

Productivity, Wages and Employment in Manufacturing Industries in Uttar Pradesh: 2001-2015

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Abstract

This paper attempts to examine the industrial variation in output, employment and productivity growth in registered manufacturing units in Uttar Pradesh by using data of annual survey of industries. The relationship between the productivity and the growth rates of employment and productivity have been a serious problem for an economy where unemployment is more focused among low skilled workers. The higher rate of growth in manufacturing output leads to higher rate of productivity growth, but not a faster rate of employment growth. The structural change took place in favour of capital that increased profit rate by displacing workers in manufacturing industries. Workers were affected badly more as compared to other employees, i.e. office staff and supervisors by this kind of job destroying structural change in manufacturing industry.

Keywords: - structural changes within industries, annual growth rates of employment, output, fixed capital and labour productivity.

1 Introduction

1.1 The relationship between the productivity and the growth rates of employment and productivity have been a serious problem for an economy where unemployment is more focused among low skilled workers. Undoubtedly, rapid and sustained productivity growth improved the standards of living in the advanced industrialised nations during the era of the nineteenth century capitalism and even thereafter by any historical events. In other hand, in the developing nations, the technological innovations and capital-intensive investments, the mainsprings of the productivity growth, may act as instigators of job destruction, particularly for unskilled workers. While there is no formal relationship between productivity growth and the growth rate of employment in either direction, economic growth continues to go hand in hand with structural change entailing "creative destruction" as celebrated in Schumpeter (1947). New jobs are created in the expanding sectors of the economy and old jobs are lost in declining industries scope.

1.2 There has been a concentration on the implications of employment dynamics for productivity growth and it is very difficult to interpret the issues relating to productivity differentials in different industries as observed in India over the past decades. Some regions (e.g. Gujarat) outperformed the others in terms of productivity growth, but at the cost of lower, or even negative employment growth in some sectors. Again, employment growth is not high in some regions, namely West Bengal, experiencing lower productivity growth. This kind of stylised facts may raise the question of a possible trade-off between employment growth and productivity growth, and of a conflict between employment growth and real wage growth.

1.3 Kuznets (1957, 1966) has put the issue of industrial growth into a broader perspective. Kuznets described the increase in industrial output as part of the general transformation that he identified as “modern economic growth”.

1.4 Chenery and Taylor (1968) found a statistically significant relationship between per capita income and the degree of industrialisation. Thus economic development has been identified with industrialisation, which means the growing volume of industrial output both in absolute and relative terms as contrasted with agriculture (Jorgenson and Griliches, 1967).

1.5 Against these stylised facts, this paper attempts to examine the industrial variation in output, employment and productivity growth with data from registered manufacturing industries in Uttar Pradesh. Most of the empirical studies (Bairam 1991, Atesoglu 1993 and Scott 1999) used cross-country regressions for estimating a relationship between output growth and employment growth in manufacturing activities. There have, however, been hardly any studies of this type with time series data for manufacturing industries in a developing country like India.

1.6 This study is inspired by Kaldor's (1966) hypothesis that employment growth and productivity growth are positively related, but not at the proportional rate, largely because of the dynamic increasing returns to scale associated with the invention and innovation in manufacturing industries. Labour productivity growth in the manufacturing sector is positively related to output growth of this sector because of static and dynamic increasing returns to scale. Kaldor remarked a highly significant relationship suggesting that the output growth played a major role in determining productivity growth and also employment growth in the manufacturing sector². The higher rate of growth of manufacturing output leads to higher rate of productivity growth, but not a faster rate of employment growth.

1.7 After this introductory part, part 2 deals about the data used in this study. Part 3 describes Contribution of GVA, Employment and Fixed Capital in aggregate 18 manufacturing sector by industries in Uttar Pradesh. Part 4 discusses with the Structural changes within industries in Uttar Pradesh, 2001, 2008 and 2009. Part 5 deals with annual growth rates of output, employment and fixed capital. And part 6 deals with conclusions.

Data

2.1 Data collections of this study have been taken from the Annual Survey of Industries (ASI), which is an annual survey of factories registered under Sections 2m(i) and 2m(ii) of the Factories Act (1948) and is the important source of information about the industry published by the Central Statistical Office (CSO), Government of India. Registered units are defined as factories employing 10 or more workers using power, and those employing 20 or more workers without using power. The entire unregistered manufacturing sector is not covered by the ASI, but over the past 25 years the share of unregistered manufacturing in total manufacturing output has shrunk to just over 30%. However, the share of unregistered manufacturing in total manufacturing employment is more than 80% of total manufacturing employment. The study of the structure of all the registered manufacturing industries is classified into 18 industry groups.

Figure of industries code

Nic code 2008	Classification of the industries (two digit industry)
11	MANUFACTURE OF FOOD PRODUCTS AND BEVERAGES
12	MANUFACTURE OF TOBACCO PRODUCTS
13	MANUFACTURE OF TEXTILES
14	MANUFACTURE OF WEARING APPAREL; DRESSING AND DYEING OF FUR
15	TANNING AND DRESSING OF LEATHER;MANUFACTURE OF LUGGAGE,HANDBAGS SADDLERY,HARNESS AND FOOTWEAR
16	MANUFACTURE OF WOOD AND OF PRODUCTS OF WOOD AND CORK,EXCEPT FURNITURE;MANUFACTURE OF ARTICLES OF STRAW AND PLATING MATERIALS
17	MANUFACTURE OF PAPER AND PAPER PRODUCTS
18	PUBLISHING, PRINTING AND REPRODUCTION OF RECORDED MEDIA
19	MANUFACTURE OF COKE, REFINED PETROLEUM PRODUCTS AND NUCLEAR FUEL
20	MANUFACTURE OF CHEMICALS AND CHEMICAL PRODUCTS
22	MANUFACTURE OF RUBBER AND PLASTIC PRODUCTS
23	MANUFACTURE OF OTHER NON-METALLIC MINERAL PRODUCTS
24	MANUFACTURE OF BASIC METALS
25	MANUFACTURE OF FABRICATED METAL PRODUCTS, EXCEPT MACHINERY AND EQUIPMENTS
28	MANUFACTURE OF MACHINERY AND EQUIPMENT N.E.C.
29	MANUFACTURE OF MOTOR VEHICLES, TRAILERS AND SEMI-TRAILERS
30	MANUFACTURE OF OTHER TRANSPORT EQUIPMENT
31	MANUFACTURE OF FURNITURE; MANUFACTURING N.E.C.

2.2 Gross value of output, gross value added, fixed capital, wages, worker, and total employee are considered as a variables in research analysis, ASI reports gross output, GVA, fixed capital, wages data in value terms (Rs. Lakh) and worker and employee data in number terms (number-lakh).

Value of output The value of output was obtained from the value of shipments, value of own account capital formations and receipts of industrial and nonindustrial services adjusted for changes in inventories of finished goods and change in work in-progress during the reference period

Gross Value Added: Value added has been defined as the difference of the value of output and value of intermediate consumptions.

Fixed Capital Assets: The book value at the beginning of the year, value of gross additions during the year and depreciation of all assets with productive life of one year or more, owned by the establishment (i.e. Land, Buildings, Other constructions and Land improvements, Machinery and Other equipment, Transport equipment) have been collected. Leased or rented assets have not been included.

Number of persons engaged: This is defined as the total number of persons who work in or for the establishment, including working proprietors, active partners, unpaid family workers, operatives and all other employees

Wages and Salaries: All payments whether in cash or in kind made by the employers during the year with the work done to all “ employees “ had been included here.

- i. All regular and overtime cash payments houses and cost of living allowances.
- ii. Wages and salaries paid during vacation sick leaves

- iii. Taxes and social insurance contribution
- iv. Payments in land

3. Contribution of GVA, Employment and Fixed Capital in aggregate 18 manufacturing sector by industries.

3.1 Around forty eight percent of the gross value added of the registered manufacturing sector has been contributed by the three type of manufacturing industries, (Food and Beverage (11), Chemicals related (20) and Basic Metal related (24) industries), absorbing roughly forty one percent of the total employment in this sector in 2001-02. In the context of GVA, Chemical and chemical related industry was top rank, contributing more than 18 percent in aggregate GVA of Uttar Pradesh in 2001-02 Chemical and chemical related lost top position by falling its share significantly from 18.49 percent in 2001-02 to over 8.01 percentage points and 10.73 percentage points in 2008-09 and 2015-16 respectively. Gross value added of paper and paper products contributed range between 1.31 to 1.90 percent in aggregate GVA of manufacturing industry during 2001 to 2015.

3.2 industry wise variations in industrial development has been clear from the estimated figures as shown in Table 1. , Leather and Leather related products have gained share and Chemical and chemical related industry have gone down share in aggregate Output, total employment and aggregate fixed capital accumulation during time period of this study.

4. Structural changes within industries in Uttar Pradesh, 2001, 2008 and 2009

4.1 Structural change in registered manufacturing occurred in favour of capital during the period 2001-2015, highly unevenly across the major industries as shown by the coefficient of variation (CV) in the last row of Table 2. In terms of capital-labour ratio, manufacturing of coke, refined petroleum products and nuclear fuel industry was at the top, followed by manufacturing of food products and beverages, paper products and chemical products industries. Capital intensity in registered manufacturing increased huge in , refined petroleum products and nuclear fuel industry during this study period from 21.17 to 119.82 The industries including food & beverage, tobacco, product of wood, product of machinery and equipment also experienced a marked increase in capital labour ratio during this period. On the other hand, capital intensity in registered manufacturing declined in manufacturing of motor vehicles, trailers and semi-trailers during the same period. Capital labour ratio in registered manufacturing varied from 2.28 in wearing apparel to 25.95 in paper and paper products in 2015-16.

4.2 Manufacturing workers have been highly dominating in the ASI sector everywhere in Uttar Pradesh (Table 2). About 73 % of the total employees in registered manufacturing in Uttar Pradesh were workers in 2001 and the proportion increased to 77.61 percent in 2015 at the state level. In manufacturing of wearing apparel , tanning and dressing of leather related and fabricated metal related industries the share of manufacturing workers was 80 percent and above during 2001-2015. The proportional share of workers to total employees varied between 64.86 percent in manufacturing of chemicals and chemical products and 90.3 percent in tobacco in 2015. Industry-wise variation in workers' composition has been very low during this period.

4.3 We have calculated real wage per employee, taking all types of employees, in the registered manufacturing sector. Table 2 displays the variations in wage rate by industries in Uttar Pradesh in different years between 2001 and 2015. Wage rate in real terms in registered manufacturing

varied industry wise as measured by the CV. Although the real wage rate improved in almost all industries over this period, the industrial variation has still been prominent. In 2015, wage per employee was higher in manufacturing of tobacco, coke, refined petroleum products and nuclear fuel, chemicals and chemical products, basic metals and motor vehicles industries as compared to the rest of the industry.

4.4 Figures 1 and 2 shows the trends in output and employment in registered manufacturing of 18 types of industry in Uttar Pradesh during 2001-2015. There has been no sign of systematic convergence in either indicator. Absolute trend of fifteen industries out of eighteen industries in terms of output were positive and Petroleum & coke products, basic metals and furniture industries were less performance in trends during this study period. In the context of employment, we have found that clear positive trend in terms of absolute figure in wearing apparel, leather, wood products and motor vehicles industries and negative trend in furniture and chemical related industries.

5. Annual growth rates of output, employment and fixed capital

5.1 Table 4 represents annual growth rate of output, labour and fixed capital in the registered manufacturing sector in different industries in Uttar Pradesh over the period of 2001-2015. In the term of output, varied range between maximum of 40.66 % in refined petroleum, coke and nuclear fuel and followed by wood related products and minimum of 6.67% in furniture industry. All eighteen industries have done positive performance in output growth.

5.2 Fixed capital in real terms grew at the highest rate in non-metallic products and at the lowest rate in chemical related products displaying a wide industrial variation of it. 12 industries out of 18 industries have achieved more than average growth 12 % per annum and average growth of all 18 manufacturing industries of Uttar Pradesh were 13.47% from 2001-02 to 2015-16.

5.3 Growth rates of employment have varied between maximum of 17.84% in coke, refined petroleum, and nuclear fuel than wearing apparel and minimum of 0.57% in manufacturing of food and beverage products. Only chemical and chemical product industry has recorded negative growth in job creation. Also found that average growth of new job creation in these manufacturing industries was 6.15%.

6. Conclusions

6.1 In this study, we have tried to figure out the industry-wise variation in output, employment and productivity growth in registered manufacturing industries in Uttar Pradesh during the period after one decade of new economic policy reforms, 2001 to 2015. The structural change took place in favour of capital that increased profit rate by displacing workers in manufacturing industries in Uttar Pradesh for the period of 2001-2015. In most of the industry in Uttar Pradesh a smaller labour force relative to the size of capital has been employed and over 70 per cent of them were ordinary workers. Thus workers were affected badly more as compared to other employees, i.e. office staff and supervisors by this kind of job destroying structural change in manufacturing industry in Uttar Pradesh. The contribution of labour to output growth was significantly higher than that of capital. This was achieved partly by increasing the workload of the ordinary workers with technological up-gradation of machinery.

6.2 This study remarks significant industrial inequality in industrial growth in Uttar Pradesh although the incidence of unevenness declined at a very slow rate. Structural change occurred in Uttar Pradesh industries in favour of capital, Capital labour ratio increased not only because of higher employment of capital but because of the displacement of workers as good. Output growth increased at a higher rate with slower employment growth or negative employment growth may be an indicative of higher work burden per worker even in indecent work conditions during the post-reform period in India. The mismatch between output and employment growth also implies higher productivity growth contributing to more profit of the capitalist class.

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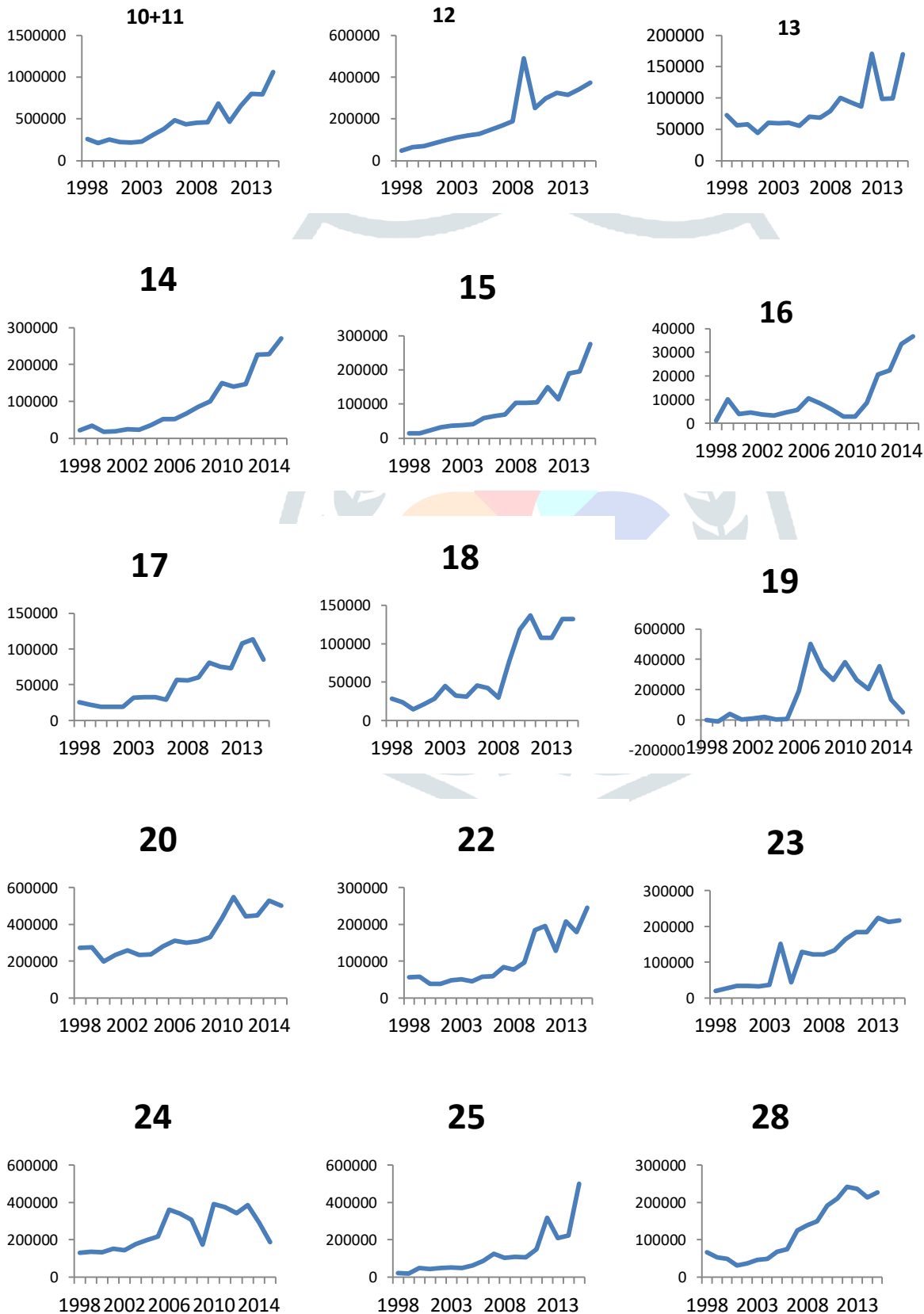
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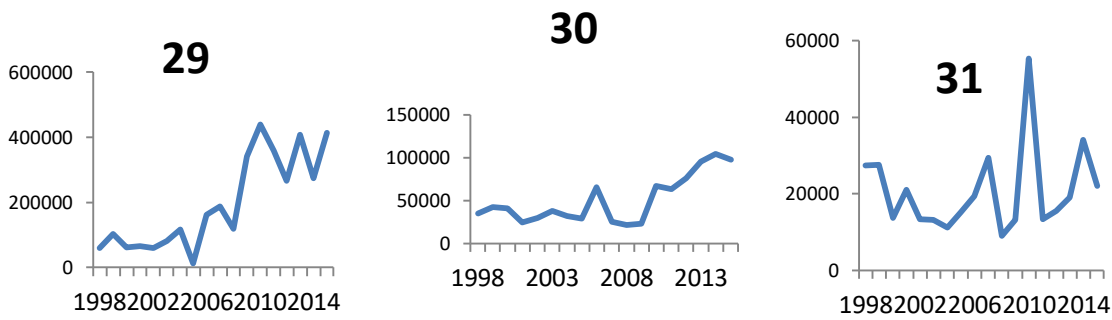
Appendix

Figures 1

Absolute trend in output: 2001-2015

Industry name showing in number code:- 11-31

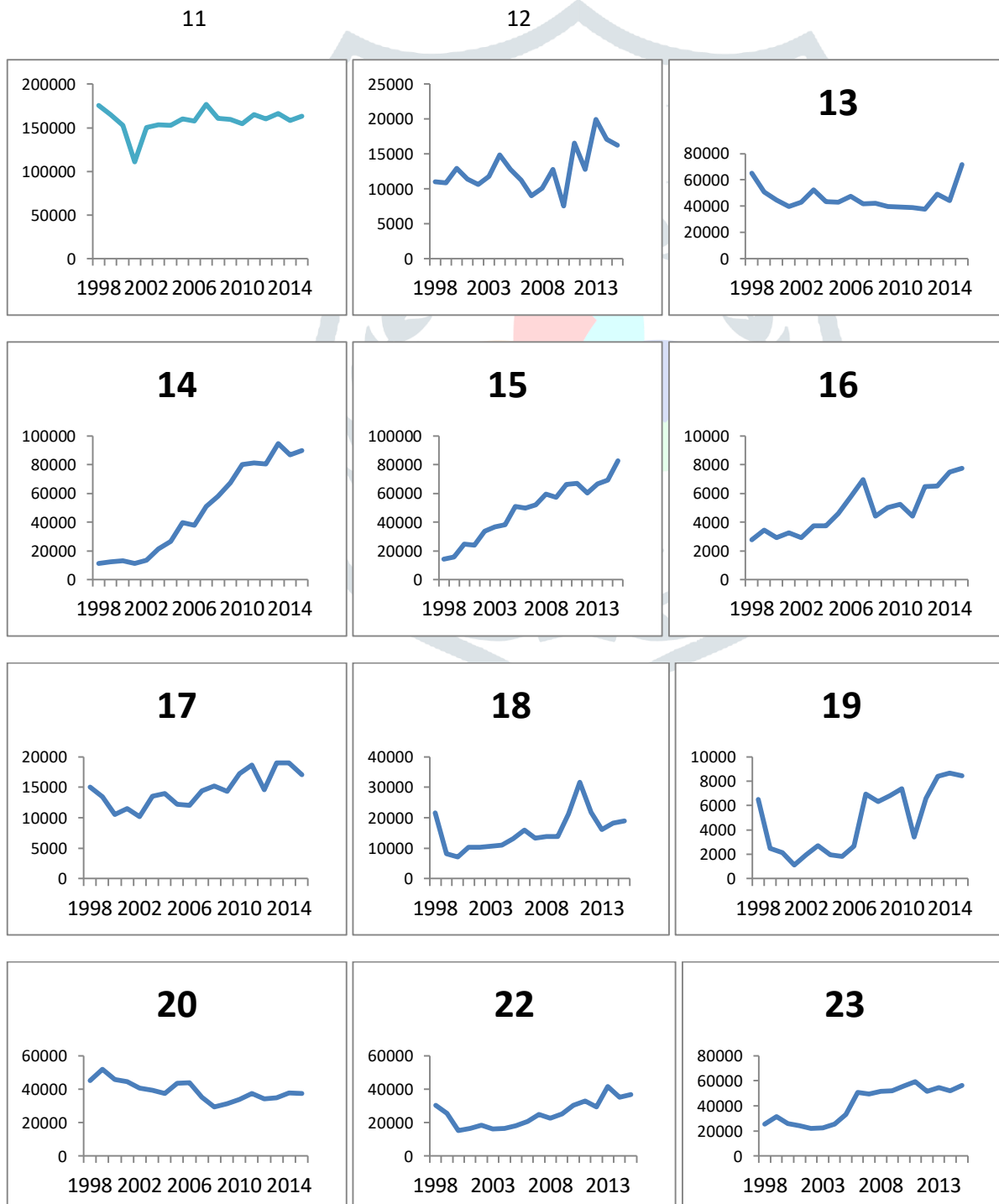


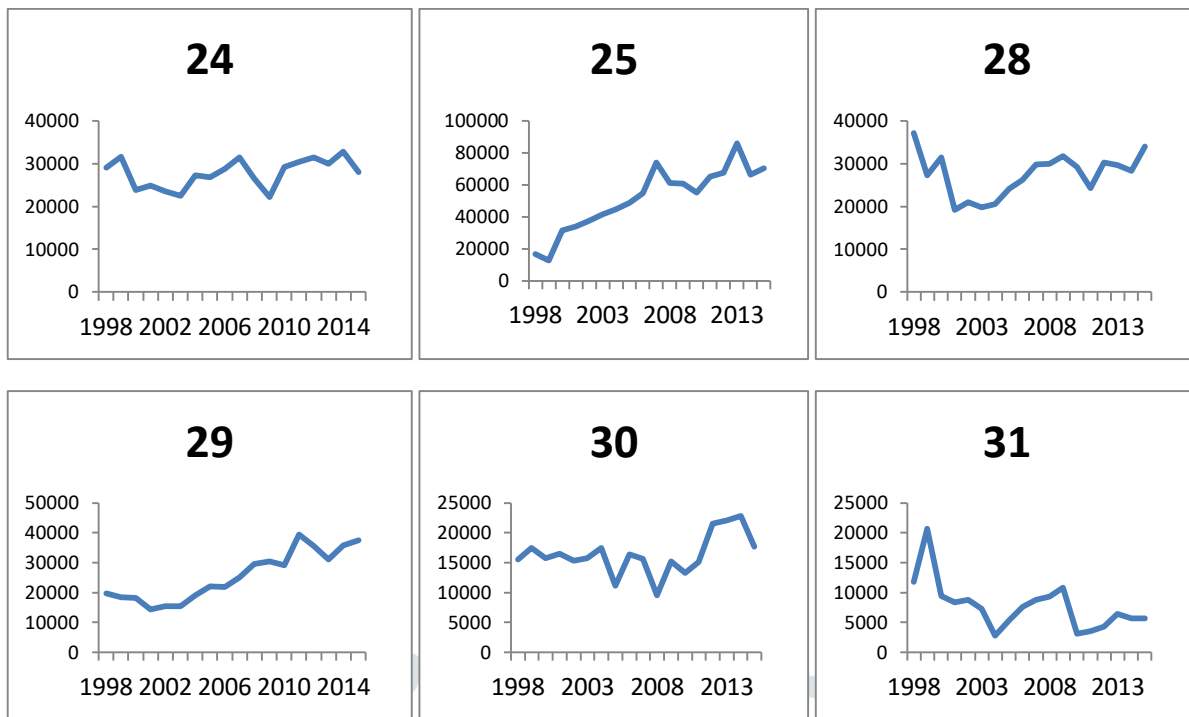


Figures 2

Absolute trend in employment: 2001-2015

Industry name showing in number code:- 11-31





Contribution of GVA, employment and fixed capital in aggregate 18 manufacturing sector by industries, Uttar Pradesh: 2001-2015

Table no. 1

industry Nic- 2008	2001-02			2008-09			2015-16		
	output	Labour	capital	output	Labour	capital	output	Labour	capital
10+11	17.64	28.09	16.20	15.41	21.74	26.92	16.39	17.33	22.14
12	6.53	2.22	0.86	6.37	1.37	0.63	5.76	1.72	0.77
13	3.49	7.75	6.21	2.69	5.72	3.92	2.62	7.61	3.25
14	1.49	2.17	0.91	2.86	7.85	1.07	4.19	9.54	1.62
15	2.51	4.65	1.42	3.52	8.03	1.72	4.26	8.80	2.45
16	0.36	0.64	0.25	0.20	0.60	0.40	0.57	0.82	0.31
17	1.51	2.24	2.25	1.90	2.06	3.06	1.32	1.81	3.49
18	1.68	2.00	0.95	1.00	1.87	1.90	2.04	2.01	1.37
19	0.11	0.22	0.78	11.40	0.86	6.76	0.76	0.89	7.95
20	18.49	8.65	19.96	10.49	3.96	10.72	7.77	3.97	6.40
22	2.98	3.23	4.54	2.62	3.04	2.95	3.80	3.91	3.77
23	2.67	4.71	1.99	4.13	7.01	5.77	3.35	5.96	4.94
24	11.93	4.83	12.06	10.40	3.59	6.15	2.88	2.98	4.05
25	3.45	6.63	1.46	3.45	8.27	1.84	7.74	7.45	1.78
28	2.50	3.74	1.20	4.68	4.05	2.55	2.13	3.18	2.44
29	5.15	2.80	14.32	4.01	4.01	9.10	6.40	3.99	3.32
30	1.92	3.20	2.58	0.72	1.29	0.47	1.51	1.88	1.15
31	1.66	1.62	0.72	0.30	1.25	0.33	0.34	0.60	0.18

Table no.2

Change in selected structural ratios: 2001-2015

	Capital-labour ratio			share of workers of total employees (%)			wages per employee (Rs.lakhs)			
	2001-02	2008-09	2015-16	2001-02	2008-09	2015-16	2001-02	2008-09	2015-16	
10+11	4.41	10.51	17.22	76.95	76.1	75.31	Table no.3 Change in labour product ivity: 2001- 2015	0.30	0.44	0.94
12	2.27	3.89	6.01	78.84	81.92	90.3		0.35	0.51	1.04
13	4.72	5.82	5.76	80.94	76.19	85.15		0.36	0.44	0.89
14	2.48	1.16	2.28	80.62	85.52	83.02		0.29	0.46	0.87
15	1.79	1.82	3.75	85.31	89.53	85.52		0.25	0.45	0.94
16	2.36	5.74	5.15	76.83	74.64	79.9		0.19	0.32	0.81
17	5.92	12.63	25.95	76.95	76.15	76.87		0.30	0.45	0.90
18	2.79	8.61	9.17	59.14	61.51	64.86		0.32	0.48	0.82
19	21.17	67.01	119.82	61.61	77.21	80.94		0.19	1.49	2.25
20	13.59	22.96	21.75	65.36	69.59	68.79		0.32	0.57	1.12
22	8.28	8.22	13.01	70.75	75.28	74.14		0.25	0.40	0.91
23	2.49	6.99	11.17	77.96	83.04	84.99		0.22	0.31	0.67
24	14.69	14.52	18.33	76.7	75.63	76.89		0.37	0.81	1.62
25	1.29	1.89	3.21	83.91	87.47	85.92		0.25	0.35	0.83
28	0.60	5.34	9.09	66.24	68.36	69.15		0.31	0.58	0.92
29	30.08	19.26	11.23	70.8	75.92	74.89		0.54	0.69	1.14
30	4.75	3.09	8.24	68.77	77.42	65.28		0.46	0.62	0.83
31	2.61	2.24	3.96	73.16	78.24	75.16	0.27	0.38	0.80	
Industry-wise				Productivity of workers			Productivity of other employees			
				2001	2008	2015	2001	2008	2015	
FOOD PRODUCTS AND BEVERAGES				2.02	3.72	8.63	6.74	11.85	26.33	
TOBACCO PRODUCTS				9.23	22.74	25.41	34.37	103.08	0.00	
TEXTILES				1.38	2.46	2.78	5.84	7.87	15.93	
WEARING APPAREL				2.12	1.70	3.63	8.80	10.06	17.76	
TANNING AND DRESSING OF LEATHER				1.57	1.95	3.89	9.11	16.71	22.99	
PRODUCTS OF WOOD AND CORK				1.82	1.80	5.93	6.05	5.28	23.59	
PAPER AND PAPER PRODUCTS				2.17	4.84	6.51	7.26	15.46	21.62	
PUBLISHING, PRINTING AND REPRODUCTION OF RECORDED MEDIA				3.52	3.46	10.76	5.09	5.53	19.85	
COKE, REFINED PETROLEUM PRODUCTS AND NUCLEAR FUEL				2.08	68.91	7.26	3.33	233.48	30.84	
CHEMICALS AND CHEMICAL PRODUCTS				8.09	15.19	19.56	15.27	34.75	43.10	
RUBBER AND PLASTIC PRODUCTS				3.24	4.57	9.01	7.83	13.90	25.82	
OTHER NON-METALLIC MINERAL PRODUCTS				1.80	2.83	4.54	6.36	13.88	25.73	
BASIC METALS				7.97	15.27	8.64	26.24	47.41	28.74	
FABRICATED METAL PRODUCTS				1.53	1.90	8.31	8.00	13.29	50.70	
MACHINERY AND EQUIPMENT				2.50	6.74	5.87	4.90	14.57	21.46	
MOTOR VEHICLES, TRAILERS AND SEMI-TRAILERS				6.43	5.26	14.72	15.58	16.58	43.91	
OTHER TRANSPORT EQUIPMENT				2.16	2.91	8.44	4.75	9.96	15.87	
FURNITURE				3.48	3.65	5.17	9.49	1.32	15.63	
Mean				3.51	9.44	8.84	10.28	31.94	24.99	
C.V				0.73	1.69	0.66	0.79	1.74	0.47	

Table no. 4

**Growth rates of output, capital and labour in Uttar Pradesh:
2001-2015**

Industry-wise	Output growth	Employment growth	Fixed capital growth
FOOD PRODUCTS AND BEVERAGES	12.27	0.57	12.8
TOBACCO PRODUCTS	17.4	6.93	12.93
TEXTILES	12.2	4.76	6.01
WEARING APPAREL	21.61	15.36	17.29
TANNING AND DRESSING OF LEATHER	20.24	9.15	17.19
PRODUCTS OF WOOD AND CORK	29.93	8.69	16.65
PAPER AND PAPER PRODUCTS	14.34	4.39	16.18
PUBLISHING, PRINTING AND REPRODUCTION OF RECORDED MEDIA	23.25	9.48	22.89
COKE, REFINED PETROLEUM PRODUCTS AND NUCLEAR FUEL	40.66	17.84	7.68
CHEMICALS AND CHEMICAL PRODUCTS	6.49	-0.93	3.78
RUBBER AND PLASTIC PRODUCTS	16.8	6.15	11.98
OTHER NON-METALLIC MINERAL PRODUCTS	20.77	2.79	23.58
BASIC METALS	8.42	1.85	1.99
FABRICATED METAL PRODUCTS	23.33	6.51	15.41
MACHINERY AND EQUIPMENT	10.24	0.91	19.93
MOTOR VEHICLES, TRAILERS AND SEMI-TRAILERS	14.07	5.94	8.25
OTHER TRANSPORT EQUIPMENT	18.11	4.38	17.8
FURNITURE	6.67	6.07	10.23
Mean	17.6	6.15	13.47