 highlights that at All India level, employment is positively related with output and negatively related with wages. The relation of employment with wages is significant at 10 per cent level of significance and it is insignificant for its relation with output. The value of R^2 is indicated with the fact that 79 per cent variation in employment is explained by above model and rest of 21 per cent is because of some other factors.

In case of state of Andhra Pradesh, employment is positively associated with level of output and negatively with wages in dairy industry in India. The relation of employment with output is found to be statistically insignificant and significant with level of wages at 10 per cent level of significance. R^2 value highlights that 72 per cent variation in employment is explained by this model. In case of state of Assam, employment is positively related with level of output and negatively with wages. The relation of employment with output and wages is found to be insignificant. 56 per cent variations in employment is explained by this model. In case of Bihar, the employment is negatively associated with output and wages. The relation of employment with output is statistically insignificant and significant with wages at 10 per cent level of significance. The value of R^2 is further highlights that 67 per cent variations in employment is explained by this model. In case of state of Gujarat, the employment is positively related with output and negatively with wages. The relation of employment with output is statistically significant at 10 per cent level of significance and insignificant with wages. The value of R^2 is indicated by the fact that 78 per cent variations in the employment is explained by this model. In case of Haryana, the relation of employment with output is positively and negative with wages. The relation of employment with output and wages is statistically significance at 10 per cent level of significance. R^2 value further projects that 82 per cent variations in employment is explained by this model.

Similar type of observations have been obtained in case of state of Karnataka. The R^2 value here shows that 92 per cent variation in employment is explained by this model. In case of Kerala employment is negatively associated with output and wages. The relation of employment with output and wages is found to be statistically insignificant. R^2 value shows that 53 per cent variation in employment is explained by this model. In case of Madhya Pradesh the relation of employment with output is positive and significant at 10 per cent level of significance. On the other hand, the relation of employment with wages is negative and insignificant. R^2 value shows that 40 per cent variations in employment is explained by this model. The relation of employment is found to be positive with output in case of state of Maharashtra and is also insignificant. On the other hand, relation of employment with wages is negative and is found to be insignificant. The value of R^2 shows that 48 per cent variations in employment is explained by this model. In case of state of Punjab, the relation of employment with output is positive and statistically significant at 10 per cent level of significance. The relation of employment with wages is positive and insignificant. The value of R^2 further shows that 94 per cent variations in employment is explained by this model. Similar type of observation have been made in case of relation of

employment with output and wages in case of information on Rajasthan. The value of R^2 shows that 58 per cent variations in employment is explained by this model.

Similar type of observations have been obtained in case of state of Tamil Nadu and West Bengal. The value of R^2 in former case shows that 92 per cent variation in employment and in latter case, 81 per cent variations is explained by this model. In case of Uttar Pradesh, the relation of employment and wages is positive and insignificant. The value of R^2 further shows that 68 per cent variations in employment is explained by this model.

Suggestions and Policy Implications

The foregoing analysis reveals that the growth rate of employment in dairy industry in India has been 5 per cent over the period of time. The growth rate of employment is found to be more during pre-reform period than in post-reform period. During pre-reform period, growth of employment in dairy industry in India is found to be highest in the State of Haryana, Maharashtra and Rajasthan. But during post-reform period the growth of employment is found to be more in the state of Karnataka, Kerala and Rajasthan. But during both period under consideration Haryana, Rajasthan, Kerala and Maharashtra have shown considerable improvement. The information at All-India level highlights that the relation of employment with output is found to be positive and negative with wages. Both are found to be statistically significant at 10 per cent level of significance. The state-wise information further shows that the relation of employment with output is found to be positive in all states under consideration except in case of Bihar and Kerala. On the other hand, relation of employment in wages is found to be negative in all the states, except in the states of Gujarat, Maharashtra, Punjab and Rajasthan. For the increase in employment and productivity in dairy industry in India financial assistance should be provided on liberalized terms and conditions. Encouragement should be given to rural youth to start dairy farming business and assistance should be provided to those who approach the financial institutions. Constant interaction between farmers involved in dairy business, experts in the field of dairy industry and policy makers can go a long way in boosting the productivity of milk and dairy industry in India. Moreover, modern technology should be made available to people involved in dairy sector as well as dairy industry at reasonable prices.

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