International Labour Office
Geneva

Employment Policy Department

EMPLOYMENT
Working Paper No. 185

2015

Employment and wages in Indian manufacturing: Post-reform performance

Bishwanath Goldar
Amit Sadhukhan

Employment and Labour Market Policies Branch

International Labour Office
Geneva

Employment Policy Department
EMPLOYMENT Working Paper
No. 185

2015

Employment and wages in Indian manufacturing: Post-reform performance

Bishwanath Goldar and Amit Sadhukhan

Employment and
Labour Market
Policies Branch

ILO Cataloguing in Publication Data

Goldar, Bishwanath; Sadhukhan, Amit

Employment and wages in Indian manufacturing : post-reform performance / Bishwanath Goldar and Amit Sadhukhan ; International Labour Office, Employment Policy Department, Employment and Labour Market Policies Branch. - Geneva: ILO, 2015
(Employment working paper ; No. 185)

ISSN 1999-2939 (print); ISSN 1999-2947 (web pdf)

International Labour Office Employment Policy Dept.

labour market analysis / employment / wages / manufacturing / economic reform / labour productivity / wage differential / trend / India

13.01.1

Printed by the ILO, Geneva, Switzerland

Preface

The primary goal of the ILO is to work with member States towards achieving full and productive employment and decent work for all. This goal is elaborated in the ILO Declaration 2008 on *Social Justice for a Fair Globalization*,[1] which has been widely adopted by the international community. Comprehensive and integrated perspectives to achieve this goal are embedded in the Employment Policy Convention of 1964 (No. 122), the *Global Employment Agenda* (2003) and – in response to the 2008 global economic crisis – the *Global Jobs Pact* (2009) and the conclusions of the *Recurrent Discussion Reports on Employment* (2010 and 2014).

The Employment Policy Department (EMPLOYMENT) is engaged in global advocacy and in supporting member States in placing more and better jobs at the center of economic and social policies and growth and development strategies. Policy research and knowledge generation and dissemination are essential components of the Employment Policy Department's activities. The resulting publications include books, country policy reviews, policy and research briefs, and working papers. [2]

The *Employment Policy Working Paper* series is designed to disseminate the main findings of research on a broad range of topics undertaken by the branches of the Department. The working papers are intended to encourage the exchange of ideas and to stimulate debate. The views expressed within them are the responsibility of the authors and do not necessarily represent those of the ILO.

Azita Berar Awad
Director
Employment Policy Department

Foreword

This work is a contribution to the Employment Policy Department's focus on employment and growth in G20 developing economies. Much discussion on employment and growth in developing economies analyses what happens to the manufacturing sector. Using primary data from India, the authors show that unless we make a distinction between the organised and unorganised parts of the manufacturing sector, we are unlikely to form an adequate economy-wide picture of what is happening to employment in the lead developmental sector. While Indian data permit these calculations, the inability to do similar assessments for other developing countries puts a serious question mark on the validity of sectoral growth and employment analysis that cannot make these distinctions. The notable feature of this paper is that it produces estimates of unorganised and organised employment in manufacturing at the all India level.

While the organized part of manufacturing has grown at a reasonable pace, it remains a minority segment of total employment in Indian manufacturing. The unorganised part of Indian manufacturing constitutes nearly 80 per cent of the country's manufacturing employment, and it is in this part of the manufacturing sector that employment growth is sluggish. It is because of this composition in manufacturing that even a high growth rate of organised jobs within manufacturing cannot be revealed in total manufacturing sector employment growth. This is a critical feature of Indian manufacturing.

Nevertheless, there are signs of improvements in the unorganised parts of Indian manufacturing. The paper shows that while employment growth in unorganised manufacturing has been quite slow, real wages in this part of Indian manufacturing have been rising. In other words, structural transformation is taking place *within* the unorganised part of Indian manufacturing. This is confirmed by corresponding productivity analysis as well as shifts in the distribution of workers away from self-employment. Despite the fact that real wages are rising in both organised and unorganised manufacturing, there is a decline in wage shares in value added in India.

The authors discuss the role of infrastructural and educational impediments as well as institutional arrangements in the labour market that constrain manufacturing output. Further improvements in the employment situation in manufacturing will clearly be contingent on removing obstacles to output growth in manufacturing.

Iyanatul Islam
Chief
Employment and Labour Market Policies Branch
Employment Policy Department

Acknowledgements

The authors gratefully acknowledge the financial support received from the ILO for conducting this study. They are sincerely thankful to Prof. Ajit Ghose, Visiting Professor, Institute for Human Development, New Delhi and Dr Nomaan Majid, ILO for the guidance and intellectual inputs they received for the study. The paper has benefited greatly from the comments and suggestions of Dr Ghose and Dr Majid.

B N Goldar
Institute of Economic Growth, New Delhi

Amit Sadhukhan
Institute of Development Studies, Kolkata

Contents

List of Figures

List of Tables

Introduction

The initiation of economic reforms in 1991 was a major watershed in India's industrial development. The steps taken in 1991 and the next few years led to the dismantling of most domestic industrial controls and substantial liberalization of trade. This process of trade liberalization continued over time and eventually, by around the mid-2000s, almost all products were freely importable and tariff rates, except for some agricultural products and certain manufactured items, had been brought down to a low level . How Indian manufacturing has fared in terms of employment generation and wages in the post-reform period, i.e., the period after 1991, is the main topic addressed in this study.

At the time the economic reforms began in India, there was an expectation that they would boost the rate of India's industrial growth and encourage a more labour-intensive industrial development, by furthering exports of labour-intensive products. This would enhance employment generation in manufacturing and give a significant upward push to the wages of industrial workers, the less educated and less skilled. It was also hoped that with rapid growth in industrial employment, a significant part of the workers engaged in agriculture would shift to manufacturing, which would improve their productivity and income levels. Whether the developments that took place in the post-reform period actually lived up to expectations, is an interesting question.

Drawing on secondary data, the study focuses primarily on an analysis of trends in employment and wages in Indian manufacturing, in the post-reform period, followed by an attempt is then made to explain them. The first section outlines the data sources used for the study. Section 2 analyses trends in employment, labour productivity and wages in aggregate, broken down between organized and unorganized manufacturing[1] and aggregate manufacturing. Section 3 provides a detailed breakdown of trends in employment and labour productivity, while Section 4 carries out a similar analysis of wages and wage inequality. Sections 5 and 6 attempt to explain the observed trends. The main findings and conclusions are summarized in Section 7.

[1] The 'organized' segment of the Indian manufacturing sector comprises all manufacturing units which employ 10 or more workers using electricity, and units which employ 20 or more workers without electricity. The rest of manufacturing after removing the organised segment from the *aggregate manufacturing* industry is known as 'unorganized' manufacturing. This is a key dichotomy within the Indian manufacturing sector and it is therefore important to study the two components separately. Based on the definition of organized and unorganized manufacturing above, there should be no overlap. Despite this, analysis of unorganized manufacturing survey data in practice does reveal some overlap. Data on unorganized organized manufacturing obtained from the surveys undertaken by the National Sample Survey Office (NSSO) includes manufacturing units that employ 10 or more workers and use power. Chatterjee and Kanbur (2013) have examined this issue and come to the conclusion that a majority of the units eligible to be covered under organized manufacturing, are not, in fact, covered by the organized manufacturing survey, but are included under unorganized manufacturing. Despite this overlap, a typical manufacturing unit in the organized sector is much bigger than a typical manufacturing unit in the unorganized sector in terms of output, capital stock and employment, and for this reason the dichotomy still remains important for the purposes of this study.

1. Data Sources

This study mainly uses two sources of data. The first is the Annual Survey of Industries (ASI) published by the Central Statistical Office (CSO), Government of India, which provides industrial data on an annual basis (Indian fiscal year, i.e. April to March) for the "organized segment" of the aggregate manufacturing sector.[2] The other data source is the Employment and Unemployment Survey (EUS)[3] in the National Sample Survey (NSS) published by the Indian National Sample Survey Office (NSSO. In addition, data have been drawn from (a) the National Accounts Statistics published by the Central Statistical Office and (b) NSS reports of surveys of unorganized manufacturing enterprises published by the NSSO.

The focus of the study is on the two decades following the economic reforms initiated in 1991. The analysis presented in the various sections, however, covers slightly different periods depending on data availability. Some parts of the analysis, which are based on ASI data, consider the period from 1989 to 2010 to cover the two decades of India's economic liberalization. This analysis relates to organized manufacturing, since the ASI covers only the organized component of manufacturing. Other parts of the analysis consider the entire manufacturing sector, covering the periods 1993-94 to 2004-05 and 2004-05 to 2011-12. For this analysis, three major rounds of the EUS have been used: the 50th Round (1993-94), 61st Round (2004-05), and most recent, the 68th Round (2011-12). In some places, the results of the 55th round (1999-2000) are used.

The 3-digit level of National Industrial Classifications (NIC): NIC-1987 for the 50th Round, NIC-1998 for the 61st Round, and NIC-2008 for the 68th Round) is the unit of product disaggregation used here. The details of these 3-digit products groups for the manufacturing sector in each round are given in Annex A. These 3-digit product groups have been further classified into three broad groups that correspond to the level of capital intensity in the Indian manufacturing sector in 1960: traditionally labour-intensive, traditionally low capital-intensive and traditionally high capital-intensive. The allocation into these three groups used cluster analysis applied to the capital-labour ratio of different three-digit industries in 1960.[4] The mean and standard deviation of the capital-labour ratio in the traditionally labour-intensive manufacturing group (in 1960) were 1.7 and 0.63 respectively; 4.02 and 1.27 for the traditionally low capital-intensive group; and 20.5 and 24.9 for the traditionally high capital-intensive group. The detailed lists of these groups are given in Annex 2.

The National Accounts Statistics data are mainly used for the computation of labour productivity and wage share of value added when the organized and unorganized components of manufacturing are considered together. However, the analysis of labour productivity and wage share for organized manufacturing alone uses ASI data, while the analysis of unorganized manufacturing uses unorganized manufacturing survey results.

The rationale for using the various employment and wage indicators and how they have been constructed from the data sources is discussed in more detail in the respective sections below.

[2] As mentioned earlier, the organized sector units employ 10 or more workers with electrical power or 20 or more workers without power. These units are registered as "factories" under the Indian Factories Act, 1948, and thus are subject to various regulations under the Act.

[3] The EUS covers both organized and unorganized segments.

[4] The data for an early year in India's development, i.e. 1960 was considered for the purpose of cluster analysis since the aim was to identify the traditionally labour-intensive and traditionally capital-intensive industries.

2. Trends at aggregate level

It would be useful to begin with the overall picture of output growth, employment growth and labour productivity growth in Indian manufacturing. Between 1993-94 and 2011-12, manufacturing real gross domestic product (GDP) grew at the rate of 7.6 per cent per annum (Table 1). The growth rate in manufacturing employment in this period was much lower at 2.4 per cent per annum. Thus, the employment elasticity was about 0.3. The labour productivity growth rate of aggregate manufacturing in the period 1993-94 and 2011-12 was about five per cent per annum.

Table 1. Growth rates in real GDP, employment and labour productivity, Indian manufacturing (per cent per annum)

Period	*Growth rate in real GDP*			*Growth rate in employment*			*Growth rate in labour productivity*		
	Aggregate manu-facturing	Org. Mfg	Unorg. Mfg.	Aggregate manu-facturing	Org. Mfg	Unorg. Mfg.	Aggregate manu-facturing	Org. Mfg	Unorg. Mfg.
1993-94-1999-2000	7.27	7.42	6.77	1.60	0.76	1.79	5.58	6.61	4.89
1999-2000-2004-05	6.01	7.02	4.32	5.00	0.59	5.90	0.97	6.39	-1.49
2004-05-2011-12	8.90	10.11	6.45	1.33	6.97	0.13	7.47	2.94	6.32
1999-2000-2011-12	7.69	8.81	5.56	2.84	4.26	2.49	4.71	4.36	3.00
1993-94-2011-12	7.55	8.35	5.96	2.43	3.08	2.26	5.00	5.11	3.62

Source: Authors' computations using NAS, EUS and ASI data.

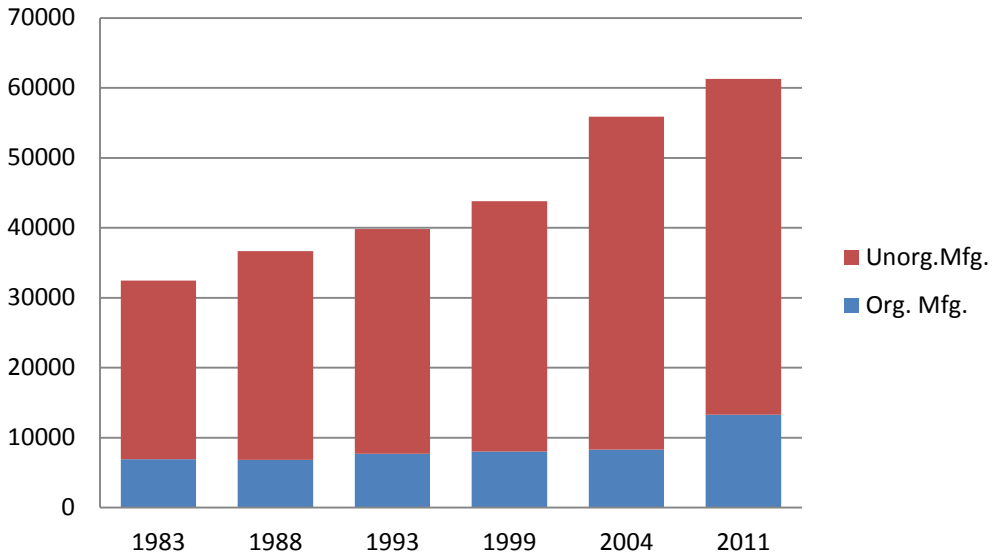
Note: The growth rates shown are annual compound growth rates.

During the period 1993-94 and 2011-12, both output (real GDP growth) and the employment growth rate in organized manufacturing outpaced unorganized manufacturing.[5] The labour productivity growth rate in was higher in organized manufacturing than in unorganized manufacturing: 5.1 per cent per annum as against 3.6 per cent.

Unorganized manufacturing accounts for about 80 per cent of manufacturing employment (Figure 3.1). The share of unorganized manufacturing has changed little over time. There has been a small increase in the share of organized manufacturing in aggregate manufacturing employment.

[5] Organized sector employment data are at present not available for 2011-12. Therefore, the data for previous years have been extrapolated. Employment in unorganized manufacturing has been derived from the employment estimate for aggregate manufacturing (which are based on NSS employment-unemployment surveys) and employment estimates for organized manufacturing (which are obtained from the ASI). The estimate for the organized sector is subtracted from the estimate of aggregate manufacturing employment, to arrive at an estimate of employment in the unorganized sector. It should be pointed out here that, due to differences in the concepts used, the two sets of estimates of employment are not exactly comparable, but perhaps the best that can be achieved.

Figure 1. Employment in manufacturing ('000s)



Source: Authors' computations using EUS and ASI data.

Analysis of growth rates in output, employment and labour productivity for the sub-periods reveals marked intertemporal variations. The output growth rate in organized manufacturing was higher in the period 2004-05 to 2011-12 than in the earlier periods (Table 3.1). The same holds true for aggregate manufacturing, for the reason that the organized sector has a dominant share of this. The output growth rate in unorganized manufacturing during 2004-05 to 2011-12 was higher than in the period 1999-2000 to 2004-05, but not as high as in the period 1993-94 to 1999-2000. Indeed, the growth rate in output in unorganized manufacturing in the whole of 1999-2000 to 2011-12 was lower than in 1993-94 to 1999-2000.

As regards employment, growth rates in both organized and unorganized manufacturing, and therefore in aggregate manufacturing, were modest in the period 1993-94 to 1999-2000. . There was a sharp acceleration in employment growth in unorganized manufacturing in the period 1999-2000 to 2004-05, also reflected in aggregate manufacturing employment. The employment growth rate in in unorganized manufacturing increased from about two per cent per annum during 1993-94 to 1999-2000 to about six per cent per annum during 1999-2000 to 2004-05. In aggregate manufacturing, similarly, the employment growth rate accelerated from 1.6 per cent per annum during 1993-94 to 1999-2000 to about five per cent per annum during 1999-2000 to 2004-05.[6] By contrast, the employment growth rate in organized manufacturing accelerated sharply in the later period 2004-05 to 2011-12, reaching some seven per cent per annum, a rate never achieved by organized manufacturing hitherto. Interestingly, in the same period, there was virtually no increase in employment in unorganized manufacturing, which accounts for about 80 per cent of aggregate manufacturing employment. Consequently, the aggregate growth rate in in the period 2004-05 to 2011-12 fell sharply from the high rate achieved during 1999-2000 to 2004-05.

The growth rate in manufacturing labour productivity was relatively high in the period 1993-94 to 1999-2000. For unorganized manufacturing and aggregate manufacturing, the labour productivity growth rate fell significantly in the period 1999-2000 to 2004-05,

[6] The sharp increase in the growth rate in manufacturing employment between 1999-2000 and 2004-05 is a little surprising. One needs to carefully check for a possible over-estimation of employment for 2004-05 (61st round of the NSS). To examine this issue, employment estimates based on other surveys were considered. Reassuringly, the estimates for the 60th round and the 64th round were found to be little different from the estimate for the 61st round.

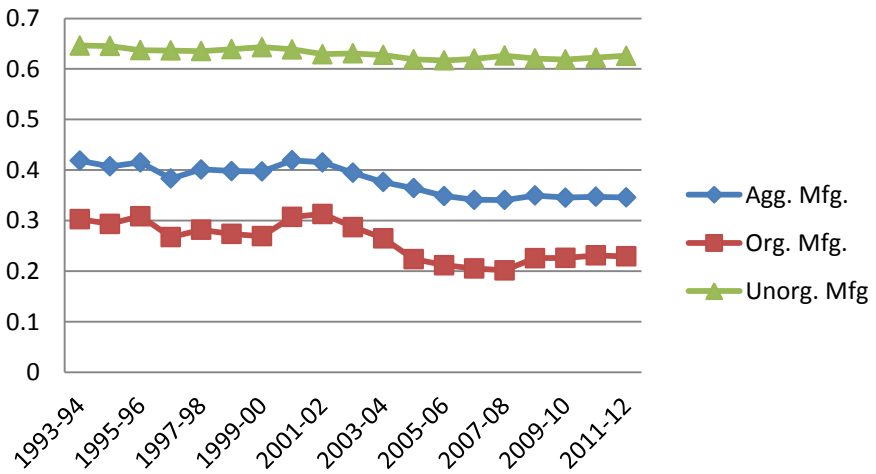
before recovering in the following period, 2004-05 to 2011-12. By contrast, organized manufacturing achieved a high labour productivity growth during both 1993-94 to 1999-2000 and 1999-2000 to 2004-05. It was only in the period after 2004-05 that it came down as the employment growth rate rose to a high level.

The analysis of trends in Table 3.1 above raises two questions. Firstly, why did employment growth in organized manufacturing accelerate to about seven per cent per annum in the period after 2004-05 causing labour productivity growth to decelerate significantly? Secondly, why did employment in unorganized manufacturing accelerate in the period between 1999 and 2004 when the growth rate in output suffered a slowdown? [7]

Turning from trends in output, employment and labour to wages and wage share in value added, Figure 3.2 shows trends in the share of wages in value added in organized manufacturing, unorganized manufacturing and aggregate manufacturing. The wage shares have been computed from factor income data given in the National Accounts Statistics (CSO).[8]

The wage share in organized manufacturing showed a downward trend in the period 1993-1994 to 2007-08 and a modest upward trend thereafter. The wage share in unorganized manufacturing, on the other hand, remained more or less steady at around 0.6 throughout the period. For aggregate manufacturing, a downward trend in wage share is observed until 2007-08 followed by a modest upward trend, similar to organized manufacturing. The pattern is similar to that of organized manufacturing, because the latter has a dominant position in aggregate manufacturing in terms of value added.

Figure 2. Wage share in gross value added



Source: Authors' computations using NAS data.

[7] This spike in the growth rate in employment in unorganized manufacturing in the period 1999-2000 to 2004-05 is not corroborated by the NSS survey results of unorganized sector manufacturing enterprises. However, the estimate of the number of persons employed in manufacturing based on the EUS is believed to be more reliable than the employment estimates obtained from the NSS unorganized manufacturing surveys, which provide good estimates of the rates and ratios, but may not give a good estimate of the level of employment.

[8] One problem encountered in computing labour income share in gross value added in unorganized manufacturing is that in the NAS data the income of self-employed persons has not been split into labour income and capital income components. Rather, in the NAS, this is shown as mixed income. It has been assumed that 60% of mixed income is labour income and the remaining 40% is capital income. The figure of 60% used for splitting mixed income has been chosen on the following consideration. According to NSS survey results for unorganized manufacturing for 2000-01, 2005-06 and 2010-11, the ratio of wage rates of employed workers to gross value added per worker in establishments was about 0.6, which may be treated as labour income share in establishments. This figure for wage share in establishments is assumed to be applicable to the self-employed.

Table 2 shows the growth rates for real wages (real product wage). It highlights that throughout the entire period 1993-94 to 2011-12, the growth rate in real product wage generally lagged behind the manufacturing labour productivity growth rate, particularly in organized manufacturing. In unorganized manufacturing, on the other hand, the gap between the growth rates in real wages and labour productivity was narrow.

Table 2. Growth rates in real product wage and labour productivity, Indian manufacturing (per cent per annum)

Period	*Growth rate in real product wage*			*Growth rate in labour productivity*		
	Aggregate manu-facturing	Organized manu-facturing	Unorganized. manu-facturing	Aggregate manu-facturing	Organized manu-facturing	Unorganized. manu-facturing.
1993-94 to 1999-2000	4.67	4.54	4.81	5.58	6.61	4.89
1999-2000 to 2004-05	-0.77	2.56	-2.24	0.97	6.39	-1.49
2004-05 to 2011-12	6.68	3.28	6.50	7.47	2.94	6.32
1999-2000 to 2011-12	3.51	2.98	2.77	4.71	4.36	3.00
1993-94 to 2011-12	3.89	3.50	3.44	5.00	5.11	3.62

Source: Authors' computations using NAS, EUS and ASI data.

In organized manufacturing, the growth rate in real wages lagged behind in labour productivity in the periods 1993-94 to 1999-2000 and 1999-2000 to 2004-05. Interestingly, in the period after 2004-05, the growth rate in real wages exceeded that in labour productivity. It may be recollected that this is the period in which organized manufacturing experienced a rapid growth in employment, accompanied by a somewhat faster growth in real wages than in labour productivity.

For unorganized and aggregate manufacturing, the period 1999-2000 to 2004-05 was one of rapid employment growth. Also in the same period, labour productivity growth was low (negative in the case of unorganized manufacturing). Growth rates in real wages were negative and thus fell behind the growth in labour productivity.

It should be pointed out here that the growth rate in real wages in aggregate manufacturing shown in Table 3.2 above is based on factor income data obtained from the NAS and employment data obtained from the EUS. Data on wages are also directly available from the EUS. The analysis of wage data obtained from the EUS is presented below in Section 4.

Several studies have observed that wage inequality between skilled and unskilled labour in the Indian manufacturing sector has widened in the post-reform period (see Ramaswamy, 2008, Mehta and Hasan, 2011; Mishra and Das, 2012; Roy, 2012; and Sadhukhan, 2012; for a review see Goldar, 2013). Comparing the daily earnings of regular workers in manufacturing, Goldar (2013) finds that the ratio of daily earnings of workers with graduate level education and above to the daily earnings of illiterate workers increased between 1993-94 and 2009-10. In the case of urban males, for instance, the ratio in question increased from 2.36 in 1993-94 to 3.42 in 2009-10 in manufacturing industries with NIC codes 15 to 22 (food, textiles, leather, etc.), and from 2.66 in 1993-94 to 4.69 in 2009-10 in manufacturing industries with NIC codes 23 to 36 (chemicals, metals, machinery, etc.). It seems, therefore, that the manufacturing sector has experienced a significant increase in skill premium over time. This aspect is further discussed below in Section 4.

3. Changes in employment and labour productivity: Disaggregated analysis

This section discusses the various economic aspects of employment in Indian manufacturing for the two decades since India's major economic reforms in the early 1990s. The experience of this period can be useful in understanding the quantity and quality of employment created in the Indian manufacturing sector and, therefore, may also be helpful in addressing its future challenges, especially creating decent jobs and achieving robust employment growth. An analysis of the Indian manufacturing industry needs to mark the duality within this sector, which, as mentioned above, consists of two broad segments: an organized segment and an unorganized segment. Comparable data show that the share of the organized segment in aggregate manufacturing employment was around 19 per cent in 1993, and that it increased to around 22 per cent by 2011, i.e. an increase of only about 3 percentage points over one and half decades. Since the organized segment is regarded as the better job provider, usually through higher formal wages and a range of non-wage benefits, than its unorganized counterpart, such a slow increase in the absorption rate of employment in organized manufacturing indicates that the overall quality of manufacturing employment has not improved significantly.[9] Given the importance of the organized segment in providing higher wage and non-wage benefits – possibly because of higher productivity compared with the unorganized segment – it is imperative to examine this sector in detail, along with the aggregate manufacturing sector.

As this study uses two different databases for Indian manufacturing industry, the Annual Survey of Industries (ASI) for the organized segment and the NSS Employment and Unemployment Survey (EUS) for aggregate manufacturing, the following subsections discuss these two categories separately. The section concludes with a comparative analysis of the unorganized sector using the NSS survey results.

3.1 Pattern of employment in organized manufacturing

Total employment in the organized manufacturing sector is the aggregate of the "number of employees" across various 3-digit manufacturing groups. The number of employees is divided into two broad categories: "workers" and "other than workers". Within the workers category, workers "employed through contractors" comprise a subset.

Table 3 shows the levels and changes of employment in organized manufacturing for various years and periods respectively. By considering a number of years and periods over the last two decades, it becomes possible to get an understanding of the exact time when significant changes took place. Moreover, the cluster-based manufacturing groups, ranked by their capital intensity, help us to identify the specific groups which have made significant contributions to changes in employment. In this regard, it is important to mention that the skill intensity[10] in the traditionally labour-intensive group is lower than that in the other two groups; the traditionally low capital-intensive group is less skill-intensive than the traditionally high capital-intensive group. Moreover, the level of skill intensity has remained almost unchanged over the last two decades. Skill intensity in the traditionally labour-intensive group was around 16 per cent; skill intensity in traditionally low capital-intensive and traditionally high capital-intensive groups is around 26 per cent and 29 per cent respectively.

It is evident from Table 3 that the traditionally labour-intensive group contributed around 50 per cent of aggregate organized manufacturing employment in 1989, while the

[9] The differences in the wages of organized and aggregate manufacturing are discussed in Section 5 below.
[10] Skill intensity is measured by the share of skilled labour in total labour within each manufacturing group.

traditionally low capital-intensive and traditionally high-capital-intensive groups, contributed 29 per cent and 21 per cent respectively. In the most recent period, the last decade, the traditionally low capital-intensive group has increased its share in aggregate organised manufacturing to 36 per cent in 2010, whereas the traditionally labour-intensive group has experienced a small decline to 47 per cent. Nonetheless, the fact to be noted is that the traditionally labour-intensive group still accounts for nearly half of aggregate employment in organized manufacturing. The details of the share of employment in aggregate organized manufacturing for each of the three manufacturing groups for selected years are shown in Table 4 below.

Table 3. Employment in organized manufacturing ('000s)

Year	*Traditionally labour-intensive*	*Traditionally low capital-intensive*	*Traditionally high capital-intensive*	*Aggregate organized manufacturing*
1989	3361.5	1934.1	1351.3	6646.9
1993	3513.7	2135.0	1510.3	7158.9
2000	3770.1	2011.5	1582.2	7363.8
2004	3977.6	2193.1	1592.4	7763.1
2007	4708.0	2896.6	2028.0	9632.6
2010	5630.0	4323.0	2124.9	12077.9
Growth rate in employment in organized manufacturing (% p.a.)				
Period	*Traditionally labour-intensive*	*Traditionally low capital-intensive*	*Traditionally high capital-intensive*	*Aggregate organized manufacturing*
1989-93	1.11	2.50	2.82	1.87
1994-2000	0.39	-1.63	0.33	-0.20
2001-07	4.26	6.75	4.99	5.12
2008-10	3.34	8.45	7.54	5.83
1990-2000	1.32	-0.01	1.32	0.94
2000-10	4.09	7.95	2.99	5.07
1989-2010	2.49	3.90	2.18	2.88

Table 4. Share of employment in each manufacturing group in aggregate employment in organized manufacturing (as percentage)

Year	*Traditionally labour-intensive*	*Traditionally low capital-intensive*	*Traditionally high capital-intensive*
1989	50.6	29.1	20.3
1993	49.1	29.8	21.1
2000	51.2	27.3	21.5
2004	51.2	28.3	20.5
2007	48.9	30.1	21.1
2010	46.6	35.8	17.6

Aggregate employment in organized manufacturing increased from 6.6 million to 12.1 million, about 1.8 times, in the period from 1989 to 2010. However, the growth rate varied across the different industry groups. Employment in the traditionally labour-intensive group increased 1.7 times; the corresponding figures for the traditionally low capital-intensive and

traditionally high capital-intensive groups were 2.2 and 1.6 times respectively. Therefore, the traditionally low capital-intensive group contributed more to generating employment than the other two groups. This phenomenon is also reflected in the growth estimates of employment in this group compared with the other two groups. The annual compound growth of employment in the traditionally low capital-intensive group was 3.9 per cent per annum over the period 1989-2010, but less in the other two groups, the same rate.

A further breakdown of employment growth shows that in the latter decade, the 2000s, employment increased much faster than in the 1990s. Employment growth in the period 1990-2000 was 0.9 per cent per annum, compared with 5.1 per cent per annum in 2000-10. Moreover, this high growth rate in aggregate employment in the 2000s came from higher growth across all three manufacturing groups in the period 2000-10 than in 1990-2000. Within the low-growth period, the 1990s, the period 1994-2000 even saw negative growth, about 0.2 per cent in aggregate employment , due to the corresponding negative employment growth (-1.6 per cent) in the traditionally low capital-intensive group.

A similar breakdown for the 2000s does not show any significant variations in the growth of aggregate employment between the pre-crisis period of 2001-07 and the post-crisis period 2008-10). However, the post-crisis growth of employment in the traditionally labour-intensive group was lower than its pre-crisis level, while in the other two groups, it increased relative to its pre-crisis level.

Having discussed the quantitative aspects of organized manufacturing employment, it is important to discuss some of its qualitative aspects. One major qualitative indicator of manufacturing employment is the scope and changes in contractualization of labour. Contract workers are generally paid less than their regular counterparts. Moreover, they are not generally entitled to non-wage benefits which are otherwise available to regular labour. The ratio of contractual workers to aggregate workers can be calculated from the available ASI data.

From Tables 5 and 6, it is clear that the share of contract workers in aggregate organized manufacturing workers increased from 14 per cent to 34 per cent in the period between 1989 and 2010. Within the traditionally labour-intensive manufacturing group, there was a two-fold increase in the share of contract workers in aggregate workers over the same period. For the traditionally low capital-intensive and traditionally high capital-intensive groups, the increase in the share of contractual workers was 3.6 and 2.6 times respectively. Although contractualization has increased steadily over the last two decades, its rise has been more significant in the latter, i.e. the 2000s. Table 6 shows this more clearly. The annual growth rate of contract employment increased to 10 per cent per annum over the period 2000-10, substantially higher than the 4.8 per cent per annum observed in the previous period, 1989-2000. Moreover, the growth of contract labour was more prominent in the traditionally low capital-intensive group compared to the other two groups for all periods except 1989-1994. This growing contract employment among organized manufacturing workers is reflected in the deteriorating quality of employment in the Indian organized manufacturing sector.

Table 5. Share of contract workers in aggregate workers within each manufacturing group (per cent)

Year	*Traditionally labour-intensive*	*Traditionally low capital-intensive*	*Traditionally high capital-intensive*	*Aggregate organized manufacturing*
1989	15.6	10.3	15.7	14.2
1994	16.1	11.0	21.1	15.6
2000	21.4	20.8	24.2	21.8
2004	24.7	28.7	29.1	26.5
2007	27.8	34.0	35.7	31.1
2010	29.7	37.1	40.2	33.9

Table 6. Growth rate in contractual employment (% p.a.)

Period	*Traditionally labour-intensive*	*Traditionally low capital-intensive*	*Traditionally high capital-intensive*	*Aggregate organized manufacturing*
1989-94	2.36	3.54	8.72	4.02
1994-2000	5.10	9.52	2.50	5.43
2001-07	8.49	14.02	11.41	10.69
2008-10	4.55	17.04	8.17	9.51
1989-2000	3.85	6.76	5.28	4.79
2000-10	7.54	14.82	8.53	9.93

3.2 Pattern of employment in aggregate manufacturing

Having discussed various aspects of employment in the organized segment of the Indian manufacturing sector in the previous section, this section presents the employment structure of the aggregate manufacturing sector in more detail. Since the ASI data cover only the organized manufacturing segment, the estimates for the aggregate manufacturing sector from the NSS Employment and Unemployment Survey (EUS) data, i.e. the organized and unorganized manufacturing sector combined, gives the complete picture of Indian manufacturing sector. Moreover, the EUS allows us to compute the employment structure by region (e.g. rural and urban), status (e.g., regular, casual, and self-employed), gender, education, etc...

Manufacturing sector workers are defined for the purposes of this study as persons whose principal economic activity or subsidiary economic activity or both during the last one year have been in that sector. The EUS allows an estimate of the number of workers in each manufacturing group at the 5-digit NIC level, and accordingly, the number of workers engaged in each manufacturing cluster-based group has been computed and are presented below.

As noted above, employment in the organized manufacturing segment increased by 1.7 times from 7.2 million to 12.1 million over the period 1993-2010. The comparable statistics for the aggregate manufacturing sector presented in Table 7 below show that aggregate manufacturing employment increased by 1.6 times over the period 1993 to 2011, from 32.6 million to 51.2 million. In other words, the orders of increase in employment in

organized and aggregate manufacturing are not dissimilar, but with one important difference. In the case of organized manufacturing, the traditionally low capital-intensive sector achieved a bigger increase in employment than the other two groups. By contrast, in aggregate manufacturing, it is the traditionally labour-intensive sector which had the largest increase. Employment in this industry group in 2011-12 was 1.8 times that of 1993-94, higher than the other two groups. Thus, although the organized manufacturing segment experienced an almost proportionate increase in employment compared with the aggregate manufacturing sector, it is the traditionally labour-intensive manufacturing group that generated more employment. This phenomenon reflects the fact that the increase in employment in this group has been concentrated in unorganized manufacturing. This indicates a negative trend as far as the formalization of the manufacturing sector is concerned, underlining the point made earlier that the Indian manufacturing sector has not moved significantly towards an organized production structure.

Table 7. Employment in aggregate manufacturing ('000s)

Year	*Traditionally labour-intensive*	*Traditionally low capital-intensive*	*Traditionally high capital-intensive*	*Aggregate manufacturing*
1993-94 (50th Round)	20660.0	9883.9	2032.8	32576.7
1999-2000 (55th Round)	25709.5	9956.0	3422.4	39088.3
2004-05 (61st Round)	34211.4	9918.9	3580.3	47710.6
2011-12 (68th Round)	37416.7	10632.9	3169.4	51219.0
Growth rate in employment in aggregate manufacturing (% p.a.)				
Period	*Traditionally labour-intensive*	*Traditionally low capital-intensive*	*Traditionally high capital-intensive*	*Aggregate manufacturing*
1993-94 to 1999-2000	3.71	0.12	9.07	3.08
1999-2000 to 2004-05	5.88	-0.07	0.91	4.07
1993-94 to 2004-05	4.69	0.03	5.28	3.53
2004-05 to 2011-12	1.29	1.00	-1.73	1.02
1993-94 to 2011-12	3.35	0.41	2.50	2.55

Note: Employment estimates shown in the table use the multipliers within the dataset on NSS unit records. Hence these are based on population estimates within the NSS data. They differ from the estimates discussed in Section 3 where the work participation rates are taken from the NSS and employment estimates are derived with the help of population estimates derived from the Census population figures. As a result the absolute figures on employment as well as growth rates in this table will not tally with the employment estimates presented in Section 3 above.

In addition to the absolute figures on estimated employment in each manufacturing group, the employment growth figures for three periods, 1993-1994 to 1999-2000, 1999-2000 to 2004-2005 and 2004-2005 to 2011-2012 (Table 7) deserve particular consideration. They provide some indication of the time when the structural changes took place in the aggregate manufacturing sector. A comparison of Table 3 and Table 7 shows that annual employment growth in organized manufacturing was lower (at 0.94 per cent) in the period 1990-2000 than in the aggregate manufacturing sector (3.5 per cent) in the period 1993-1994 to 2004-2005, However, this trend reversed in favour of the organized segment (with growth of 5.1 per cent) in the last decade from 2000, whereas the aggregate manufacturing sector experienced growth of around one per cent in the period 2004-2005 to 2011-2012. Higher employment growth in the traditionally labour-intensive manufacturing group than in the other two groups, over the last two decades in general and the last decade in particular, indicates that, despite a shift towards more capital-intensive industries in organized manufacturing, Indian manufacturing employment in general does not reflect this trend.

The various dimensions of employment in Indian manufacturing are shown in the following tables. Firstly, Table 8 presents the level of concentration of manufacturing employment, and therefore, manufacturing activities in rural versus urban areas. It is clear from this table that around 50 per cent of manufacturing employment is concentrated in rural areas, more on the traditionally labour-intensive manufacturing group than the other two groups. Traditionally high capital-intensive manufacturing is mostly urban-centric relative to the traditionally low labour-intensive group. Moreover, a trend towards urbanized manufacturing activity has been observed in the traditionally low capital-intensive groups, whereas traditionally high-capital intensive manufacturing activity has shifted towards rural areas over last two decades.

Table 8. Share of rural employment in manufacturing industry groups (per cent)

Year	*Traditionally labour-intensive*	*Traditionally low capital-intensive*	*Traditionally high capital-intensive*	*Aggregate manufacturing*
1993-94 (50th Round)	58.6	49.3	30.4	54.0
1999-00 (55th Round)	61.5	43.0	32.7	54.3
2004-05 (61st Round)	58.4	43.5	37.5	53.7
2011-12 (68th Round)	54.1	42.4	36.8	50.6

Gender is another important dimension of the analysis of manufacturing employment. Table 9 shows that female participation in aggregate manufacturing employment is around 30 per cent. However, it is not uniform across manufacturing groups, being substantially higher in the traditionally labour-intensive group than in the other two groups. In the traditionally low capital-intensive group female participation declined by around 10 percentage points over the period 1993-1994 to 2011-2012, while in the traditionally high capital-intensive group it was only slightly lower (10.6 per cent in 2011-2012 down from 12.7 per cent in 1993-1994) . Overall, therefore, female participation in capital-intensive manufacturing activities has worsened significantly over the last two decades.

Table 9. Share of women employed by manufacturing industry group (per cent)

Year	*Traditionally labour-intensive*	*Traditionally Low Capital-intensive*	*Traditionally High Capital-intensive*	*Aggregate manufacturing*
1993-94 (50th Round)	37.8	18.7	12.7	30.4
1999-00 (55th Round)	36.9	11.1	22.5	29.1
2004-05 (61st Round)	39.1	9.7	24.4	31.9
2011-12 (68th Round)	38.0	8.2	10.6	30.1

Almost half of Indian manufacturing sector employment consists of self-employed individuals (Table 10), and it is most prominent in the traditionally labour-intensive group. It is interesting to observe that the share of self-employed employment has decreased in traditionally low capital-intensive and traditionally high capital-intensive groups especially since 2004-05, whereas, it has remained almost unchanged in the traditionally labour-intensive manufacturing group.

The growing level of contractualization/casualization in Indian manufacturing is a major concern, as reflected in the previous section (the issue is discussed in the existing literature, see, for instance, Sen et al., 2010).

Although contractualization has increased in the organized manufacturing segment, this phenomenon is not equally reflected in the employment structure of the aggregate manufacturing sector.[11] Rather, it is interesting to observe that the proportion of regular workers in traditionally capital-intensive industries has gone up. The lack of a rise in casualization in aggregate manufacturing may be explained by the high level of self-employment present in the remainder of the sector, the unorganized segment.

Table 10. Distribution of labour by employment status in different manufacturing industry groups (%)

Manufacturing Group	*Period*	*Regular*	*Casual*	*Self-employed*
Traditionally labour-intensive	1993-94	20.2	24.3	55.4
	1999-00	20.1	19.2	60.5
	2004-05	21.3	18.1	60.6
	2011-12	24.3	18.4	57.2
Traditionally low capital-intensive	1993-94	42.4	20	37.6
	1999-00	44.9	15.5	39.5
	2004-05	46	14.9	39.1
	2011-12	56.2	13.7	30.1
Traditionally high capital-intensive	1993-94	65.5	13.7	20.8
	1999-00	63.5	13.1	23.4
	2004-05	61.9	15.4	22.7
	2011-12	80.1	8.6	11.3
Aggregate manufacturing	1993-94	29.8	22.3	47.9
	1999-00	30.3	17.7	51.9
	2004-05	29.5	17.2	53.3
	2011-12	34.4	16.9	48.7

The educational distribution of manufacturing labour shows an increasing concentration of secondary and higher secondary level education in the Indian manufacturing sector over the last two decades (Table 11). The majority of manufacturing workers (89 per cent) do not have a college degree (in 2011-12). Indeed, about 35 per cent have only primary education or lower, suggesting that manufacturing has the capacity to absorb workers with little education.

The share of primary and below primary level educated labour has fallen since 1993-94 across all manufacturing groups. Moreover, the share of graduates and diploma holders has increased from around one per cent in 1993-94 to some 9 per cent in 2011-12. This increase is more prominent in the traditionally low capital-intensive and traditionally high capital-intensive manufacturing groups than in the traditionally labour-intensive group. Therefore, overall, the increasing share of secondary and higher secondary level educated labour and graduate and diploma holders has contributed to the better educated labour force in the Indian manufacturing sector. However, the declining shares of post-graduate degree holders in aggregate manufacturing and across the three manufacturing groups suggests that the sector does not have much need of employees with post-graduate degrees.

[11] Goldar and Aggarwal (2012b) have presented estimates of casual employment in organized manufacturing. They make use of the EUS and distinguish between the workers in organized and unorganized sector firms. According to their estimates the proportion of casual workers in organized manufacturing was 22.4 per cent in 1999-2000 and 22.8 per cent in 2009-10. Thus, there was very little change. See, in this context, Goldar and Aggarwal (2012a).

Table 11. Distribution of labour by educational level in different manufacturing industry groups (%)

	Traditionally labour-intensive			*Traditionally low capital-intensive*			*Traditionally high capital-intensive*			*Aggregate manufacturing*		
Educational Levels	**93-94**	**04-05**	**11-12**	**93-94**	**04-05**	**11-12**	**93-94**	**04-05**	**11-12**	**93-94**	**04-05**	**11-12**
Primary or lower level including Illiterate	58.9	43.9	39.6	42.9	25.3	18.0	29.5	23.2	18.7	52.5	38.5	33.8
Secondary or higher secondary	39.2	52.0	55.0	48.7	59.2	59.9	49.3	51.7	50.5	42.6	53.5	55.7
Graduate or Diploma	0.1	3.8	4.8	1.4	14.1	18.5	4.4	21.3	23.3	0.7	7.2	8.8
Post-Graduate	1.7	0.4	0.6	7.0	1.4	3.6	16.7	3.9	7.5	4.2	0.8	1.6

3.3 Comparison of organized and unorganized manufacturing

The industrial composition of the organized and manufacturing sector in terms of employment and how that composition has changed over time are presented in Tables 12 and 13. In the organized sector, the relative share of textiles in employment fell between 1989-90 and 2010-11 whereas the share of wearing apparel increased. Taken together, the share of these two industries in employment has not changed much. The share of food products, beverages and tobacco products fell while that of chemicals, rubber, plastics and motor vehicles increased. Turning to unorganized manufacturing, the share of food products, beverages and tobacco products in employment fell (as in the case of organized manufacturing) while the relative shares of textiles and wearing apparel increased significantly. Other industry groups whose relative share in employment increased between 1989-90 and 2010-11 include rubber and plastic products and metal products.

Considering the organized and unorganized sectors as a whole, the textiles and wearing apparel industry group and the chemicals, rubber and plastics group both increased their share in employment.

Table 12. Distribution of employment in organized manufacturing, by industry

Industry Code (2-digit)	*Description of industry*	*Composition of employment*			
		1989-90	**1993-94**	**1999-2000**	**2010-11**
15	Manufacture of food products and beverages	0.162	0.165	0.170	0.136
16	Manufacture of tobacco products	0.067	0.061	0.060	0.034
17	Manufacture of textiles	0.186	0.171	0.162	0.119
18	Manufacture of wearing apparel; dressing and dyeing of fur	0.015	0.028	0.038	0.072
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	0.016	0.015	0.015	0.024
20	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plating materials	0.010	0.009	0.006	0.007
21	Manufacture of paper and paper products	0.019	0.021	0.022	0.020
22	Publishing, printing and reproduction of recorded media	0.020	0.020	0.014	0.014
23	Manufacture of coke, refined petroleum products and nuclear fuel	0.008	0.009	0.009	0.009
24	Manufacture of chemicals and chemical products	0.085	0.090	0.103	0.090
25	Manufacture of rubber and plastics products	0.024	0.028	0.034	0.042
26	Manufacture of other non-metallic mineral products	0.064	0.060	0.057	0.076
27	Manufacture of basic metals	0.085	0.084	0.080	0.083
28	Manufacture of fabricated metal products, except machinery and equipment	0.034	0.032	0.035	0.055
29	Manufacture of machinery and equipment n.e.c.	0.064	0.062	0.059	0.056
31	Manufacture of electrical machinery and apparatus n.e.c.	0.033	0.034	0.031	0.042
30+32+33	Manufacture of office, accounting and computing machinery; Manufacture of radio, television and communication equipment and apparatus; Manufacture of medical, precision and optical instruments, etc.	0.028	0.026	0.025	0.019
34	Manufacture of motor vehicles, trailers and semi-trailers	0.028	0.029	0.037	0.059
35	Manufacture of other transport equipment	0.044	0.047	0.023	0.021
36	Manufacture of furniture; manufacturing n.e.c.	0.008	0.011	0.016	0.023
	All	1.000	1.000	1.000	1.000

n.e.c.: not elsewhere classified

Table 13. Distribution of unorganized sector employment by major industry group

Sl. No	*NIC 98*	*Industry group*	*1989-90 (45th round)*	*1994-95 (51st round)*	*2000-01 (56th round)*	*2005-06 (62nd round)*	*2010-11 (67th round)*
1	15+16	Food products, beverages and tobacco	0.283	0.276	0.277	0.289	0.226
2	17+18	Textiles and wearing apparel	0.228	0.221	0.290	0.309	0.356
3	19	Leather and related products	0.017	0.017	0.011	0.013	0.009
4	21+22	Paper, paper products, printing and publishing	0.019	0.018	0.020	0.021	0.024
5	24	Chemicals and chemical products	0.017	0.012	0.015	0.024	0.014
6	23+25	Rubber, plastic and petroleum products	0.008	0.011	0.010	0.008	0.016
7	26	Non-metallic mineral products	0.086	0.086	0.082	0.064	0.082
8	27	Basic metals	0.003	0.004	0.004	0.003	0.004
9	28	Metal products	0.035	0.043	0.043	0.046	0.052
10	29+30+31+ 32+33	Machinery and equipment	0.035	0.039	0.022	0.025	0.031
11	34+35	Transport equipment	0.004	0.004	0.005	0.006	0.004
12	20+36+37	Other manufacturing including wood	0.265	0.271	0.223	0.192	0.183
13		All	1.000	1.000	1.000	1.000	1.000

As noted above, the organized manufacturing sector achieved a high rate of employment growth in the 2000s while in the unorganized sector it was sluggish. Tables 14 and 15 show the employment growth rate in organized and unorganized manufacturing at a disaggregated level. The tables highlight that the accelerated employment growth in organized manufacturing has been broad-based rather than confined to a few industry groups. The decline in the employment growth rate in in unorganized manufacturing was similarly spread across a number of industry groups.

A detailed examination of employment data for unorganized manufacturing using NSS 62nd and 67th round survey results reveals that in the latter period a fall in employment has occurred in self-employed enterprises but not in establishments.[12] Between 2005-06 and 2010-11, employment in establishments grew at the rate of 1.9 per cent per annum, while employment in self-employed enterprises fell by an annual 2.5 per cent. The implication is that a major restructuring is occurring within unorganized manufacturing away from self-employed enterprises and towards establishments.

[12] Self-employed enterprises are relatively small in size, often consisting of family members. They do not have any hired workers. Establishments are defined as businesses which employ workers.

Table 14. Trend growth rate in employment, by industry and sub-periods

Industry Code (2-digit)	*Description of industry*	*Composition of employment*			
		1980-81 to 1990-91	1990-91 to 1999-2000	1999-2000 to 2010-11	1980-81 to 2010-11
15	Manufacture of food products and beverages	-1.98	1.98	2.25	1.06
16	Manufacture of tobacco products	2.07	0.80	-1.53	0.90
17	Manufacture of textiles	-1.80	0.85	1.95	0.01
18	Manufacture of wearing apparel; dressing and dyeing of fur	8.61	11.63	11.67	10.62
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	5.49	1.27	7.88	4.21
20	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plating materials	-1.44	-1.80	4.64	-0.60
21	Manufacture of paper and paper products	0.40	2.59	3.67	2.01
22	Publishing, printing and reproduction of recorded media	-1.10	-1.85	4.04	-0.56
23	Manufacture of coke, refined petroleum products and nuclear fuel	1.59	2.21	6.05	2.81
24	Manufacture of chemicals and chemical products	1.90	3.95	2.96	2.47
25	Manufacture of rubber and plastics products	3.65	5.88	6.59	4.56
26	Manufacture of other non-metallic mineral products	1.67	-0.09	6.73	2.05
27	Manufacture of basic metals	0.27	0.40	5.81	0.81
28	Manufacture of fabricated metal products, except machinery and equipment	1.75	2.28	8.90	3.31
29	Manufacture of machinery and equipment n.e.c.	0.20	2.52	4.64	0.74
31	Manufacture of electrical machinery and apparatus n.e.c.	2.09	0.53	7.46	2.21
30+32+33	Manufacture of office, accounting and computing machinery; Manufacture of radio, television and communication equipment and apparatus; Manufacture of medical, precision and optical instruments, etc.	4.38	1.79	3.94	1.70
34	Manufacture of motor vehicles, trailers and semi-trailers	1.44	4.50	9.81	3.89
35	Manufacture of other transport equipment	-0.29	-3.36	3.31	-1.94
36	Manufacture of furniture; manufacturing n.e.c.	0.75	9.74	9.07	6.46
	All	0.38	1.26	4.02	1.97

Source: Goldar and Sengupta (2013)

n.e.c.: not elsewhere classified

Table 15. Growth rates in unregistered manufacturing employment, by industry and sub-periods (% per annum)

Industry code	*Description of Industry*	*1984-85 to 1989-90*	*1989-90 to 2000-01*	*2000-01 to 2010-11*	*1984-85 to 2010-11*
15+16	Food products, Beverages and Tobacco	0.53	0.90	-2.37	-0.51
17+18	Textiles and Wearing Apparel	-11.56	3.37	1.30	-0.40
19	Leather and related products	-6.36	-2.84	-1.85	-3.10
21+22	Paper, paper products, printing and publishing	9.00	1.67	1.14	2.77
24	Chemicals and Chemical products	24.00	0.10	-1.08	3.65
23+25	Rubber, plastic and Petroleum products	-5.30	2.27	4.36	1.66
26	Non-metallic mineral product	1.70	0.65	-0.63	0.32
27	Basic Metals	-4.64	1.50	-0.25	-0.37
28	Metal Products	2.12	2.90	1.28	2.09
29 to 33	Machinery and equipment	-17.25	-2.96	2.44	-3.68
34+35	Transport equipment	5.57	1.42	-2.03	0.75
20+36+37	Other manufacturing including wood	6.63	-0.50	-2.32	0.03
	All	-0.95	1.10	-0.55	-0.21

Source: Goldar and Sengupta (2013). The estimates are based on NSS survey data on unorganized manufacturing.

Table 16 presents a comparison of growth rates in labour productivity. It shows that in the recent decade, the 2000s, the growth rate in labour productivity was higher in unorganized manufacturing than organized manufacturing for a number of industry groups. These include textiles and wearing apparel, leather and leather products, paper, paper products, printing and publishing, and chemicals and chemical products. Within the organized sector, the five best performing industry groups in terms of labour productivity growth in the 2000s are machinery and equipment, metal products, rubber, plastic and petroleum products, transport equipment, and food products, beverages and tobacco products. In the unorganized sector, the five best performing industry groups by the same criterion are metal products, transport equipment, chemicals and chemical products, paper, paper products, printing and publishing, and other manufacturing including wood. While the organized sector component of the rubber, plastic and petroleum products attained a high rate of labour productivity growth, growth in the unorganized sector component was sluggish. It is also interesting to observe that while the aggregate unorganized manufacturing sector achieved a labour productivity growth rate of about six per cent per annum during the 2000s, only the basic metals industry recorded a decline.

Table 16. Growth rate in labour productivity in organized and unorganized manufacturing (% per annum)

Industry code	*Description of Industry*	*Organized manufacturing*				*Unorganized manufacturing*			
		1984-85 to 1989-90	1989-90 to 2000-01	2000-01 to 2010-11	1984-85 to 2010-11	1984-85 to 1989-90	1989-90 to 2000-01	2000-01 to 2010-11	1984-85 to 2010-11
15+16	Food products, beverages and tobacco	5.76	4.22	5.24	4.91	-2.64	3.31	3.94	2.43
17+18	Textiles and wearing apparel	9.68	5.25	4.27	5.71	8.3	5.6	5.38	6
19	Leather and related products	-2.26	3.88	4.39	2.86	-10.5	6.57	5.28	2.67
21+22	Paper, paper products, printing and publishing	2.51	3.29	4.47	3.59	-2.79	-1.39	6.36	1.43
24	Chemicals and chemical products	7.99	5.03	4.78	5.50	-10.09	-1.22	6.28	0.01
23+25	Rubber, plastic and petroleum products	15.12	1.88	8.29	6.78	9.75	6.7	1.63	5.15
26	Non-metallic mineral product	7.54	7.59	1.47	5.18	7.04	7.7	3.82	5.98
27	Basic metals	7.95	6.01	4.09	5.63	13.48	0.29	-1.79	1.74
28	Metal Products	2.29	5.28	8.37	5.87	-5.92	3.92	7.42	3.41
29 to 33	Machinery and equipment	3.79	6.84	10.38	7.59	8.3	7.99	5.87	7.18
34+35	Transport equipment	5.37	6.88	8.20	7.09	-25.41	2.93	6.38	-1.72
20+36 +37	Other manufacturing including wood	0.70	7.78	2.85	4.49	6.47	1.99	6.05	4.45
	All	6.86	5.40	6.75	6.20	2.42	3.9	5.74	4.37

Source: Goldar and Sengupta (2013)

4. Trends in wages and wage inequalities: Disaggregated analysis

This section examines trends in wages and wage inequalities in the Indian manufacturing sector, distinguishing labour according to employment status (i.e. regular, casual, and self-employed), skills and levels of education, industry affiliations etc. This complements the above discussion of various aspects of employment in the sector. An examination of the level and changes in employment would clearly not provide sufficient understanding of the existing quality of employment in the Indian manufacturing sector without considering wages, wage inequalities and changes in the wages earned by manufacturing workers. The wage aspects become even more pertinent considering that the Indian manufacturing sector is increasingly deviating from the so-called decent employment agenda through rising contractualization of industrial labour and the slow pace of formalization. The experience of India's economic liberalization over the last two decades with regard to the manufacturing sector's performance in providing decent employment would be helpful in formulating future policy.

As in Section 3, the analysis here draws on the same two databases: the Annual Survey of Industries (ASI) for the organized manufacturing segment and the Employment and Unemployment Survey (EUS) for the aggregate manufacturing sector. Based on these two databases with their different coverage of the various aspects of manufacturing, trends in wages are analysed below: subsections, 5.1, the organized manufacturing segment and 5.2, the aggregate manufacturing sector.

4.1. Wages and wage inequalities in organized manufacturing

Table 17 presents detailed wage levels of skilled and unskilled labour separately for three groups of manufacturing industries and in aggregate for selected years over the last two decades. Since the changes or growth in these wages have more analytical importance than wage levels alone, the wage growth rates for the three categories of labour are presented in the table. It shows that the annual real wage rate[13] (at 2001 prices) for labour employed in organized manufacturing was INR 56,953 in 1989, which increased to INR 77,217 in 2010, i.e. an increase of about 1.4 times over the period of 21 years. However, this increase in overall wages was not uniformly spread across skilled and unskilled labour. [14] While wages for skilled labour doubled over the period 1989-2010, wages for unskilled labour remained almost unchanged. This phenomenon indicates that the general economic conditions of unskilled labour, which comprises around 80 per cent of total organized manufacturing labour, have not improved in comparison with its skilled counterpart. Additional figures on the wage growth of skilled and unskilled labour in various manufacturing industry groups further illustrate this.

The annual growth in the overall organized manufacturing real wage rate was 1.5 per cent over the period 1989 to 2010. This growth may be attributed to the growth of the skilled labour wage, since the unskilled labour wage remained stagnant over the same period. The growth of skilled wages was fairly similar in traditionally low capital-intensive and traditionally high capital-intensive manufacturing groups, but around one percentage point higher than in the traditionally labour-intensive group. The unskilled wage increased marginally by 0.5 per cent in the traditionally high capital-intensive manufacturing group, while in the other two groups it even decreased slightly. Examination of the growth rates in real wages during various sub-periods of the last two decades shows that after experiencing slow growth in the initial period of India's economic reform (1989-93) the annual growth rate has increased to more than 2 per cent level and remained stable until the recent economic crisis in 2008. The overall real wage growth rate was predictably lower in the post-crisis period (2008-10) compared with the pre-crisis period (2001-07). Comparing the last two decades, manufacturing wage growth was marginally lower, by 0.2 percentage points, in the last decade (2000-10) than in 1990-2000. Moreover, skilled wage growth across manufacturing groups declined significantly in the last decade whereas their unskilled counterparts experienced a marginal improvement compared to the previous decade.

[13] Real wage rate here means real income wage. The nominal wage has been deflated by the consumer price index.

[14] Wage rate of unskilled labour is computed by dividing 'wages' reported in the ASI by the number of 'workers'. The wage rate of skilled labour is computed in the following way: (a) wages are subtracted from total emoluments, (b) the estimate of workers is subtracted from the estimated number of employees, and then (a) is divided by (b). An assumption implicit here is that benefits other than wages and salaries mostly accrue to employees other than workers. The procedure adopted for computing the wage of skilled workers has an upward bias. The extent of the bias is not known, but is probably small. It needs to be emphasized here that all production workers irrespective of their level of education and experience have been categorized as unskilled labour. On the other hand, all employees other than workers are treated as skilled labour (although this is not confined to supervisors and managers and may include categories such as security personnel and canteen staff). This definition has been adopted in a number of earlier studies as used in the present study, mainly because from the labour data available in the ASI, a more precise breakdown into skilled and unskilled workers is not possible.

Table 17. Real wage rate in organized manufacturing (in INR, at 2001 prices), by industry group

	Traditionally labour-intensive		*Traditionally Low capital-intensive*		*Traditionally High capital-intensive*		*Aggregate organized manufacturing*		
Year	**Skilled labour**	**Unskilled labour**	**Skilled labour**	**Unskilled labour**	**Skilled labour**	**Unskilled labour**	**Skilled labour**	**Unskilled labour**	**All employees**
1989	71705	36238	100685	56974	116301	64088	94437	47016	56953
1993	72367	36042	97997	56603	126294	60692	96535	46513	57756
2000	102070	35121	144264	55479	171886	69940	136341	47067	66985
2004	111981	33185	160047	53685	201781	67965	154216	45026	67944
2007	131856	34822	205708	53427	244940	65788	188997	46172	75550
2010	119506	35282	211734	55993	237618	71007	185716	48133	77217

Growth rate of real wages in organized manufacturing (% p.a.)

	+		**Traditionally low-capital intensive**		**Traditionally high-capital intensive**		**Aggregate organized manufacturing**		
Period	**Skilled labour**	**Unskilled labour**	**Skilled labour**	**Unskilled labour**	**Skilled labour**	**Unskilled labour**	**Skilled labour**	**Unskilled labour**	**All employees**
1989-93	0.2	-0.1	-0.7	-0.2	2.1	-1.4	0.6	-0.3	0.4
1994-00	5.3	-0.2	5.8	-1.1	5.7	0.7	5.5	-0.3	2.1
2001-07	4.3	0.3	6.2	-0.1	5.7	-0.8	5.4	0.1	2.2
2008-10	1.7	2.6	6.9	-0.1	-5.0	-2.0	2.3	1.1	1.2
1990-00	4	-0.4	4.1	-0.3	4.4	0.9	4.1	-0.1	1.6
2000-10	1.6	0	3.9	0.1	3.3	0.2	3.1	0.2	1.4
1989-2010	2.5	-0.1	3.6	-0.1	3.5	0.5	3.3	0.1	1.5

The differences observed in real wage growth rate between skilled and unskilled labour result in changing patterns of wage inequality between skilled and unskilled labour, which need to be examined in the context of the organized manufacturing sector. Prime among various wage inequality measures is the differences in manufacturing wages between groups. From Table 18, it can be seen that the wage in the traditionally labour-intensive manufacturing group was 73 per cent of that paid to manufacturing labour overall in 1989; this value had fallen to 63 per cent in 2010. The wage paid to labour in the traditionally low capital-intensive manufacturing sector was 120 per cent of the overall manufacturing wage, and this group has not experienced any significant changes in wages relative to the overall manufacturing wage over the last two decades. The traditionally high capital-intensive group had the highest wage rates of the three groups, at around 140 per cent of the overall wage in 1989, rising to around 150 per cent in 2010. In short, relative wages in the traditionally labour-intensive manufacturing group have declined, remained unchanged in the traditionally low capital-intensive group, and increased in the traditionally high capital-intensive group (relative to aggregate organized manufacturing). Since the skill intensity of the traditionally high capital-intensive industry group is much higher than that of the traditional labour-intensive industry group, and the wage gap between the two groups has widened over time, this may be regarded as a clear sign of growing wage inequality between skilled and unskilled labour.

Table 18. Ratio of overall (skilled and unskilled) wage rates by industry group to that of aggregate organized manufacturing

Year	*Traditionally labour intensive*	*Traditionally low-capital intensive*	*Traditionally high-capital intensive*
1989	0.73	1.20	1.38
1993	0.73	1.18	1.38
2000	0.69	1.19	1.50
2004	0.66	1.19	1.58
2007	0.66	1.20	1.50
2010	0.63	1.22	1.53

Table 19 presents the ratio of skilled wage to unskilled wage as a measure of wage inequality. The skilled-unskilled wage ratio has increased steadily over the last two decades, and in 2010 it was almost double that in 1989. This rise in wage inequality was more marked in the traditionally low capital-intensive manufacturing group, where the skilled-unskilled wage ratio in 2007 was about 2.1 times that in 1989. The corresponding figure for the traditionally high capital-intensive group was 1.9 percentage points and 1.8 percentage points for the traditionally labour-intensive group. This was the pattern up to the pre-crisis period 1989-2007. However, there has been a decline in the skilled-unskilled wage ratio in the post-crisis period, i.e. from 2008 to 2010, across all manufacturing groups.

Table 19. Skilled-unskilled wage ratio by industry group

Year	*Traditionally labour intensive*	*Traditionally low-capital intensive*	*Traditionally high-capital intensive*	*Aggregate organized manufacturing*
1989	2.0	1.8	1.8	2.0
1993	2.0	1.7	2.1	2.1
2000	2.9	2.6	2.5	2.9
2004	3.4	3.0	3.0	3.4
2007	3.8	3.9	3.7	4.1
2010	3.4	3.8	3.3	3.9

Before concluding the discussion on wages in organized manufacturing, it should be noted that the income share of labour in gross value added has declined over time. As shown in Figure 3.1 in Section 3, the wage share in value added in organized manufacturing declined by about 10 percentage points between 1993-94 and 2007-08. Analysis of changes in wage share at a disaggregate level reveals that in a majority of two-digit industries, the wage share in value added declined in this period (Goldar, 2013). From an examination of the wage and value added data for two-digit industries, it appears that the decline in wage share in value added in the traditionally labour-intensive industry group, if any, was lower than that in the traditionally capital-intensive industries.

4.2. Wages and wage inequalities in aggregate manufacturing

Given the importance of the unorganized manufacturing segment within the Indian manufacturing sector, this section covers both organized and unorganized segments together along the lines of the earlier discussion presented in Section 4.2. The Employment and Unemployment Survey (EUS) data cover the aggregate manufacturing sector with detailed information on wages of manufacturing labour categorized on the basis of their employment status (i.e. regular/wage labour, casual labour, and self-employed labour), level of education, gender etc. Unlike the section on aggregate manufacturing employment,

this section uses the wages of workers in any manufacturing industry derived from the principal economic activities reported over the last one year period in the EUS. The EUS provides the data on total wages (i.e. wages in cash and in kind) on a weekly basis and these data are the basis for the following discussion.

Table 20, shows that the average weekly wage in the aggregate manufacturing sector increased annually at 1.4 per cent over the last two decades from 1993-1994 to 2011-2012. This single statistic reflects the fact that the Indian manufacturing sector has not experienced any improvement in wages commensurate with the country's strong economic growth. As expected, wage growth rates were neither uniform across various manufacturing groups nor similar across the various periods considered in this study. This phenomenon is clearly reflected in the corresponding growth estimates for the two periods: the period from 2004-2005 to 2011-2012 and the period from 1993-1994 to 2004-2005. Wage growth was significantly higher across all manufacturing groups over the period 2004-2005 to 2011-2012 compared with the earlier period. The traditionally low capital-intensive manufacturing group experienced the highest annual growth rate in real wages of about 6.6 per cent; the traditionally labour-intensive group, about 5.8 per cent; and the traditionally low capital-intensive group the lowest at about 3.3 per cent.

Table 20. Average real weekly wage in aggregate manufacturing (in INR, at 2001 prices), by industry group

Year/Period	*Traditionally labour-Intensive*	*Traditionally low capital-intensive*	*Traditionally high capital-intensive*	*Aggregate manufacturing*
1993-94 (50th Round)	460	718	1124	636
2004-05 (61st Round)	479	751	1140	639
2011-12 (68th Round)	709	1176	1435	823
Real weekly wage growth rate (% p.a.)				
1993-94 to 2004-05	0.38	0.41	0.13	0.04
2004-05 to 2011-12	5.75	6.62	3.34	3.69
1993-94 to 2011-12	2.43	2.78	1.37	1.44

Comparing Table 7 on aggregate manufacturing employment with Table 20, it can be seen that wage growth was higher than the growth of employment across all manufacturing groups in the period 2004-2005 to 2011-2012. However, further investigation is needed to explain the reasons of this high wage growth relative to the growth in employment in the Indian manufacturing sector. In this regard, one cannot rule out the effectiveness of the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) in raising the growth of manufacturing wages, particularly after 2006 when the employment guarantee scheme was implemented. It is possible that this may lead to a rise in informal non-manufacturing sector wages given that labour, and especially unskilled labour, is mobile across the manufacturing and non-manufacturing sectors.

If MNREGA is the main explanation for the sharp rise in real wages in manufacturing observed in the 2000s, both the wage rise and the increase in manufacturing employment could be a result of rapid growth in demand for labour in manufacturing. This is another aspect that needs investigation.

Table 21 shows wage differences in Indian manufacturing between its rural and urban sectors. Although one would expect the rural wage to be lower than the urban wage simply because of the lower cost of living in rural areas compared with urban, the gap is too large to be explained by this factor alone. It will noticed that rural manufacturing wages were only about half of the urban wage. It is interesting to observe that while the rural-urban

wage gap has narrowed in the case of traditionally labour-intensive industries, this has not happened in the case of traditionally high capital-intensive industries.

Table 21. Disparity between rural and urban wage in various manufacturing industry groups (rural wage as a percentage of urban wage)

Year	*Traditionally labour-intensive*	*Traditionally low capital-intensive*	*Traditionally high capital-intensive*	*Aggregate manufacturing*
1993-94 (50th Round)	56.6	57.2	61.7	52.0
2004-05 (61st Round)	69.5	64.2	49.0	59.1
2011-12 (68th Round)	74.4	63.4	50.6	62.5

Table 22, shows the gender wage gap within the manufacturing sector. Despite a progressive decline in wage disparity between female and male labour in the aggregate manufacturing sector has been observed over last two decades, female workers still earn only half as much as their male counterparts. Moreover, this disparity has increased in the traditionally high capital-intensive manufacturing group which is supposed to have more equal wages among male and female because of their high-skilled activities. However, this wage disparity has declined in the traditionally labour-intensive manufacturing group where the female share in employment is the highest (38 per cent, as shown in Table 9) among all manufacturing groups.

Table 22. Gender wage disparity (female wage as percentage of male wage) by manufacturing industry group

Year	*Traditionally labour-intensive*	*Traditionally low capital-intensive*	*Traditionally high capital-intensive*	*Aggregate manufacturing*
1993-94 (50th Round)	36.4	44.9	68.7	37.8
2004-05 (61st Round)	45.9	56.2	49.4	44.4
2011-12 (68th Round)	54.6	52.9	54.6	48.1

Table 23 presents the wage earned by casual labour compared with its regular counterpart. It is estimated that the casual labour wage was only around 45 per cent of regular labour earnings in 2011-12, although there has been an improvement in the casual wage relative to the regular wage over the last two decades. In the traditionally high capital-intensive manufacturing groups, casual labour is the least paid relative to regular labour compared with the other manufacturing groups.

Table 23. Casual wage as a proportion of regular wage in various manufacturing industry groups as percentage)

Year	*Traditionally labour-intensive*	*Traditionally low capital-intensive*	*Traditionally high capital-intensive*	*Aggregate manufacturing*
1993-94 (50th Round)	46.8	36.3	27.5	36.8
2004-05 (61st Round)	51.3	42.7	23.5	40.3
2011-12 (68th Round)	55.8	44.4	30.9	44.5

Table 24 presents the wage differential in manufacturing labour for different education levels. It can be clearly seen that workers with a higher level of education earned almost double that of the immediately lower level of education, except in the case of workers with a post-graduate degree who earned some two-thirds of the graduate or diploma holder's

income in 1993-94. Thus, apart from 1993-94, it is fair to say that the educational premium exists in the Indian manufacturing sector.

As noted above, the growth of real wages in aggregate manufacturing was much higher in the period 2004-05 to 2011-12 than in the earlier period 1993-94 to 2004-05, at 3.7 per cent per annum and 0.04 per cent per annum respectively (Table 5.4). The high growth rate of real wages in the period 2004-05 to 2011-12 compared with the earlier decade is found for all educational levels, except for workers at post-graduate level. One possibility is that the estimated wage of post-graduate workers in manufacturing for 1993-94 substantially understates their true average wage. Since the sample size is small, this cannot be ruled out.

Primary or below primary educated labour gained more than their secondary or higher-secondary counterparts in last decade. On the other hand, the wages of workers at graduate or diploma level have grown faster than those of workers with secondary or higher secondary education. Thus, there were two opposing forces at work: one raising the wage of the lowest educational category and reducing wage inequality; the other, raising the wages of graduates and diploma holders, tending to enhance wage inequality.

Table 24. Weekly real wage for labour with different educational levels in various manufacturing industry groups

	Traditionally labour-intensive			*Traditionally low capital-intensive*			*Traditionally high capital-intensive*			*Total manufacturing*		
Educational Level	*1993-94*	*2004-05*	*2011-12*	*1993-94*	*2004-05*	*2011-12*	*1993-94*	*2004-05*	*2011-12*	*1993-94*	*2004-05*	*2011-12*
Primary or below primary	+	380	558	452	469	674	677	536	714	454	416	596
Secondary or higher secondary	684	635	811	869	902	987	993	1163	1125	817	803	920
Graduate or diploma	1790	1310	1626	2244	1452	2159	2377	1925	2366	2221	1548	2047
Post-graduate	1438	2077	2940	1400	2439	3548	1673	3095	3021	1503	2584	3324
Wage ratio of labour with different levels of education												
Primary and below primary to secondary or higher secondary	0.5	0.6	0.7	0.5	0.5	0.7	0.7	0.5	0.6	0.6	0.5	0.6
Secondary or higher secondary to Graduate or diploma	0.4	0.5	0.5	0.4	0.6	0.5	0.4	0.6	0.5	0.4	0.5	0.4
Graduate or diploma to post-graduate	1.2	0.6	0.6	1.6	0.6	0.6	1.4	0.6	0.8	1.5	0.6	0.6
Growth of weekly real wage for labour with different educational levels, by manufacturing industry group												
Primary and below primary	0.21	5.64	0.34	5.31	-2.09	4.18	-0.80	5.27				
Secondary or higher secondary	-0.67	3.55	0.34	1.29	1.45	-0.48	-0.15	1.95				
Graduate or diploma	-2.80	3.13	-3.88	5.83	-1.90	2.99	-3.23	4.07				
Post-graduate	3.40	5.09	5.17	5.50	5.75	-0.35	5.05	3.66				

5. Explaining the trends: Employment

Employment growth in Indian manufacturing in the post-reform period has been slower than was hoped at the time the reforms were initiated and also slower than required to transform the Indian economy into an industrial economy. Part of the blame for the weak employment growth performance of Indian manufacturing must fall on the less than satisfactory growth in output. The share of manufacturing in GDP has remained static while the share of services has increased.[15] Another part of the blame should fall on the fact that the structure of Indian manufacturing has not shifted in favour of labour-intensive industries though there are theoretical reasons to expect such a shift in the structure of exports and hence in the structure of production in the manufacturing sector because of liberalization of trade. In addition, there has been a strong tendency on the part of entrepreneurs to go for more and more capital-intensive production methods. Indeed, even the labour-intensive industries have increased their capital intensity over time (ICEIER, 2008).

One important reason why the manufacturing sector has not been able to grow fast enough to increase its share in national GDP is that Indian manufacturing faces a number of serious constraints on its growth. One of the foremost of these is inadequate infrastructure.[16] A related issue is the availability of land for setting up industrial units. Both of these are commonly regarded as major problems faced by the Indian manufacturing sector. In comparison with manufacturing, services are less constrained by inadequate infrastructure or difficulties in land acquisition. This factor has favoured services sector growth rather than manufacturing sector growth.

Another major obstacle to manufacturing sector growth is rigidities in the labour market. There is a widely held view that labour regulations have constrained manufacturing sector growth as well as employment generation in this sector. Various studies have provided evidence of the adverse effect of labour market rigidities on manufacturing productivity (e.g. Veeramani and Goldar, 2005; and Mitra and Ural, 2008). By implication, these labour market rigidities will tend to lower manufacturing sector growth. Another set of studies has linked labour market rigidities to the phenomenon of the "missing middle" in Indian manufacturing. Again, this problem adversely affects industrial efficiency and thus constrains growth.[17]

Goldar (2011) has examined the surge in the growth rate in employment in organized manufacturing after 2003 and has presented empirical evidence that suggests that one of the contributing factors to rapid employment growth in recent years has been the labour market reforms undertaken by the states. This lends support to the argument that labour market rigidities are one of the main factors responsible for slow employment growth in organized manufacturing.

Besides affecting the quantity of employment generation, labour regulations have adversely affected the quality of industrial jobs created. A number of studies have presented econometric evidence indicating that labour regulations have been responsible for the growing use of contract workers in organized industry (Sen et al. 2010; Saha, et al.

[15] The new National Manufacturing Policy aims at boosting the growth rate of output in manufacturing so as to increase the share of manufacturing in GDP from about 15 per cent at present to about 25 per cent in the next ten years. Crucially, whether it will actually be possible to raise the share of manufacturing in GDP rests on the successful implementation of the new policy.

[16] There have been several econometric studies linking infrastructure to industrial performance. Goel (2002), Mitra et al. (2002) and Mitra et al. (2012), among others, have presented evidence of the positive effects of infrastructure availability on Indian manufacturing productivity.

[17] Majurdar and Sarkar (2008) discuss how the "missing middle" pulls down manufacturing growth. According to them, the phenomenon of the "missing middle" is attributable to the policy of protecting small-scale industries, education policy biased towards promotion of tertiary education, and labour laws in the formal manufacturing sector.

2013; Ramaswamy, 2013). Other studies have shown that labour reform will lead to an increase in regular industrial jobs in place of casual jobs (Goldar and Aggarwal, 2012a, 2012b). Some of these studies have shown that import competition has induced the casualization or contractualization of industrial labour and this tendency can be curbed by labour market reforms.

Labour regulations together with an education policy subsidizing tertiary education has made poorly educated labour costlier and well educated workers cheaper than otherwise would have been the case. Capital is also subsidized in various ways, such as cheap credit. The outcome of these policies is that capital and skills have become relatively cheap while unskilled labour has become more costly to entrepreneurs. This has created a bias in favour of services and against manufacturing (Ghosh, 2013). Moreover, within manufacturing, this causes a bias in favour of capital-intensive, skill-intensive industries.

Other policies have favoured services at the expense of manufacturing. Services have been subject to lighter taxation than manufacturing. Trade and foreign direct investment policies have been more favourable to services than manufacturing (Ghosh, 2013). It is also interesting to observe that liberalization of imports of manufactured products has helped the services sector to improve productivity and thus attain a faster growth. This is an argument made by Dehejia and Panagariya (2010), supported by empirical evidence.

6. Explaining the trends: Wages and wage inequality

Section 4 above discusses the trends in wage and wage inequality in India's organized manufacturing and aggregate manufacturing separately. The analysis showed that the level of wages and the rate of change in wages were significantly different between organized and aggregate manufacturing. The level of average wages in organized manufacturing exceeded that in aggregate manufacturing, implying thereby that wages in unorganized manufacturing are lower than that in organized manufacturing. The growth of real wages in the organized manufacturing segment was nearly one percentage point higher than that of aggregate manufacturing in the 1990s, thus indicating higher growth of real wages than in its unorganized counterpart. However, it is interesting to note that the growth rate in real wages in the organized manufacturing has declined during the last decade. the period 2000 to 2010, in comparison with the previous decade. By contrast, comparable data for aggregate manufacturing show an improvement in the growth rate of real wages in the period 2004-05 to 2011-12 compared with the earlier period, 1993-94 to 2004-05. This suggests an increase in wage growth in the unorganized segment of the Indian manufacturing sector in the period 2004-05 to 2011-12 compared with the previous period 1993-1994 to 2004-2005. The relatively slow growth of average real wages in organized manufacturing in the 2000s was accompanied by near stagnation in unskilled labour wages, and a rise in skilled labour wages, signifying a sharp rise in wage inequality between skilled and unskilled labour.

The average growth rate in real wages in organized manufacturing in the two decades following the economic reforms was only about 1.5 per cent per annum. This is not impressive when a comparison is made with the growth in real value added in organized manufacturing or with the growth rate in real per capita income in India.[18] Also, there was a downward trend in the share of wages in value added in organized manufacturing. The fact that the growth in real wages in organized manufacturing has been slow and the share of wages in value added has declined over time means that the performance of the organized manufacturing sector in the matter of compensation paid to workers has not been satisfactory.

[18] Between 1993-94 and 2009-10, net national product (NNP) per capita at constant prices grew at the rate of 5.1 per cent per annum (Goldar, 2013).

How can the slow growth in real wages and downward trend in wage share in organized manufacturing be explained? Three factors stand out. First, several studies have found that trade liberalization tends to eliminate rents associated with restrictive trade regimes and this causes a downward pressure on wages. Some studies undertaken for India have shown that such forces were also at work in Indian manufacturing (Goldar, 2004; Vasudeva-Dutta, 2007). Secondly, the wages of contract workers are substantially lower than those of directly employed workers and the proportion of contract workers in the overall total of total workers employed has increased over time (Goldar 2013, Sood et al. 2013), thus reducing the average wages of workers overall. Moreover, the real wages of directly employed workers fell at the rate of 0.12 per cent per annum during the 2000s, and although the real wages of contract workers grew by 3.25 per cent per annum (Sood, et al. 2013), the average real wages of workers overall, directly employed and contract workers together, fell by an annual 0.19 per cent . Thirdly, workers have not been able to obtain wage rises much above the growth in the cost of living because the bargaining power of industrial workers constantly diminished in the post-reform period (Goldar, 2004; Goldar and Agarwal, 2005; Sood et al., 2013). Two other factors may also partly explain the downward trend in wage share in value added in India's organized manufacturing: labour saving technical change and the increasing export orientation of Indian industries. The effect of labour saving technical change in the downward share in wage share in organized manufacturing is suggested by the econometric results of the study undertaken by Virmani and Hashim (2009). As regards the effect of rising export intensity, Onaran (2007) finds that increasing export intensity led to a decline in the wage share in manufacturing in Turkey and Mexico (although no significant effect was found in the case of Korea). For India's organized manufacturing sector, a similar effect of export intensity on labour share in value added is indicated by the econometric analysis of wage share presented in Goldar (2013).

The analysis of wage trends for the aggregate manufacturing sector presented in Section 4 above shows that in the two decades of the post-reform period there has been some reduction in the rural-urban wage divide, the gender wage gap, and the wage gap between casual and regular labour. However, the average rate of growth in real wages in Indian manufacturing in the period 1993-1994 to 2011-12 was rather low, at about 1.4 per cent per annum. The explanation for this lies in the fact that the changes in the production structure that took place in India during the post-reform period have not given a boost to aggregate labour demand and have thus failed to create an upward pressure on wages (Goldar, 2013). While the services sector has grown rapidly, it has not created sufficient employment opportunities to attract labour from the primary sector on a large scale. Similarly, the growth of manufacturing has not been particularly successful in creating employment opportunities in labour-intensive industries because the structure of manufactured exports has not moved in favour of unskilled labour-intensive products. The implication of these developments is that the demand for unskilled labour has not risen fast enough to create upward pressure on the wages of unskilled workers.

One observation on real wages in manufacturing that calls for an explanation is the sharp rise in the rate of growth in real wages (3.7 per cent annually) in aggregate manufacturing in the period 2004-05 to 2011-12 as against a marginal growth of 0.04 per cent per annum the previous period, 1993-94 to 2004-05. The answer may lie partly in the wage premium for education. In the period 1993-94 to 2004-05, the growth rate in real wages for workers with secondary or higher secondary education was negative, but turned significantly positive in the later period 2004-05 to 2011-12. This may have something to do with the nature of the technical change that took place in Indian manufacturing.

Another possible reason for the relatively high wage growth in the aggregate manufacturing sector in general, and the unorganized sector in particular, in the period 2004-05 to 2011-12 is the rising wages in agriculture and the rural sector since 2006, the year when the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) was introduced. An increased agricultural wage and access to MNREGA schemes may have some positive impact on the unorganized manufacturing sector wage (especially for

casual and unskilled labour) because of the shortage of potential unskilled labour or increased wage-bargaining power due to the low opportunity cost of not working in that sector. In addition, the MNREGA may have discouraged migration of rural workers to cities to work in manufacturing units unless they are paid well. This phenomenon has also been experienced in China over the last few years when migration from rural to urban areas has declined due to the increase in job opportunities in rural areas, and this has led to an increase in urban wages (Li et al. 2012).

The evidence on wages presented in Section 4 showed that higher levels of education have contributed to higher earnings of industrial workers, and therefore, there exists an educational premium in the Indian manufacturing sector. The analysis also indicated an increase in the educational premium over time leading to growing wage inequality.

The observed rise in wage inequality in the Indian manufacturing sector in general and its organized segment in particular has received a good deal of attention (see Goldar, 2013), and a number of explanations have been suggested. The increasing use of skill-biased technological change and the growing use of contractual labour are considered to be two of the major factors (Sen, 2008; Sadhukhan, 2012; Goldar, 2013). India's growth-oriented economic reform in general and trade liberalization in particular have also contributed to this growing wage inequality over the last two decades. Increasing competition with developing countries, through increasing trade with the South, is another possible reason (Sadhukhan, 2012).[19]

7. Conclusion

The organized and unorganized manufacturing sectors have shown different inter-temporal growth trends. Employment in the organized sector has been growing fast in recent years, but employment in unorganized manufacturing, which accounts for about 80 per cent of manufacturing employment, has been sluggish. Even if the rapid growth in employment in organized manufacturing continues for some time, the employment growth rate in in manufacturing overall will continue to be low.

The real wages of workers in unorganized manufacturing have grown relatively fast in the recent period, 2004-2005 to 2011-2012. This appears to be attributable to rapid growth in labour productivity. There is evidence to indicate that the unorganized manufacturing sector is undergoing a structural transformation, moving away from self-employed enterprises to establishments, and this has helped in attaining more rapid labour productivity and wage growth. The employment guarantee scheme in the country's rural areas may also have contributed to increases in real wages in unorganized manufacturing.

In the organized manufacturing sector, real wages grew at a rapid rate in the 1990s, but, more recently, the growth in real wages has slowed. A more disturbing phenomenon is the downward trend in wage share in value added. This is probably attributable to the weakening bargaining power of labour, increasing capital intensity of production and labour saving technical change.

The wage gap between skilled and unskilled labour in manufacturing has widened over time when trade liberalization should have had an opposite effect. There has been extensive research on this question. The findings of these studies indicate that skill-biased technological change and increased use of contractual labour in many industries are two

[19] Mehta and Hasan (2011) have carefully examined the causes of growing wage inequality in Indian manufacturing. Based on their analysis, they conclude that the portion of the increase in wage inequality which can be traced to trade liberalization is only about 13 per cent. Also, the effect of services liberalization in causing wage inequality is greater than the effect of trade liberalization.

very important explanatory factors. In addition, India's growth-oriented economic reform in general and trade liberalization in particular have contributed to this growing wage inequality in Indian manufacturing over last two decades.

A key reason for the unsatisfactory growth performance of Indian manufacturing in terms of employment is that output growth has not been high enough. There are several constraints on manufacturing sector growth including lack of infrastructure and inadequate policies. Labour market rigidities and an education policy directed at subsidized tertiary education have worked to the detriment of employment generation in manufacturing. Unless these problems are addressed, it will be difficult to achieve high growth in manufacturing, sustained over a long period, and unless that is done, the performance of the manufacturing sector in terms of employment generation, both quantity and quality, will fall far short of satisfactory.

References

Chatterjee, U. and Kanbur, R. 2013. *Regulation and non-compliance: Magnitudes and Patterns for India's Factories Act*, Paper presented at the 55th Annual Conference of the Indian Society of Labour Economics, Jawaharlal Nehru University, December 16-18.

Dehejia, R. and Panagariya, A. 2010. *Services growth in India: A look inside the black box*, Working Paper No. 2010-4, Columbia Program on Indian Economic Policies

Goel, D. 2002. *Impact of infrastructure on productivity: Case of Indian registered manufacturing*", Working paper no. 106, Center for Development Economics, Delhi School of Economics, Delhi.

Goldar, B. 2004. "Trade Liberalisation and real wages in organised manufacturing industries in India", in Karnik A. and Burange L.G. (eds.), *Economic policies and the emerging scenario: Challenges to government and industry*, Himalaya, Mumbai.

---. 2011. *Growth in organized manufacturing employment in recent years*, Economic and Political Weekly, February 12, 2011.

---. 2013. *Wages and wage share in India during the post-reform period*, Indian Journal of Labour Economics, 56(1): 75-94.

Goldar, B. and Aggarwal S.C. 2005. *Trade liberalisation and price–cost margin in Indian industries*, Developing Economies, Vol. 43, No. 3, pp. 346-73.

---. 2012a. *Informalization of industrial labour in India: Effect of labour market rigidities and import competition*, Developing Economies, June, pp. 141-69.

---. 2012b. "Employment of casual workers in organized manufacturing in India: Analysis of trends and the impact of labour reforms" paper presented at the National Seminar on *Globalisation, labour markets and employment relations in India* organized by the Institute for Human Development and the Indian Society of Labour Economics, 9-10 July, 2012 at J.P. Nayak Bhavan, ICSSR Western Regional Centre, Mumbai.

Ghosh, A. K. 2013. *The end of road for services-led growth*, Business Standard, October 26, 2013.

Goldar, B. and Sreerupa S. 2013. "Post-reform trends in growth and productivity in Indian manufacturing," Paper presented at the Conference on *Trade and industry: Patterns, trends and policies* held at IGIDR, Mumbai on 22-24 October 2013.

ICRIER. 2008. *A study on labour intensity and employment potential of Indian manufacturing*, Report submitted to the National Manufacturing Competitiveness Council, Indian Council for Research on International Economic Relations, New Delhi.

Majumdar, D. and Sarkar S. 2008. *The employment problem in India and the phenomenon of missing middle*, Paper presented at the Canadian Economic Conference, Vancouver, June 6-8, 2008.

Mehta, A. and Hasan, R. 2011. *Effects of trade and services liberalization on wage inequality in India*, ADB Economics Working Paper Series No. 268, Asian Development Bank, Manila.

Mishra, P. and Kusum Das, D. 2012. *Trade liberalization and wage inequality in India: A mandated wage equation approach*," Indian Growth and Development Review, forthcoming.

Mitra, A.; Varoudakis, A. and Veganzones-Varoudakis, M-A. 2002. *Productivity and technical efficiency in Indian States' manufacturing: The role of infrastructure*, Economic Development and Cultural Change, 50(2): 395-426.

Mitra, A.; Sharma, C. and Veganzones-Varoudakis, M-A. 2012. *Estimating impact of infrastructure on productivity and efficiency of Indian manufacturing*, Applied Economic Letters, 19: 779-83.

Mitra, D. and Ural, B.P. 2008. *Indian manufacturing: A slow sector in a rapidly growing economy*, Journal of International Trade and Economic Development, 17(4): 525-559.

Onaran, Ö. 2007. *Wage share, globalisation, and crisis: The case of the manufacturing industry in Korea, Mexico, and Turkey*, Working Paper No. 132, Political Economy Research Institute, University of Massachusetts, Amherst.

Ramaswamy, K.V. 2008. *Wage inequality in Indian manufacturing: Is it trade, technology or labour regulations?* Working Paper no. 2008-021, Indira Gandhi Institute of Development Research, Mumbai.

---. 2013. *Size dependent labour regulation and threshold effects: The case of contract-worker intensity in Indian manufacturing*," Paper presented at the Conference on Labour and Employment, September 5-6, 2013, Indira Gandhi Institute of Development Research, Mumbai.

Roy, S. 2012. *Regional disparities in growth and human development in India*, ISID Working Paper no.2012/03, Institute for Studies in Industrial Development, New Delhi.

Sadhukhan, A. 2012. *Trade, technology, and institution: How do they affect wage inequality? Evidence from Indian manufacturing*, Paper presented at Asian Meet of the Econometric Society, December 19-22, Delhi School of Economics, Delhi.

Saha, B.; Sen, K. and Maiti, D. 2013. *Trade openness, labour institutions and flexibilisation: Theory and evidence from India*, Paper presented at the Conference on Labour and Employment, September 5-6, 2013, Indira Gandhi Institute of Development Research, Mumbai.

Sen, K.; Saha, B. and Maiti, D. 2010. *Trade openness, labour institutions and flexibility: Theory and evidence from India*, BWPI Working Paper No. 123, Brooks World Poverty Institute, University of Manchester.

Sood, A.; Nath, P. and Ghosh, S. 2013. *Deregulating capital, regulating labour: The dynamics of capital and labour in the manufacturing sector in India*, Paper presented at the 55th Annual Conference of the Indian Society of Labour Economics, Jawaharlal Nehru University, December 16-18, 2013.

Vasudeva-Dutta, P. 2007. *Trade protection and inter-industry wages in India*, Industrial and Labour Relations Review, Cornell University, ILR School, Vol. 60, No. 2, January, pp. 268-86.

Veeramani, C. and Goldar, B. 2005. *Manufacturing productivity in Indian States: Does investment climate matter?* Economic and Political Weekly, June 11, 40(24): 2413-20.

Virmani, A. and Danish A. H. 2009. *Factor employment, sources and sustainability of output growth: Analysis of Indian manufacturing*, Working Paper No. 3/2009, DEA, Ministry of Finance, Government of India, New Delhi.

Annex 1: Product description of 3-digit manufacturing groups according to NIC 1987, NIC 1998, and NIC 2008

	Product Description
NIC 1987	
200	Slaughtering, preparation and preservation of meat
201	Manufacture of dairy products
202	Canning and preservation of fruits and vegetables
203	Processing, canning, and preservation of fish, crustaceans and similar foods
204	Grain milling
205	Manufacture of Bakery Products
206	Manufacture and refining of sugar (vacuum pan sugar factories)
207	Production of indigenous sugar, boora, khandsari, gur, etc. from sugar-cane, palm juice , etc.
208	Production of common salt
209	Manufacture of cocoa products and sugar confectionery (including sweetmeats)
210	Manufacture of hydrogenated oils and vanaspati ghee etc.
211	Manufacture of vegetable oils and fats (other than hydrogenated)
212	Manufacture of animal oils and fats , manufacture of fish oil
213	Processing and blending of tea including manufacture of instant tea
214	Coffee curing, roasting, grinding and blending etc. including manufacture of instant coffee
215	Processing of edible nuts
216	Manufacture of ice
217	Manufacture of prepared animal and bird feed
218	Manufacture of food products not elsewhere classified
220	Distilling, rectifying and blending of spirits, ethyl alcohol production from fermented materials
221	Manufacture of wines
222	Manufacture of malt liquors and malt
223	Production of country liquor9arrack and toddy etc.)
224	Manufacture of soft drinks and syrups
225	Tobacco stemming, re-drying and all other operations connected with preparing raw leaf tobacco
226	manufacture of bidi
227	Manufacture of cigars, cigarettes, cheroots and cigarette tobacco
228	Manufacture of snuff, zarda, chewing tobacco and other tobacco products n.e.c. (except pan masala containing tobacco)
229	Manufacture of pan-masala, catechu (kattha) and chewing lime
230	Cotton ginning, cleaning and baling
231	Cotton spinning other than in mills (charkha)
232	Weaving and finishing of cotton khadi
233	Weaving and finishing of cotton textiles on handlooms
234	Weaving and finishing of cotton textiles on power looms
235	Cotton spinning, weaving and processing in mills
236	Bleaching, dyeing and printing of cotton textiles (This group includes bleaching, dyeing and printing of not self-produced cotton textiles. No distinction is to be between these activities carried out on a fee or contract basis or by purchasing the materials and selling the finished products. Bleaching, dyeing and printing of self-produced textiles in composite mills is classified in class 235.4)
240	Preparation of raw wool, silk and artificial/synthetic textile fibres for spinning
241	Wool spinning, weaving and finishing other than in mills
242	Wool spinning, weaving and processing in mills
243	Bleaching and dyeing of woollen textiles
244	Spinning, weaving and finishing of silk textiles other than in mills
245	Spinning, weaving and processing of silk textiles in mills
246	Bleaching, dyeing and printing of silk textiles
247	Spinning, weaving and processing of man-made textile fibres
248	Bleaching, dyeing and printing of artificial/synthetic textile fabrics
250	Jute and mesta pressing and baling
251	Preparatory operations (including carding and combing) on jute and mesta fibres
252	Preparatory operations (including carding and combing) on coir fibres
253	Preparatory operations (including carding and combing) on sann hemp and other vegetable fibres n.e.c.
254	Spinning, weaving and finishing of jute and mesta textiles
255	Spinning, weaving and finishing of coir textiles
256	Spinning, weaving and finishing of sann hemp and other vegetable fibre textiles n.e.c.
257	Bleaching, dyeing and printing of jute and mesta textiles
258	Bleaching, dyeing and printing of coir textiles
259	Bleaching, dyeing and printing of other vegetable fibre textiles n.e.c.

260	Manufacture of knitted or crocheted textile products
261	Manufacture of all types of threads, cordage, ropes, twines and nets, etc.
262	Embroidery work, zari work and making of ornamental trimmings
263	Manufacture of blankets, shawls, carpets, rugs, and other similar textile products
264	Manufacture of floor coverings of jute, mesta sann-hemp and other kindled fibres and of coir
265	Manufacture of all types of textile garments and clothing accessories n.e.c. (except by purely tailoring establishments) from not self-produced material(Note: in principle, the raw material is cut and sewn together in the establishments covered in this group)
266	Manufacture of rain coats, hats, caps and school bags etc. from waterproof textile fabrics or plastic sheeting
267	Manufacture of made-up textile articles; except apparel
268	Manufacture of waterproof textile fabrics
269	Manufacture of textiles/textile products not elsewhere classified like linoleum, padding wadding, upholstering and filling, etc.
270	Sawing and planing of wood (other than plywood)
271	Manufacture of veneer sheets, plywood and their products
272	Manufacture of structural wooden goods (including treated timber) such as beams, posts, doors and windows(excluding hewing and rough shaping of poles, bolts and other wood material which is classified under logging)
273	Manufacture of wooden and cane boxes, crates, drums, barrels and other containers, baskets and other wares made entirely or mainly of cane, rattan, reed, bamboo, willow, fibres, leaves and grass
274	Manufacture of wooden industrial goods n.e.c.
275	Manufacture of cork and cork products
276	Manufacture of wooden furniture and fixtures
277	Manufacture of bamboo and cane furniture and fixture
279	Manufacture of products of wood, bamboo, cane reed and grass (including articles made from coconut shells etc.) n.e.c.
280	Manufacture of pulp, paper and paper board including manufacture of newsprint
281	Manufacture of containers and boxes of paper or paper board
282	Manufacture of paper and paper board articles and pulp products not elsewhere classified
283	Manufacture of special purpose paper whether or not printed n.e.c.
284	Printing and publishing of newspapers
285	Printing and publishing of periodicals books, journals, directories, atlases, maps, sheet music, schedules & Pamphlets etc.
286	Printing of bank notes, currency notes, postage stamps, security passes, stamp papers and other similar products
287	Engraving, etching, and block-making etc.
288	Book binding on account of others
289	Printing and allied activities not elsewhere classified
290	Tanning, curing,, finishing, embossing and japanning of leather
291	Manufacture of footwear excluding repair) except of vulcanized or moulded rubber or plastic
292	Manufacture of wearing apparel of leather and substitutes of leather
293	Manufacture of consumer goods of leather and substitutes of leather; other than apparel and footwear(Note: Manufacture of school bags and traveling accessories from water-proof textile fabrics is included in group 266)
294	Scrapping, currying, tanning, bleaching and dyeing of fur and other pelts for the trade
295	Manufacture of wearing apparel of fur and pelts
296	Manufacture of fur and skin rugs and other similar articles
299	Manufacture of leather and fur products n.e.c.
301	Manufacture of fertilizers and pesticides
302	Manufacture of plastics in primary forms; manufacture of synthetic rubber
303	Manufacture of paints, varnishes, and related products; artists' colours and ink
304	Manufacture of drugs, medicines and allied products
305	Manufacture of perfumes, cosmetics, lotions, hair dressings, toothpastes, soap in any form, detergents, shampoos, shaving products, washing and cleaning preparations and other toilet preparations.
306	Manufacture of man-made fibres
307	Manufacture of matches.
308	Manufacture of explosives, ammunition and fire works
309	Manufacture of chemical products not elsewhere classified.
310	Tyre and tube industries.
311	Manufacture of footwear made primarily of vulcanised or moulded rubber and plastics.
312	Manufacture of rubber products not elsewhere classified
313	Manufacture of plastic products not elsewhere classified.
314	Manufacture of refined petroleum products (this group includes production of liquids of gaseous fuels, illuminating oils, lubricating oils or greases or other products obtained from crude petroleum or their fractionation productions, Liquefaction of natural gas is classified in group 111 and bottling of natural gas or liquefied petroleum gas is classified in group 315)
315	Bottling of natural gas or liquefied petroleum gas.
316	Manufacture of refined petroleum products not elsewhere classified (this group includes Manufacture of variety of

	products extracted/obtained from the products or residues of petroleum refining).
317	Processing of nuclear fuels (this group includes extraction of uranium metals from pitch blende or other uranium bearing ores; Manufacture of alloys or dispersions or mixtures of natural uranium or its compounds, Manufacture of enriched uranium and its compounds; plutonium and its compounds; uranium depleted in U 235 and its compounds; thorium and its compounds; other radioactive elements, isotopes or compounds and non-irradiated fuel elements for use in nuclear reactors. Production of heavy water is classified in group 309.)
318	Manufacture of coke oven products (this group includes operation of coke ovens chiefly for the production of coke or semi-coke from hard-coal and lignite, retort carbon and residual products such as coal tar or pitch agglomeration of coke is included. Distillation of coal tar is classified in group 319 below)
319	Manufacture of other coal and coal tar products not elsewhere classified.
320	Manufacture of refractory products and structural clay products.
321	Manufacture of glass and glass products.
322	Manufacture of earthen and plaster products.
323	Manufacture of non-structural ceramic ware
324	Manufacture of cement, lime and plaster
325	Manufacture of mica products
326	Stone dressing and crushing, Manufacture of structural stone goods and stone ware.
327	Manufacture of asbestos cement and other cement products.
329	Manufacture of miscellaneous non-metallic mineral products not elsewhere classified.
330	Manufacture of iron and steel in primary/semi-finished forms.
340	Manufacture of fabricated structural metal products.
341	Manufacture of fabricated metal products not elsewhere classified.
342	Manufacture of furniture and fixtures primarily of metal
343	Manufacture of hand tools, weights and measures and general hardware.
344	Forging, pressing, stamping and roll-forming of metal; power metallurgy. (This group includes production of a wide variety of finished or semi-finished metal products, by means of the above activities which, individually, would be characteristically produced in other activity categories)
345	Treatment or coating of metals; general mechanical engineering on a sub-contract basis. (This group includes plating, polishing, anodizing, engraving, printing, hardening, buffing, deburring, sand blasting, welding or other specialised operations on metals on a fee or contract basis. The units classified here, generally, do not take ownership of the goods nor do they sell them to third parties).
346	Manufacture of metal cutlery, utensils and kitchenware
349	Manufacture of metal products (except machinery and equipment) not elsewhere classified
350	Manufacture of agricultural machinery and equipment and parts thereof
351	Manufacture of machinery and equipment used by construction and mining industries
352	Manufacture of prime movers, boilers, steam generating plants and nuclear reactors
353	Manufacture of industrial machinery for food and textile industries (including bottling and filling machinery)
354	Manufacture of industrial machinery for other than food and textile industries
355	Manufacture of refrigerators, air conditioners and firefighting equipment and their parts and accessories.
356	Manufacture of general purpose non-electrical machinery/equipment, their components and accessories, n.e.c.
357	Manufacture of machine tools, their parts and accessories
358	Manufacture of office, computing and accounting machinery and parts, (Note: Manufacture of computers and computer based systems including word processors is classified in group 367)
359	Manufacture of special purpose machinery/equipment, their components and accessories n.e.c.
360	Manufacture of electrical industrial machinery, apparatus and parts thereof
361	Manufacture of insulated wires and cables, including manufacture of optical fibre cables
362	Manufacture of accumulators, primary cells and primary batteries
363	Manufacture of electric lamps
364	Manufacture of electric fans and electric/electro-thermic domestic appliances and parts thereof
365	Manufacture of apparatus for radio broadcasting, television transmission, radar apparatus and radio-remote control apparatus and apparatus for radio/line telephony and line telegraphy
366	Manufacture of television receivers; reception apparatus for radio broadcasting, radio telephony/telegraphy, video recording or reproducing apparatus, turn-tables, record-players, cassette-players and other sound reproducing apparatus, sound recording reproducing apparatus, microphones, loudspeakers, amplifiers and sound amplifiers and pre-recorded audio/video records/tapes.
367	Manufacture of computers and computer based systems
368	Manufacture of electronic valves and tubes and other electronic components n.e.c.
369	Manufacture of radiographic X-ray apparatus X-ray tubes and parts and manufacture of electrical equipment n.e.c.
370	Ship and boat building
371	Manufacture of locomotives and parts
372	Manufacture of railway/tramway wagons and coaches and other railroad equipment n.e.c.
373	Manufacture of heavy motor vehicles; coach work
374	Manufacture of motor cars and other motor vehicles principally designed for the transport of less than 10 persons (includes manufacture of racing cars and golf-cars etc.)
375	Manufacture of motor-cycles and scooters and parts (including three-wheelers)
376	Manufacture of bicycles, cycle-rickshaws

377	Manufacture of aircraft, spacecraft and their parts
378	Manufacture of bullock-carts, push-carts and hand-carts etc.
379	Manufacture of transport equipment and parts not elsewhere classified
380	Manufacture of medical, surgical, scientific and measuring equipment except optical equipment
381	Manufacture of photographic, cinematographic and optical goods and equipment (excluding photochemicals, sensitised paper and film)
382	Manufacture of watches and clocks
383	Manufacture of jewellery and related articles
384	Minting of currency coins
385	Manufacture of sports and athletic gooks
386	Manufacture of musical instruments (Note: Manufacture of toy musical instruments is classified in group 389)
387	Manufacture of stationery articles n.e.c.
388	Manufacture of items based on solar energy like solar cells, cookers, air and water heating systems and other related items
389	Manufacture of miscellaneous products not elsewhere classified
NIC 1998	
151	Production, processing and preservation of meat, fish, fruit vegetables, oils and fats
152	Manufacture of dairy products
153	Manufacture of grain mill products, starches and starch products, and prepared animal feeds
154	Manufacture of other food products
155	Manufacture of beverages
160	Manufacture of tobacco products
171	Spinning, weaving and finishing of textiles
172	Manufacture of other textiles
173	Manufacture of knitted and crocheted fabrics and articles
181	Manufacture of wearing apparel, except fur apparel
182	Dressing and dyeing of fur; manufacture of articles of fur
191	Tanning and dressing of leather, manufacture of luggage, handbags, saddlery and harness
192	Manufacture of footwear
201	Saw milling and planing of wood
202	Manufacture of products of wood, cork, straw and plaiting materials
210	Manufacture of paper and paper product
221	Publishing
222	Printing and service activities related to printing
223	Reproduction of recorded media
231	Manufacture of coke oven products
232	Manufacture of refined petroleum products
233	Processing of nuclear fuels
241	Manufacture of basic chemicals
242	Manufacture of other chemical products
243	Manufacture of man-made fibres
251	Manufacture of rubber products
252	Manufacture of plastic products
261	Manufacture of glass and glass products
269	Manufacture of non-metallic mineral products n.e.c.
271	Manufacture of Basic Iron & Steel
272	Manufacture of basic precious and non-ferrous metals
273	Casting of metals
281	Manufacture of structural metal products, tanks, reservoirs and steam generators
289	Manufacture of other fabricated metal products; metal working service activities
291	Manufacture of general purpose machinery
292	Manufacture of special purpose machinery
293	Manufacture of domestic appliances, n.e.c.
300	Manufacture of office, accounting and computing machinery
311	Manufacture of electric motors, generators and transformers
312	Manufacture of electricity distribution and control apparatus
313	Manufacture of insulated wire and cable
314	Manufacture of accumulators, primary cells and primary batteries
315	Manufacture of electric lamps and lighting equipment
319	Manufacture of other electrical equipment n.e.c.
321	Manufacture of electronic valves and tubes and other electronic components
322	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy
323	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods
331	Manufacture of medical appliances and instruments and appliances for measuring, checking, testing, navigating and other purposes except optical instruments

332	Manufacture of optical instruments and photographic equipment
333	Manufacture of watches and clocks
341	Manufacture of motor vehicles
342	Manufacture of bodies (coach work) for motor vehicles; manufacture of trailers and semi-trailers
343	Manufacture of parts and accessories for motor vehicles and their engines
351	Building and repair of ships & boats
352	Manufacture of railway and tramway locomotives and rolling stock
353	Manufacture of aircraft and spacecraft
359	Manufacture of transport equipment n.e.c.
361	Manufacture of furniture
369	Manufacturing n.e.c.
NIC 2008	
101	Processing and preserving of meat
102	Processing and preserving of fish, crustaceans and molluscs
103	Processing and preserving of fruit and vegetables
104	Manufacture of vegetable and animal oils and fats
105	Manufacture of dairy products
106	Manufacture of grain mill products, starches and starch products
107	Manufacture of other food products
108	Manufacture of prepared animal feeds
110	Manufacture of beverages
120	Manufacture of tobacco products
131	Spinning, weaving and finishing of textiles
139	Manufacture of other textiles
141	Manufacture of wearing apparel, except fur apparel
142	Manufacture of articles of fur
143	Manufacture of knitted and crocheted apparel
151	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery
152	Manufacture of footwear
161	Sawmilling and planing of wood
162	Manufacture of products of wood, cork, straw and plaiting materials
170	Manufacture of paper and paper products
181	Printing and service activities related to printing
182	Reproduction of recorded media
191	Manufacture of coke oven products
192	Manufacture of refined petroleum products
201	Manufacture of basic chemicals, fertilizer and nitrogen compounds, plastics
202	Manufacture of other chemical products
203	Manufacture of man-made fibres
210	Manufacture of pharmaceuticals, medicinal chemical and botanical products
221	Manufacture of rubber products
222	Manufacture of plastics products
231	Manufacture of glass and glass products
239	Manufacture of non-metallic mineral products n.e.c.
241	Manufacture of basic iron and steel
242	Manufacture of basic precious and other non-ferrous metals
243	Casting of metals
251	Manufacture of structural metal products, tanks, reservoirs and steam
252	Manufacture of weapons and ammunition
259	Manufacture of other fabricated metal products; metalworking service
261	Manufacture of electronic components
262	Manufacture of computers and peripheral equipment
263	Manufacture of communication equipment
264	Manufacture of consumer electronics
265	Manufacture of measuring, testing, navigating and control equipment;
266	Manufacture of irradiation, electromedical and electrotherapeutic
267	Manufacture of optical instruments and equipment
268	Manufacture of magnetic and optical media
271	Manufacture of electric motors, generators, transformers and electricity
272	Manufacture of batteries and accumulators
273	Manufacture of wiring and wiring devices
274	Manufacture of electric lighting equipment
275	Manufacture of domestic appliances
279	Manufacture of other electrical equipment
281	Manufacture of general purpose machinery
282	Manufacture of special-purpose machinery

291	Manufacture of motor vehicles
292	Manufacture of bodies (coachwork) for motor vehicles; manufacture of
293	Manufacture of parts and accessories for motor vehicles
301	Building of ships and boats
302	Manufacture of railway locomotives and rolling stock
303	Manufacture of air and spacecraft and related machinery
304	Manufacture of military fighting vehicles
309	Manufacture of transport equipment n.e.c.
310	Manufacture of furniture
321	Manufacture of jewellery, bijouterie and related articles
322	Manufacture of musical instruments
323	Manufacture of sports goods
324	Manufacture of games and toys
325	Manufacture of medical and dental instruments and supplies
329	Other manufacturing n.e.c.

n.e.c: not elsewhere classified

Annex 2: Composition of different manufacturing industry clusters and corresponding NICs

Traditionally labour-intensive

Industry Code based on 1960 ASI	Product Description	NIC 1987	NIC 1998	NIC 2008
203	Canning and preserving of fruits and vegetables	202	151	103
204	Canning and preserving of fish and other sea foods	203		102
205	Manufacture of grain mill products	204		106
208	Manufacture of cocoa, chocolate and sugar confectionery	209		
212	Wine industries	221	155	110
220	Tobacco manufactures	225	160	120
	Tobacco manufactures	226		
	Tobacco manufactures	227		
	Tobacco manufactures	228		
	Tobacco manufactures	229		
231	Spinning, weaving and finishing of textiles	230	171	131
	Spinning, weaving and finishing of textiles	231	172	
	Spinning, weaving and finishing of textiles	232		
	Spinning, weaving and finishing of textiles	233		
	Spinning, weaving and finishing of textiles	234		
	Spinning, weaving and finishing of textiles	235		
	Spinning, weaving and finishing of textiles	236		
	Spinning, weaving and finishing of textiles	240		
	Spinning, weaving and finishing of textiles	241		
	Spinning, weaving and finishing of textiles	242		
	Spinning, weaving and finishing of textiles	243		
	Spinning, weaving and finishing of textiles	244		
	Spinning, weaving and finishing of textiles	245		
	Spinning, weaving and finishing of textiles	246		
	Spinning, weaving and finishing of textiles	247		
	Spinning, weaving and finishing of textiles	248		
	Spinning, weaving and finishing of textiles	251		
	Spinning, weaving and finishing of textiles	252		
	Spinning, weaving and finishing of textiles	253		
	Spinning, weaving and finishing of textiles	254		
	Spinning, weaving and finishing of textiles	255		
	Spinning, weaving and finishing of textiles	256		
	Spinning, weaving and finishing of textiles	257		
	Spinning, weaving and finishing of textiles	258		
	Spinning, weaving and finishing of textiles	259		
232	Hosiery and knitted goods	260	173	143
	Hosiery and knitted goods	262		
	Hosiery and knitted goods	263		
	Hosiery and knitted goods	264		
	Hosiery and knitted goods	265		
	Hosiery and knitted goods	266		
	Hosiery and knitted goods	267		
	Hosiery and knitted goods	268		
	Hosiery and knitted goods	269		
233	Cordage, rope and twine industries	261		
239	Manufacture of textiles classified , pressing	250	171	139
241	Manufacture of footwear	291	192	152
243	Manufacture of wearing apparel	292	181	141
	Manufacture of wearing apparel	295	182	
252	Wooden and cane containers and cane small ware	271		161
	Wooden and cane containers and cane small ware	272		
	Wooden and cane containers and cane small ware	273		
	Wooden and cane containers and cane small ware	274		

259	Manufacture of cork and wood products n.e.c.	275	202	162
	Manufacture of cork and wood products n.e.c	277		
	Manufacture of cork and wood products n.e.c	279		
291	Tanneries and leather finishing plants	290	191	151
	Tanneries and leather finishing plants	293		
	Tanneries and leather finishing plants	294		
	Tanneries and leather finishing plants	296		
	Tanneries and leather finishing plants	299		
329	Manufacture of miscellaneous products of petroleum and coal.	317		
	Manufacture of miscellaneous products of petroleum and coal.	318		
	Manufacture of miscellaneous products of petroleum and coal.	319		
331	Manufacture of structural clay products	320		
332	Manufacture of glass and glass products	321	261	231
339	Manufacture of non-metallic mineral products n.e.c.	329	269	239
381	Shipbuilding and repairing	370	351	301
393	manufacture of watches	382	333	
395	manufacture of musical instruments	386		322
399	manufacturing industries n.e.c.	389	369	321
	manufacturing industries n.e.c.	383		329
	Slaughtering, preparation and preservation of meat	200		
	Manufacture of other food products		154	107

Traditionally low capital-intensive

Industry Code based on 1960 ASI	Product Description	NIC 1987	NIC 1998	NIC 2008
206	Manufacture of bakery products	205		
207	Sugar factories and refineries	206		
209	Manufacture of miscellaneous food preparations	218		
211	Distilling, rectifying and blending of' spirits (alcohol)	220		
251	Saw mills, planing and other wood mills	270	201	
260	Manufacture of furniture and fixtures	276	361	310
	Manufacture of furniture and fixtures	342		
280	Printing, publishing and allied industries	284	221	181
	Printing, publishing and allied industries	285	222	182
	Printing, publishing and allied industries	286	223	
	Printing, publishing and allied industries	287		
	Printing, publishing and allied industries	288		
	Printing, publishing and allied industries	289		
300	Manufacture of rubber products	311	251	221
	Manufacture of rubber products	312		
312	Vegetable and animal oils and fats (except edible oils)	210		104
	Vegetable and animal oils and fats (except edible oils)	211		
	Vegetable and animal oils and fats (except edible oils)	212		
313	Manufacture of paints, varnishes and lacquers	303		
319	Manufacture of miscellaneous chemical products	309		202
333	Manufacture of pottery, china and earthen-ware	322		
350	Manufacture of metal products except machinery and transport equipment	340	273	243
	Manufacture of metal products except machinery and transport equipment	341	281	251
	Manufacture of metal products except machinery and transport equipment	346	289	259
	Manufacture of metal products except machinery and transport equipment	349		
360	Machinery, except electrical machinery	343	291	281
	Machinery, except electrical machinery	350	292	282
	Machinery, except electrical machinery	351		
	Machinery, except electrical machinery	353		
	Machinery, except electrical machinery	354		
	Machinery, except electrical machinery	356		
	Machinery, except electrical machinery	357		
	Machinery, except electrical machinery	359		
370	Manufacture of electrical machinery, apparatus, appliances and supplies	352	293	264

	Manufacture of electrical machinery, apparatus, appliances and supplies	355	311	271
	Manufacture of electrical machinery, apparatus, appliances and supplies	358	312	273
	Manufacture of electrical machinery, apparatus, appliances and supplies	360	313	274
	Manufacture of electrical machinery, apparatus, appliances and supplies	363	314	279
	Manufacture of electrical machinery, apparatus, appliances and supplies	364	315	
	Manufacture of electrical machinery, apparatus, appliances and supplies		319	
382	Manufacture of rail-road equipment	371	352	302
	Manufacture of rail-road equipment	372		
383	Manufacture of motor vehicles	373	341	291
	Manufacture of motor vehicles	374	342	292
	Manufacture of motor vehicles		343	293
385	Manufacture of motor cycles and bicycles	375		
	Manufacture of motor cycles and bicycles	376		
386	Manufacture of aircraft	377	353	303
391	Manufacture of professional and scientific measuring and controlling instruments	380		265
	Manufacture of professional and scientific measuring and controlling instruments			266
	Manufacture of professional and scientific measuring and controlling instruments			325
394	Jewellery			
	Production of common salt	208		
	Processing and blending of tea including manufacture of instant tea	213		
	Coffee curing, roasting, grinding and blending etc. including manufacture of instant coffee	214		
	Processing of edible nuts	215		
	Manufacture of ice	216		
	Manufacture of prepared animal and bird feed	217	153	108
	Production of country liquor9arrack and toddy etc.)	213		
	Manufacture of plastics in primary forms; manufacture of synthetic rubber	302	252	222
	Manufacture of perfumes, cosmetics, lotions, hair dressings, toothpastes, soap in any form, detergents, shampoos, shaving products, washing and cleaning preparations and other toilet preparations.	305		
	Manufacture of man-made fibres	306	243	203
	Manufacture of matches.	307		
	Manufacture of explosives, ammunition and fire works	308		
	Tyre and tube industries.	310		
	Manufacture of plastic products not elsewhere classified.	313		
	Bottling of natural gas or liquefied petroleum gas.	315		
	Manufacture of non-structural ceramic ware	323		
	Manufacture of cement, lime and plaster	325		
	Manufacture of mica products	326		
	Forging, pressing, stamping and roll-forming of metal; power metallurgy. (This group includes production of a wide variety of finished or semi-finished metal products, by means of the above activities which, individually, would be characteristically produced in other activity categories)	344		
	Treatment or coating of metals; general mechanical engineering on a sub-contract basis. (This group includes plating, polishing, anodizing, engraving, printing, hardening, buffing, deburring, sand blasting, welding or other specialised operations on metals on a fee or contract basis. The units classified here, generally, do not take ownership of the goods nor do they sell them to third parties).	345		
	Manufacture of insulated wires and cables, including manufacture of optical fibre cables	361		
	Manufacture of accumulators, primary cells and primary batteries	362	314	272
	Manufacture of bullock-carts, push-carts and hand-carts etc.	378		
	Manufacture of transport equipment and parts not elsewhere classified	379	359	309
	Minting of currency coins	384		
	Manufacture of sports and athletic goods	385		323
	Manufacture of sports and athletic goods			324
	Manufacture of stationery articles n.e.c.	387		

	Manufacture of items based on solar energy like solar cells, cookers, air and water heating systems and other related items	388		

Traditionally high capital-intensive

Industry Code based on 1960 ASI	Product Description	NIC 1987	NIC 1998	NIC 2008
202	Manufacture of dairy products	201	152	105
213	Breweries and manufacturing of malt	222		
214	Soft drinks and carbonated water industries	224		
271	Manufacture of pulp, paper and paper board	280	210	170
	Manufacture of pulp, paper and paper board	281		
	Manufacture of pulp, paper and paper board	282		
	Manufacture of pulp, paper and paper board	283		
311	Basic industrial chemicals, including fertilizers	301	241	201
321	Petroleum refineries (Motor and aviation spirit, diesel oil, kerosene oil; fuel oil diverse hydro carbon oils and their blends including synthetic fuels, lubricating oils, etc.)	314	232	192
	Petroleum refineries (Motor and aviation spirit, diesel oil, kerosene oil; fuel oil diverse hydro carbon oils and their blends including synthetic fuels, lubricating oils, etc.)	316	242	
334	Manufacture of cement (hydraulic)	324		
	Manufacture of cement (hydraulic)	327		
341	Iron and steel basic industries	330	271	241
342	Non-ferrous basic metal industries		272	242
	Manufacture of drugs, medicines and allied products	304		210
	Manufacture of apparatus for radio broadcasting, television transmission, radar apparatus and radio-remote control apparatus and apparatus for radio/line telephony and line telegraphy	365		
	Manufacture of television receivers; reception apparatus for radio broadcasting, radio telephony/telegraphy, video recording or reproducing apparatus, turn-tables, record-players, cassette-players and other sound reproducing apparatus, sound recording reproducing apparatus, microphones, loudspeakers, amplifiers and sound amplifiers and pre-recorded audio/video records/tapes.	366	322	263
	Manufacture of television receivers; reception apparatus for radio broadcasting, radio telephony/telegraphy, video recording or reproducing apparatus, turn-tables, record-players, cassette-players and other sound reproducing apparatus, sound recording reproducing apparatus, microphones, loudspeakers, amplifiers and sound amplifiers and pre-recorded audio/video records/tapes.		323	
	Manufacture of computers and computer based systems	367	300	262
	Manufacture of electronic valves and tubes and other electronic components n.e.c.	368	321	261
	Manufacture of radiographic X-ray apparatus X-ray tubes and parts and manufacture of electrical equipment n.e.c.	369		
	Manufacture of photographic, cinematographic and optical goods and equipment (excluding photochemicals, sensitised paper and film)	381	332	267

n.e.c.: not elsewhere classified

Employment Working Papers

The Working Papers from 2008 to 2015 are available in

www.ilo.org/employment/Whatwedo/Publications/working-papers

Please scan the code

Employment Policy Department

For more information visit our site: http://www.ilo.org/employment

International Labour Office
Employment Policy Department
4, route des Morillons
CH-1211 Geneva 22

Email: emp_policy@ilo.org

Employment Policy Department

For more information, visit our website
http://www.ilo.org/employment

International Labour Office
Employment Policy Department
Route des Morillons 4
CH-1211 Geneva 22

Email: edempdoc@ilo.org

ISSN 1999-2939