

Rural Occupational Diversification in India: Theory and Evidence

A thesis submitted to the Indian Institute of Technology Guwahati in partial
fulfilment of the requirements for the degree of Doctor of Philosophy



Submitted by,

Nabanita Mitra

Department of Humanities and Social Sciences
Indian Institute of Technology Guwahati
Guwahati 781039
India

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Declaration

I hereby declare that the thesis titled “**Rural Occupational Diversification in India: Theory and Evidence**”, is the result of investigation carried out by me in the Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati, under the supervision of Dr. Debarshi Das, Associate Professor (Economics), Department of Humanities and Social Sciences, IIT Guwahati.

In keeping with the general practice of reporting observations, due acknowledgements have been made, whenever the work described is based on the findings of other investigators.

(Nabanita Mitra)
Research Scholar
Dept. of Humanities and Social Sciences
IIT Guwahati
October, 2018



Debarshi Das
Associate Professor (Eco.)
Department of Humanities and Social Sciences
Indian Institute of Technology Guwahati
Guwahati 781039

Email: debarshidas@iitg.ac.in
Phone: +91 361 258 4569
Fax No.: +91 361 269 2787

Certificate

This is to certify that the thesis entitled “**Rural Occupational Diversification in India: Theory and Evidence**”, submitted by Ms. Nabanita Mitra for the Doctor of Philosophy in Economics in the Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati, embodies research work carried out under my supervision and guidance. The present thesis or any part of it, has not been submitted to any other University or Institute for award of any degree or diploma. She has fulfilled all the requirements according to the rules of the Institute for submission of thesis.

(Debarshi Das)

Thesis Supervisor

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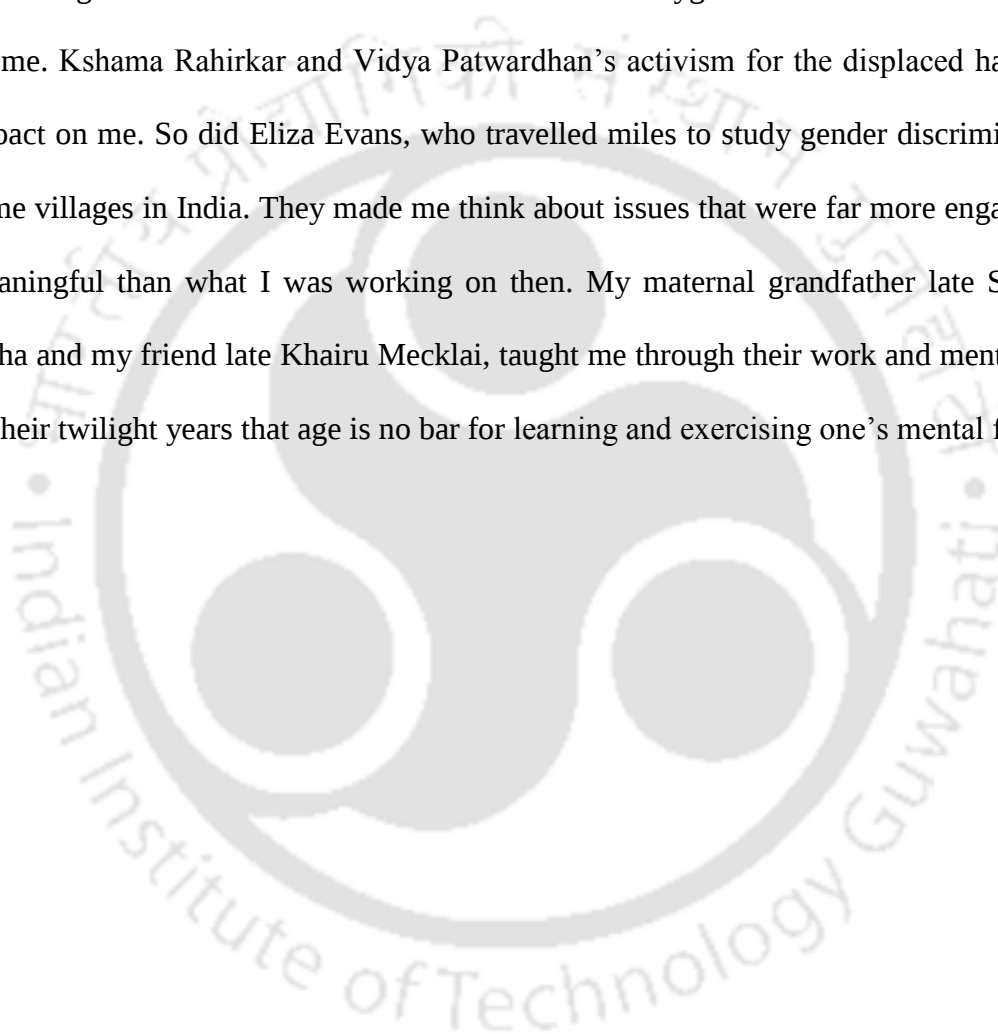
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Abbreviations

CSO	Central Statistical Organization
GDP	Gross Domestic Product
LFPR	Labour Force Participation Rate
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
NDP	National Domestic Product
NSS	National Sample Survey
OAE	Own Account Enterprise
RMPCE	Rural Monthly Per Capita Consumption Expenditure
WFPR	Work Force Participation Rate

Research is formalized curiosity. It is poking and prying with a purpose.

Zora Neale Hurston

Abstract

Post-Independence, India deviated from the theorised path of structural change. Unlike the stated theory, India failed to generate adequate productive employment in the manufacturing segment. The bulk of India's workforce got stuck in agriculture, a sector that generated the lowest share of the economy's output, since 1999-00. Rural employment growth rates tapered, with the downturn in agriculture from 1997-98 to 2005-06. The growth of the rural non-agricultural sector propped up rural employment growth rates post-1999. But the new jobs were generated in low value-added segments of the rural economy. Although they were short-term, low-quality jobs, with poor wages, they helped stymie rural distress. But the fact remains that even after the growth of the rural non-agricultural sector, the issues of lack of productive employment and working poverty loom over the rural economy. Several scholars suggest that the revival of rural industries is a way to recover the rural economy. Taking a cue from this, we examine the rural non-agricultural sector at large and the rural organised manufacturing segment, in specific. The significance of this segment rests on its potential to generate productive employment and the fact that it declares profit data. Rural organised manufacturing industries in India are essentially capitalist enterprises, with focus on profits. Economic theory points towards a link between profit rate and long-term growth in output. This thesis adopts this paradigm: it examines the profit rate of the rural organised manufacturing industries segment to assess its growth. This thesis also identifies the factors driving profit rate of this segment and develops an analytical model to explain the phenomenon underlying empirical observations, on the rural organised manufacturing industries segment.

Existing studies on the rural economy have not examined profit rates to assess the growth of the rural economy as a whole or any part of it. Most existing studies use empirical evidence on the rapid increase in this sector's workforce size, to explain the growth of the rural non-agricultural sector in India. Some studies explain this growth, using estimates of the share of this sector in the rural National Domestic Product. This thesis addresses this gap. The profit rate and output growth of urban organised manufacturing industries are also studied. We find that the profit rate of rural organised manufacturing industries grew faster than urban industries.

Given the significance of profit rate in the heterodox tradition of economics, one important aspect addressed by this thesis is the identification of the factors driving change in profit rate in the rural organised manufacturing industries segment in India. Two-factor profit rate decomposition analysis based on Weisskopf's theoretical framework has been used for this analysis. The results reveal that worsening wage share and improving output-capital ratio, underpinned by rising labour productivity were responsible for rising profit rates of rural industries. The unequal distribution of the output of this segment is a disconcerting finding. A small but higher rate of growth of the workforce, in rural industries compared to urban industries, indicates that it has the potential to generate employment. Empirical analysis of data on rural organised manufacturing industries reveals that this segment is marked by growing output, rising profit rate, workforce size, labour productivity, capital productivity, and capital intensity. The wage rate of rural industrial workers is higher than most other rural occupations. All this implies that it is a promising segment.

Our analytical model shows the impact of wage rate and labour productivity of the rural industrial worker on short-run output and medium-run growth in output of this sector.

The model shows that output rises with the increase in the rural industrial wage rate. This is so, as demand for rural industrial produce rises with improvement in wage rates. For the same reason, the output of this sector expands when the number of rural industrial workers increases per unit of output. According to the model, the medium-run growth in output of the rural industrial sector improves with improving profit share and capital productivity.

Based on our findings and results, we conclude that the rural organised industries segment is a relatively high value-added segment of the rural economy, with a potential to generate productive employment. Policies that push up rural wage rate and capital productivity in rural industries will improve the prevailing low wage rates and employment levels of the rural economy, aside from generating high growth of output. The distribution of output across rural classes, which is skewed, will also be made fairer.



Chapter 1

Introduction

1.1 Background

Theory states and history shows that economic development is connected with structural change in an economy's output and employment. It is this structural change that perpetuates an economy's growth. Since the 1980s, agriculture the mainstay of rural India witnessed ebb in its primacy in the national output. This is not an aberration, rather inevitability in the path of development of an economy. However, studies of several scholars have found the pattern of growth and structural change in the Indian economy distinct. So much so, that it has been termed as "unique" (Papola, 2005), "idiosyncratic" (Kocchar *et al.*, 2006), "anomalous" (Krishna, 2012). This is so as the structural change in India's economy is at variance with stated theory as well as that observed in developed economies and in some Asian countries. In such economies the manufacturing segment became the prime mover of the economy's growth. Initially, it brought about the secular decline of agriculture and later the expansion of the service sector. This did not happen in India. Growth has been led by the service sector; and the manufacturing sector stagnated in its share of employment and output.

Nevertheless, India's output (Gross Domestic Product) growth rate crossed the 5 per cent mark in the 80s and reached an impressive value of 7.9 per cent in the period 2001-02 to 2010-11 (Krishna, 2012). However, this did not lead to equitable development. Papola (2008) points out that the rate of decline in poverty has been a mere 0.8 per cent per annum in the period 1999-00 to 2004-05. The share of poor among the employed consistently exceeded that among the unemployed between 1983 and 2004-05, implying

a want of productive¹ employment (Papola, ibid). The rural working poor was a staggering 93.92 million (80.8² per cent of the total poor in the labour force) in 1994 that declined to 81.79 million (78.56³ per cent) in 1999 (Sundaram and Tendulkar, 2004). Studies by several scholars (Sen, 1998; Deaton and Dreze, 2002; Himanshu, 2007; Dev and Ravi, 2007; Dev 2017; Sundaram, 2007; Lanjouw and Murgai, 2008; Narayan and Murgai, 2016) reveal a decline in rural poverty. Narayan and Murgai (2016) claim that 133 million people in India were lifted out of poverty in the period 1994 to 2012. All this is good news, but some studies (Narayan and Murgai, 2016; Ruhl and Revenga, 2016) portend vulnerability to poverty. According to Narayanan and Murgai (2016), one in two Indians is vulnerable to fall back into poverty and Ruhl and Revenga (2016) point out that “...many people who have escaped poverty are not yet economically secure, living precariously close to the poverty line”. Mehrotra (2018) states that landless labourer and those who are dependent on manual casual labour for livelihoods in the rural sector are most likely to get impoverished. His claim is based on the *Socio Economic and Caste Census of India*, 2011. ILO’s Report (2018) points out that vulnerable employment in India is higher than both the world and South Asian averages. It is projected that of the 535 million strong labour force in 2019, 398.6 million will have vulnerable employment⁴.

Poverty reduction is inextricably linked to the growth of productive employment. Neither of this took off as desired, even after six decades of Independence, although the economy

¹ Productive employment is defined as employment yielding sufficient returns to labour to permit the worker and her/his dependents level of consumption above the poverty line. The deficit of productive employment consists of those who are in the labour force but do not have productive employment. This takes two forms: the working poor and the unemployed. Source: Employment Sector.(Source: ILO, 2012)

² Computed using Sundaram and Tendulkar,2004,Table 3, Panel A, pp.18 and Table 4, Panel A, pp.19

³ Computed using Sundaram and Tendulkar,2004,Table 3, Panel A, pp.18 and Table 4,Panel B, pp.19

⁴Vulnerable employment is defined as the sum of the employment status groups of own account workers and contributing family workers. They are less likely to have formal work arrangements, and are therefore more likely to lack decent working conditions, adequate social security and ‘voice’ through effective representation by trade unions and similar organizations. Vulnerable employment is often characterized by inadequate earnings, low productivity and difficult conditions of work that undermine workers’ fundamental rights.

(Source: https://esa.un.org/unmigration/documents/retreat/UN%20WOMEN_Indicator_vulnerable_employment.pdf)

registered impressive growth rates. To figure out ways to improve the generation of productive employment in rural India, this research examines the rural non-agricultural sector as a whole and the rural organised manufacturing industries segment, in particular. As this segment has the potential to generate productive employment, we construct a detailed empirical sketch of this segment, with an emphasis on profitability trends and output growth. The factors driving change in profit rate are identified and so are determinants of short-run output and medium-run growth in output. Underlying all this is the aim of defining policy prescriptions that are likely to improve productive employment in the rural economy.

But prior to this we want to understand the root cause of the observed lacunae in the rural economy. We take a look at the state in which the economy was inherited from the British. Next, we examine the focus of the Plans and key policies defined by the State⁵ post-Independence. As we walk through successive Plans our principal focus is to understand the impact of these Plans on employment generation. Sectoral and overall growth rates are also looked into. Subsequently, we examine India's structural change in output and workforce over the last few decades and how it has deviated from theoretical constructs. But first, we turn our attention to theoretical perspectives on nature and causes driving structural change in an economy, in the next section.

1.1.1 Structural Change: Theoretical Perspectives

Historically, as an economy develops, there is a secular decline in the share of agriculture in the national output as well as employment. Changes in the sectoral composition of an economy's labour force and economic activities were initially

⁵ Gerschenkron (1962, cited in Syrquin, 1988) carried out an analysis of sources of capital for industrialisation, as an economy transforms. He hypothesised that the more backward an economy is, prior to industrialisation, the greater is the role played by institutional factors, like the State and banks. Since, India qualified as a backward economy, at the time of independence, it is relevant and logical to examine the role played by the State, over the past six decades.

analysed by Fisher (1935, 1939, cited in Syrquin, 1988) and Clark (1940, cited in Syrquin, 1988). It was Lewis (1954), who theorised how a developing economy transforms through inter-sectoral labour reallocation. Such economies are marked by surplus rural labour, with the agricultural labourers drawing subsistence level wages. As the industrial output expands, surplus labour moves from the subsistence sector to the capitalist sector. During this transformation, the capitalists' income continuously increases and part of it gets invested to augment productive capacity. The subsistence wage of the agricultural workers and the real wage of industrial workers remain constant until the turning point is reached. The only benefit accruing to the labour force is the creation of new jobs, with the expansion of industrial output. Thus, an economy grows and structurally transforms, through a distribution of income that favours the capitalist class, sans a significant increase in the cost of labour.

Papola (2005) sums up the views of various scholars (Clark, 1940, cited in Papola, 2005; Kuznets, 1971, cited in Papola 2005; Kaldor, 1966, 1967, cited in Papola, 2005) on the classical sequence of structural transformation in an economy and the reasons underlying it. The basic difference in their reasoning lies in their relative emphasis on demand-side factors and supply-side factors (Islam, 2010).

In the initial stage of economic development, the share of the industrial sector expands in both national output and employment, and that of agriculture shrinks. For, Clark (ibid) and Kuznets (ibid), the resultant change in demand pattern with an increase in income (Engel effect), is the underlying cause for structural change. This change accelerates due to technological and institutional factors (Kuznets, ibid). In the later stage of structural transformation, as income levels are higher, there is a sharp rise in demand for services. Industrial expansion also increases demand for services. In a developed economy, the share of the services sector dominates both output and employment. Clark (ibid),

attributes a larger share of the workforce in the service sector, to low productivity of the services sector in relation to the industrial sector. Baumol (1967) attributes productivity differentials rather than a change in demand patterns to changes in shares of employment in the different sectors. Kaldor (1966,1967, cited in Papola, 2005) cites the role played by supply-side factors in bringing about structural change. The industrial sector, unlike the agricultural sector, does not have constraints to expansion. Moreover, industrial produce enjoys higher income elasticity of demand. An expanding industrial sector absorbs surplus labour as well as increases demand for services. Thus, the industrial sector becomes the engine of growth in this paradigm.

Table 1-1 shows output and employment shares in 2002 in some developed economies.

Table 1-1 Output and Employment Shares in Selected Developed Economies in 2002

Country	Country Shares in Output (%)			Shares in Employment (%)		
	Agriculture	Industry	Services	Agriculture	Industry	Services
UK	1	26	73	1	25	74
USA	2	23	75	2	24	74
France	2	22	76	3	25	72
Japan	1	31	68	5	31	64
Germany	1	30	69	3	33	64
Italy	3	29	69	5	32	63
Australia	4	26	69	5	21	74

Source: Papola, 2005, Table 1, pp.12.

These countries underwent the classical kind of structural transformation, as theorised in literature. Our observations are, i) The share of output and employment in agriculture is less than or equal to 5 per cent. ii) The service sector has the dominant share in output and employment. iii) The shares of the work force in agriculture, industry sector and services sector are in proportion to their respective outputs.

1.1.2 India at Independence and India's Plans and Policies

1.1.2.1 Period 1900 to 1946

Under colonial rule India was primarily agrarian (agriculture employed 75 per cent of the workforce in 1946). The main occupations of the workforce were agriculture, labour intensive industries and services. Economic growth heavily relied on the availability of natural resources and labour. Thus, exhaustion of land and fall in yield due to lack of productivity enhancing investment led to stagnation of agriculture. Agriculture registered an annual growth rate of 0.31 per cent during 1900-46. With a population growing at the rate of 0.87 per cent annually, the average product from land declined, availability of food worsened and declining land to labour ratio depressed real wages. Poverty increased. British rule also saw the integration of the Indian economy with the global economy with regard to “commodity, trade, capital flows and labour migration” (Roy, 2010). As a result, the fragile economy got exposed to global turbulence. In the inter-war period, this led to a decline in demand for Indian agricultural produce. The crops to be grown got dictated by the colonial masters. Regions that grew commercial crops took part in the export-driven growth and fared better. Regional inequality increased in India. Thus, regional disparities in agricultural development and impoverishment got sown in British India. This spilled over post-Independence. Perhaps the biggest blow rendered by colonial rule on the Indian economy was the imposition of huge remittance payment to Britain, even when economic conditions were adverse. This drained India's exchequer.

Lack of investment in agriculture, an open economy and mandatory remittances to Britain led to the low rate of net capital formation (2.12 per cent of the national income) and savings rate (3.3 per cent of the national income), in the period 1940-46. Public investment to national income ratio declined from 2.21 in 1901-13 to 1.32 in 1940-46. In

the period 1940-46, national income grew at 0.86 per cent and per capita income at 0.01 per cent (Roy, 2010).

Perhaps Roy's (2015) observations best explain the failures of British rule that led to India's underdeveloped condition, at Independence. For him colonial rule failed to address the "key challenge of development, transforming rural livelihoods" due to high military expenditure that funnelled out public expenditure. He points out that "The biggest casualty of the public goods paralysis was agriculture"; and "...the singular failure of the *Raj* was an inability to make a dent in rural poverty".

1.1.2.2 Economic Imperatives at Independence

India's backward condition at Independence put forth daunting economic challenges. They were, i) To improve productive capacity to build a modern, self-reliant India and generate employment for the surplus labour in agriculture. ii) To improve per capita income to reduce poverty. iii) To improve domestic saving capacity and convert savings to productive investment (Chakraborty, 1989). iv) To improve capital accumulation to gain self-reliance in augmenting productive capacity. The aforementioned reasons prompted planners to devise mechanisms, with the help of a plan on "how much to save, where to invest and in what forms to invest" (Chakraborty, *ibid*). Thus, planners gave primacy to supply-side constraints in the growth process and overlooked the fact that insufficient domestic demand could be a constraint to growth.

1.1.2.3 The First, Second and Third Five Year Plans (1950 to 1966)

The focus of the First Five Year Plan (1951-1956) was agriculture. 37 per cent of the total Plan expenditure was assigned for agriculture, irrigation and flood control (Jha and Acharya, 2011). The focus shifted to industrialisation in the Second Plan (1956-1961),

with a goal to increase the savings rate from 5 per cent in 1950 to 20 per cent in 1975 in an almost closed economy (Chakravarti, *ibid*). This continued into the Third Plan period (1961-1966). By the Third Plan, only 23.3 per cent of the Plan expenditure was allocated to the rural economy (refer Table 1-2a). It was envisaged that labour intensive, small-scale industries would generate employment at the rate of 5 per cent over a period of ten years. This would provide employment for a backlog of 5 million and an additional 1.5 million to 2 million.

Table 1-2 a Share (in %) of Plan Expenditure on the Rural Economy (1961-66 to 2007-12)

Third Plan	Annual Plan	Fourth Plan	Fifth Plan	Sixth Plan	Seventh Plan	Annual Plan	Eighth Plan	Ninth Plan	Tenth Plan	Eleventh Plan
23.3	25.7	24.8	23.6	25.7	23.5	22.5	23.7	21.6	20.1	18.5

Source: Jha and Acharya, 2011, Table 3, pp. 143.

The wars in the 60s (against China in 1962 and Pakistan in 1965) led to the diversion of resources. The share of budgetary expenditure on the rural economy declined from 12.0 per cent in 1960-61 to 9.9 per cent in the period 1966-67 to 1969-70 and that as the share of GDP from 1.8 per cent to 1.7 per cent as evident from Table 1-2b (Jha and Acharya, *ibid*). Two severe and successive droughts in 1965-66 and 1966-67 and a population

Table 1-2b Share (in %) of Expenditure on the Rural Economy (1950-51 to 2009-10)

Period	Share (in %) of Total Combined Budgetary Expenditure on the Rural Economy	Expenditure on the Rural Economy as a proportion of GDP (in %)
1950-51	11.4	1.0
1960-61	12.0	1.8
Annual Average 1966-67 to 1969-70	9.9	1.7
Annual Average 1970-71 to 1979-80	9.5	2.0
Annual Average 1980-81 to 1989-90	10.9	2.9
Annual Average 1990-91 to 1999-00	10.8	2.8
Annual Average 2000-01 to 2009-10	9.7	2.6

Source: Column 1, computed from Jha and Acharya, 2011, Table 2, pp. 142, Column 2, computed from Jha and Acharya, 2011, Figure 1, pp.141

growth rate above 2 per cent resulted in a food shortage. 10 million food grains had to be imported in 1966 (Dantwala, 1976).

Critics attributed this food crisis to inadequate investment in agriculture in the Plans. Contrary to these views, Dantwala (ibid) opined that with linkages between agriculture and industry, a boost in industrialisation was a requirement to accelerate agricultural growth. Balakrishnan (2010) also echoed similar views. This phase saw a marked improvement in overall and sectoral growth rates, over the pre-Independence figures (refer Table 1-3). For Balakrishnan (ibid), this period was a “bridgehead” to the future higher growth rates witnessed in India. Possibly this phase also marked the initiation of the structural change in India’s economy.

1.1.2.4 The Fourth and Fifth Five Year Plans (1969 to 1979)

Food security and associated measures to augment food production became the focal point of the Fourth Plan (1969-1974). This led to the Green Revolution in the northwestern parts of the country. In 1971, India reached food self-sufficiency. After some fluctuations, the agricultural growth rate improved to 3.3 per cent. The growth rate of the industry sector fell to 4.1 per cent. A fallout of restrictive government controls and promotion of import substitution (Krishna, 2012). The strategy for employment generation that was initiated in the last phase, continued till the middle of the 1970s.

Data (Papola, 2008) reveals that the economy’s growth and employment lagged the targets. The labour force grew at a rate of 2.5 per cent, whereas the average annual rate of growth of employment was 2 per cent. The number of unemployed grew from an estimated 5 million in 1956 to 11 million by 1977-78 (Papola, ibid). With an increase in unemployment and a sizeable share of the population reeling under poverty, the focus of the Fifth Plan (1974-79) was on “employment oriented growth”, anti-poverty

programmes and welfare schemes (Papola, ibid). An offshoot of this phase was a further increase in inter-regional disparity of agriculture development.

Table 1-3 Annual Average Growth Rates of GDP (%)

	1900-01 to 1929-30	1930-31 to 1946-47	1951-52 to 1966-67	1967-68 to 1980-81	1981-82 to 1990-91	1991-92 to 2000-01	2001-02 to 2010-11
Agriculture and Allied	0.5	0.2	1.8	3.3	3.5	2.7	2.9
Industry	0.9	1.2	6.3	4.1	7.1	5.7	7.8
Services	1.6	1.7	4.8	4.3	6.8	7.6	9.4
GDP	0.8	0.8	3.4	3.8	5.6	5.6	7.9
GDP per Capita	0.4	-0.5	1.4	1.5	3.4	3.7	6.2

Source: Krishna, 2012, Table 1, pp.7

1.1.2.5 The Sixth and Seventh Five Year Plans (1980 to 1990)

Improvement of employment opportunities, infrastructure, investment, productivity and acceleration in the growth of food grains, were some of the areas of thrust in this phase (Planning Commission, undated). From 1985 onwards there was a relaxation of industrial controls, the introduction of export incentives, expansion of open general license list (Panagaria, 2008).

This phase saw the dissemination of Green Revolution, jump in exports, an increase in GDP growth rate from 3.8 per cent to 5.6 per cent and industry growth rate increased from 4.1 per cent to 7.1 per cent (refer Table 1-3). But the employment growth rate slid to 1.8 per cent. The unemployed rose to 14.5 million in 1988 and to 17 million in 1991-92, although the generation of productive employment, was core to the Seventh Plan (Papola, 2008).

1.1.2.6 The Eighth and Ninth Five Year Plans (1992 to 2002)

In this phase, reforms like deregulation of industry, tariff reforms, removal of import licensing on intermediate inputs and capital goods were introduced to achieve high

growth rates (Krishna, 2012). The Plan focused on measures to facilitate implementation of these policies, generate adequate employment by focusing on growth of labour intensive sectors and reduce regional imbalances, improve quality of life (Planning Commission, undated).

Unemployment was around 23 million in 1992. The period 1993-94 to 1999-2000 witnessed a slowing down of growth rate in rural employment; it was the least after 1983 (Chand and Parappurathu, 2011, Thomas, 2012). The Plan set a target of employment growth of 2.6 to 2.8 per cent per annum to achieve “employment for all” by 2002 (Papola, *ibid*). Both agriculture and industry sectors registered a decline in output growth rates. Possibly fall in growth in agriculture led to a decline in rural employment. The services sector reported a remarkable growth rate of 7.6 per cent, the highest since Independence.

1.1.2.7 The Tenth, Eleventh and Twelfth Five Year Plans (2002 to 2014)

The backlog of unemployment at the start of this period stood at 35 million (Papola, 2008). Added to it was a declining agricultural growth rate, since 1997-98 (Chand and Parappurathu, 2011, Thomas, 2012). In the period 1999-00 to 2004-05 there was an addition of 22 million to the agriculture sector, undoubtedly a “retrograde development” (Mehrotra *et al*, 2014). Achieving a growth target of 8 per cent, generation of productive employment, reduction of poverty and improvement of social indicators became the areas of focus of the Tenth Plan period. To guarantee employment of hundred days in a year to rural workers, the government initiated the scheme the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS). The overall aim was to reduce the unemployment backlog to 21 million (Planning Commission, undated).

The Tenth Plan registered a spectacular growth in output of 7.7 per cent, employment grew around 2.8 per cent, but the labour force grew faster (Papola, *ibid*). With population growth, the absolute number of poor declined marginally from 320 million in 1993-94 to 302 million in 2004-05 (Planning Commission, 2008). The agriculture and allied sector output registered an annual compound annual growth rate of 2.026 per cent in the period 2000-01 to 2004-05, which is the lowest growth rate since 1980-81 (Mathur *et al.*, 2006). The decline in agriculture's performance continued till 2005-06 (Chand and Parappurathu, 2011; Thomas, 2012).

With poverty and lack of productive employment, the focus of the Eleventh Plan was rapid growth that reduces poverty, improves employment opportunities under MGNREGS, skill development, access to essential services. The focus of the Twelfth plan was faster, more inclusive and more sustainable growth (Planning Commission, undated).

The number of unemployed in the labour force reduced from 11.1 million in 2004-05 to 10.8 million in 2009-10. The net increase in employment in the period 2004-05 to 2011-12 was 15.15 million (NITI Aayog, 2015). Unemployment rate reduced from 2.3 per cent in 2004-05 to 2.2 per cent in 2011-12. However, employment in the agriculture sector did not present a rosy picture. During the period 1999-00 to 2009-10, employment in agriculture fell at the rate of 0.19 per cent per annum (Papola and Sahu, 2012). Jatav and Sen (2013) state that the rate of growth of male employment in agriculture was 0 per cent and employment of females declined by 4.3 per cent in the period 2004-05 to 2009-10. During the period 2001-02 to 2010-11, gross domestic product growth rate was an impressive 7.9 per cent, sectoral growth rates of the industry sector, services and agriculture were 7.8 per cent, 9.4 per cent and 2.9 per cent respectively. However, this

decade was marked by a high number of farmer suicides. It peaked to 18241 in 2004 and declined to 13754 in 2012 (Mishra, 2014).

The impact of the Plans on the structural composition of the economy's output and the workforce is discussed in the next section.

1.1.3 Structural Change in India

Structural change in India's output in the period 1950-51 to 2009-10 is shown in Table 1-4. Table 1-5 gives the structural change in employment in the period 1972-73 to 2009-10. Sector-wise changes in shares of output and employment are discussed below.

1.1.3.1 The Agricultural Sector

The agriculture sector's share in output declined from 56.7 per cent in 1950-51 to 15.2 per cent in 2009-10. Since, the Ninth Plan as mentioned earlier agriculture has been growing slowly, with some improvement after 2004-05. Its share of employment stood at 51.3 per cent in 2009-10, a 5.1 per cent point decrease from 2004-05. As of 2011-12, 95.9 per cent of the agricultural workforce was rural (Chand *et al.*, 2017).

Table 1-4 Sectoral Shares in GDP (%) in India 1950-51 to 2009-10 at 1999-00 Prices

Sectors	1950-51*	1960-61*	1972-73	1983	1993-94	1999-00	2004-05	2009-10
Agriculture	56.7	52.48	40.9	37.2	30	25	20.2	15.2
Industry	13.66	17.09	23.3	24.3	25.2	25.3	26.2	25.9
Services	29.64	30.43	35.8	38.6	44.8	49.7	53.6	58.8

Source: Papola and Sahu, 2012, Table 17, pp. 36; * Various.Issues of Economic Survey.

The implication is simple: agriculture, which has the least output in the economy continues to be burdened with the bulk of the workforce. This is contrary to theory. Theory states that as an economy grows, agriculture's share of national income and employment converges. The outcome of this deviation is a low land to man ratio and

poor real wages of the agricultural workforce. This in turn has given rise to a sizeable number of rural, low-income earners in India's labour force. Studies indicate that the bulk of India's population as well as her labour force continue to be rural. Rural workers were around 78 per cent of the workforce in the period 1993-94 to 2004-05, with a mild dip to 76.2 per cent in 1999-00 (computed using data from Sundaram, 2007). In 2011-12 it declined to 70.9 per cent but continues to be the significant share (Chand *et al.*, 2017).

Table 1-5 Sectoral Shares in Employment (%) in India 1972-73 to 2009-10

Sectors	1972-73	1983	1993-94	1999-00	2004-05	2009-10
Agriculture	73.9	68.6	64	60.3	56.3	51.3
Industry	11.3	13.8	15	16.2	18.8	22
Services	14.8	17.6	21.1	23.4	24.9	26.7

Source: Papola and Sahu, 2012, Table 16, pp. 36.

The 66th NSSO Report (2009-10) confirms that the movement of rural labour from agriculture has started (Thomas, 2012). There was a loss of 21.1 million workers (23.7 million workers, according to Mehrotra *et al.*, 2014) in agriculture and allied services in the period 2004-05 to 2009-10 (Thomas, 2012). The loss was 13 million in the period 2009-10 to 2011-12. The decline in agricultural employment is not attributable to the improved usage of technologies in agriculture. Rather, it stems from the inability of agriculture to improve output with a sharp decline in yield growth rates in the period 1993 to 2003-06 (Bhalla and Singh, 2009). The yield of some crops improved in the period 2000-01 to 2007-08 but negative area growth for some food grains, pulses and coarse cereals due to shift to high value, less labour intensive crops (Kannan and Sundaram, 2011) contributed to the exodus of rural labour from agriculture.

1.1.3.2 The Industrial⁶ Sector

India's industrial sector has a stagnating share of output (around 25 per cent) since 1972-73. (refer Table 1-4). It has the least share of the nation's workforce, since 1972-73 (refer Table 1-5). The distribution of industrial output and industrial workforce across various segments is provided in Table 1-6 and Table 1-7.

The manufacturing segment, which historically has driven structural change and growth in developed economies failed to pick up in India. Its share in output increased nominally from 13.5 per cent in 1972-73 to 15.4 per cent in 2009-10, even after economic reforms. Employment increased from 8.9 per cent in 1972-73 to 11.5 per cent in 2009-10. The employment elasticity in manufacturing declined from 0.61 in 1972-73 to 1983 to 0.25 in 1999-00 to 2009-10 (Papola and Sahu, 2012). It is evident that India failed to expand productive employment for its workforce in manufacturing. Panagariya (2008) attributes this to the low and stagnant share of labour intensive products in manufacturing and the emphasis given to the development of skill-intensive rather than labour-intensive industries. Possibly, this is the reason for India's share of industry in national output and employment being more similar to that observed in developed countries (refer Table 1-1) but lagging most Southeast Asian economies (refer Table 1-6). Chand *et al.*'s (2017) analysis presents an interesting aspect: 51.3 per cent of the output and 47.4 per cent of the employment of the manufacturing segment, came from the rural sector, in 2011-12. Thus, unlike Lewis's (1954) and Harris Todaro's (1970) models, manufacturing in India is not solely confined to the urban sector.

The employment elasticity of the industry sector declined from 1.375 in 1977-78 to 1982 to 0.817 in 2009-10 to 2011-12 (Basu and Das, 2016b); but it exceeded that of the

⁶ The industry sector comprises of the segments mining, manufacturing, electricity and construction.

manufacturing segment as computed by Papola and Sahu (2012). This indicates that one or more of the other industry segments (i.e. construction, mining, electricity) registered higher employment elasticity. It is evident from Table 1-7 and Table 1-8 that the higher employment elasticity of the industry sector is attributable to the construction segment. The number of rural construction workers increased by 15.5 lakhs per annum in the period 1993-94 to 2009-10 (Binswanger-Mkhize, 2012). Studies reveal that the spurt in casual, employment opportunities in construction and public works, essentially a low

Table 1-6 Sectoral Shares (%) in GDP in some Asian Countries (1960 and 2002)

Country	Agriculture		Industry		Services	
	1960	2002	1960	2002	1960	2002
China	30 (1980)	15	49	51	21	34
Indonesia	50	18	25	45	25	38
Thailand	40	9	19	43	41	48
Philippines	26	14	28	33	46	53
Malaysia	36	9	18	47	46	44
Republic of Korea	37	4	20	41	43	55
Pakistan	46	23	16	23	38	54
India	55	24	16	25	29	51

Source: Papola, 2005, Table 2, pp. 16

Table 1-7 Distribution of Industrial Output across Segments

Segments	1972-73	1977-78	1983	1987-88	1993-94	1999-00	2004-05	2009-10
Mining and Quarrying	1.83	1.86	2.25	2.39	2.51	2.33	2.2	1.74
Manufacturing	13.45	13.6	14.52	14.87	14.5	14.78	15.12	15.41
Utilities	1.27	1.45	1.71	2.08	2.43	2.49	2.29	2.1
Construction	6.77	6.76	5.81	5.88	5.76	5.71	6.62	6.67

Source: Papola and Sahu, 2012, Table 17, pp.36.

value-added segment, coincides with the implementation of MGNREGA (2005). Chand *et al.* (2017) found that 48.7 per cent of the output and 74.6 per cent of the employment in the construction segment was contributed by the rural sector.

Table 1-8 Distribution of Industrial Workforce across Segments

Segments	1972-73	1977-78	1983	1987-88	1993-94	1999-00	2004-05	2009-10
Mining and Quarrying	0.43	0.47	0.61	0.72	0.69	0.57	0.56	0.64
Manufacturing	8.87	10.2	10.66	12.22	10.6	11.01	12.27	11.5
Utilities	0.16	0.17	0.28	0.36	0.4	0.26	0.27	0.28
Construction	1.84	1.75	2.24	3.76	3.24	4.41	5.69	9.6

Source: Papola and Sahu, 2012, Table 16, pp.36.

1.1.3.3 The Services Sector

The share of the service sector in output increased from 29.64 per cent in 1950-51 to 58.8 per cent in 2009-10. The output of the service sector exceeded the combined output of agriculture and industry, since 2004-05. However, its share in employment increased from 14.8 per cent in 1972-73 to just 26.7 per cent in 2009-10. This implies that this sector was unable to generate a commensurable share of employment. This is at variance with other economies in Asia like the Phillipines, Republic of Korea, China, Indonesia, Malaysia, Thailand (refer Table 1-9). It also diverges from Baumol's (1967) hypothesis

Table 1-9 GDP and Employment Shares (%) in Services (2002)

Country	Share %	
	In GDP	In Employment
China	34	31
Indonesia	38	39
Thailand	48	33
Philippines	53	47
Malaysia	44	50
Republic of Korea	55	62
Pakistan	54	34
India	51	22

Source: Papola, 2005, Table 3, pp. 19

and Clark's (1940, cited in Papola, 2005) analysis that the service sector in an economy is bulkier on account of lower productivity of its workforce.

Chand *et al.* (2017) found that the rural workforce contributed not only to the manufacturing output but also to the output of the services sector. 39.6 per cent of its workforce based in the rural contributed to 25.9 per cent of the output of the service sector. It follows from Chand *et al.*'s (ibid) findings that the rural non- agricultural economy consisting of the industry and services sector made a substantial contribution to the economy's output as well as employment. Table 1-10 and Table 1-11 give the changing structural composition of the rural NDP and the rural workforce since the 70s.

Table 1-10 Sectoral Distribution (in %) of Rural NDP (1970-71 to 2009-10)

Period	1970-71	1980-81	1993-94	1999-00	2004-05	2009-10*
Agriculture	72.37	64.36	56.99	51.42	38.34	35
Industry	10.56	15.01	16.24	19.97	24.13	65
Services	17.06	20.63	26.75	28.63	37.52	

Source: Computed from data obtained from Papola and Sahu, 2012, Table 6, pp12; *Reddy *et al.*, 2014, Table 5, pp. 10.

Table 1-11 Sectoral Distribution (in %) of Rural Workforce (1972-73 to 2011-12)

Period	1972-73	1983	1993-94	2004-05	2009-10*	2011-12
Agriculture	85.5	83.6	78.4	72.6	68	64.1
Non-Agriculture	14.5	16.4	21.6	27.4	32	35.9

Source: Chand, Srivastava and Singh, 2017, Table 3.2, pp. 7; *Reddy *et al.*, 2014, Table 9, pp.13.

1.1.3.4 Our Inference

The key takeaway from the discussed evidence is that India deviated from the theorised path of structural change. Unlike the theory the manufacturing segment failed to generate adequate employment for its workforce. The significant share of the workforce got tied up in agriculture, a sector whose output growth rates vacillated and were low. A workforce engaged in low value-added sectors with low paying, casual jobs was unable

to generate demand for (above subsistence level) products. This in turn had a bearing on the growth in output of the manufacturing segment.

Our second inference is that rural India underwent a significant change in the structural composition of its output and workforce post-1993-94 (refer Table 1-10 and Table 1-11). Data (refer Table 1-12) shows that in the period 1999-00 to 2009-10 the bulk of the new jobs were generated in the rural non-agricultural sector.

Table 1-12 Rural Workforce Size and Break-up (1999-00, 2004-05, 2009-10)

Period	Population (No. of rural workers in thousands)	No. of rural workers in Agriculture (000)	No. of rural workers in Non-Agriculture (000)	CAGR of workforce size (in %)	
				Rural Agri.	Rural Non-Agri.
1999-00	305,395	232711	72684		
2004-05	342,838	248558	94280	1.33	5.34
2009-10	337,000*	229160**	107840**	-1.61	2.72

Source: Computed using data from Sundaram, 2007, Table 1, pp. 38; Table 7, Panel A, pp. 46; *Thomas, 2012, Table 1, pp.40,** Computed using data from NSS 66th Round Employment and Unemployment Survey.

1.1.4 The Issues

The major issues confronting the economy after more than six decades of Independence are, i) The bulk of the population and working poor continue to be in the rural sector. As per *Census* 2011, 68.85 per cent of the total population⁷ lives in rural India. Rural labourers form the significant share of the workforce⁸. ii) An agrarian sector marked by low yields in comparison to global standards and want of investment. The rate of growth of agricultural output has been low (Bhalla and Singh, 2010). iii) A large, poor and unskilled rural workforce, a major share of which, is in the agriculture sector. Radhakrishna and Sharma (1998) rightly point out that “...the rural labour has been largely bypassed by the process of socio-economic development over the last five

⁷ The share of the rural population is declining as the corresponding figures were 74 per cent in 1991 (Sen,1998) and 72.18 per cent in 2001 (*Census*,2011).

⁸ Refer section 1.1.3.1

decades or so, despite its immense contribution to the development of agriculture in particular and the rural economy in general”. iv) Poverty and vulnerability to poverty prevail, especially in rural India. v) Inadequacy in the generation of productive jobs, especially for unskilled labour. Several scholars have pointed out that the nature of jobs generated in India was short-term and low quality.

The economic imperatives sum up as alleviation of poverty, generation of productive employment and improvement of employment growth rates especially in rural India. The need for generation of productive employment for more inclusive growth has also been highlighted by Chandrasekhar and Ghosh (2007). It is evident that challenges in rural India are deeper. In this backdrop, we want to examine how the rural non-agricultural sector, a burgeoning sector in the rural economy could possibly address the aforementioned challenges.

1.1.5 The Rural Scenario

Perhaps Fields's (2005) comments on labour markets in low-income countries concisely sum up the rural employment scenario in India. He observes that in such economies the number of good jobs was limited, so workers took up bad jobs rather than stay unemployed. His second observation is that the problem of working poverty is more severe than open unemployment. On the face of it, rural India offers more employment opportunities compared to urban areas, as the *NSS 68th Round Report* (GOI, 2012) reveals that rural unemployment rates (for usual status, current weekly status and current daily status) are lower than urban unemployment rates from 1972-73 to 2011-12. The fact is as a rural labourer will “do whatever work is available from whomsoever”, the rural employment situation looks better (Tulpule, 1998).

Several scholars (Unni and Raveendran, 2007; Abraham, 2009; Dev, 2017) have commented that the nature of jobs generated in the rural unorganised, non-agricultural sector was short-term and of low quality. Basole (2017) too, underscores the issue of poor quality employment generation in rural India “....ongoing severe crisis of quality of livelihoods in the rural sector to the extent that 70% of agricultural households cannot meet their (low) consumption needs even given diverse sources of income”. Abraham (2009) shows that underemployment increased in the rural economy, in the period 1999-00 to 2004-05. Underemployment (Current Daily Status) increased from 7.2 per cent in 1999-00 to 8 per cent for males and 8.7 per cent for females in 2004-05, these figures being the highest since 1983. This reinforces the low quality of jobs in the rural economy. Generation of regular, productive employment has become a necessity. The need for the same is seconded by the fact that there has been a rise in the number of people taking education in rural India, especially in the last two decades (Chadha and Sahu, 2002, EPW Editorial, 2011; Choudhury, 2011; Thomas, 2012; Mehrotra, 2018). The problems arising out of rural underemployment and unemployment will be further compounded in the future when rural India has a pool of educated unemployed or underemployed youth.

Perhaps a concerted focus and action on rural industrialisation is a way out of this rural mare’s nest. Papola and Misra (1980) sounded their concern on a rural industrialisation approach based on the promotion of traditional industries (an objective in the initial Plans), as it is unlikely to generate necessary levels of employment and income. Papola (1987, cited in Bhalla, 1993b) in his inter-region, inter-district comparisons on agricultural development and rural industrial activity barely found one rural industry and concluded that “rural industrialisation should not be treated as an adjunct to agricultural growth but rather as a development, which needs to be fostered independently”. For

Basole (2017), to increase employment levels and revive the rural economy there needs to be a refocus on rural industrialisation.

The factors that motivate us to examine in detail the rural organised manufacturing industries segment, as part of our research are:

- i) One can analyse the growth of the rural organised manufacturing industries segment based on the average profit rate and profitability trends of this segment. To our knowledge this has not been done before. Existing studies, which have dealt with the rural economy have not examined profit rates to assess the growth of the rural economy as a whole or any part of it.
- ii) Few studies (Sau, 1989; Felipe and Kumar, 2010; Basu and Das, 2015; 2016a) analysed profit rates to understand growth; but they do not provide rural and urban break-up. Our study will fill this gap as well.
- iii) Overall, we observe that scant attention has been given to this segment, in existing literature.

Rural organised manufacturing industries⁹ form a small but distinct segment of the rural non-agricultural sector in India. It is evident from *ASI Report* (1998-99 to 2007-08)¹⁰ that there is the presence of industry groups -industrial code 15 to 37 - not only in urban India but also in rural India. This implies that the rural industrial sector has evolved beyond traditional industries. Papola and Misra (1980) pointed out that these industries not only produce agro-based products and consumables but also intermediaries and final products. Table 1-13 is a product related classification of industries 15-37. It is evident from Table 1-13 that most of the rural industries in India, during our study period belonged to the

⁹ Rural organised manufacturing industries is subsequently referred to as rural industries.

¹⁰ Our analysis is limited to the period 1997-98 to 2007-08 as disaggregated data on rural industries is provided by ASI only for the period 1997-98 to 2007-08. This thesis examines empirical trends both at the aggregate and disaggregate levels. Moreover, at the aggregate level the entire dataset required for profit rate decomposition analysis has not been provided.

consumer goods category. It is observed that the rural industries cater to a wide variety of consumer goods ranging from food products, textiles to high-end electronic gadgets like televisions and computers. It appears from the nature of the produce that some of these industries deployed sophisticated technology.

Our calculations based on ASI data show that at the aggregate level, both the output and profits of rural industries have been rising and they have registered higher output and profit growth rates than urban industries.

Table 1-13 Classification of Industries Based on Type of Produce

Type of Produce	Industry Code
Raw Material	20,23,24,27
Consumer Good	15,16,17,18,21,22,24,25,26,30,32,34,35,36
Intermediaries	17,19,20,21,26
Investment Goods	28,29,31,32,33,36

Source: Categorised based on *Time Series Data on ASI (1998-99 to 2007-08)*.

Albeit workforce size in the rural industries segment was a mere 3.2 per cent and 2.8 per cent of the total size of the rural non-agricultural workforce in 1999-00 and 2004-05 respectively, its performance (refer Chapter 4) was noteworthy compared to the agricultural sector and better than urban industries. It comes across as a bright spot in the rural economy.

1.2 Research Objectives

The broad goal of our research is to understand the growth of the rural non-agricultural sector. Although the rural non-agricultural sector as a whole will be examined, we shall

be focusing on the rural industries segment, as it comes across as a segment, with potential to generate productive employment.

Estimating the quantum of growth of the rural non-agricultural sector is a complex problem on two counts. The first is that rural and urban outputs are not computed separately in India, so a direct method for assessing the growth of this sector is ruled out. Based on certain assumptions, the Central Statistical Organisation (CSO) provided a sector-wise break-up of rural National Domestic Product, for the years 1970-71, 1980-81, 1993-94 and 1999-00. This gave an approximate view of the growth of this sector, for a limited number of periods. An alternative way to assess the growth of the rural non-agricultural sector could be through the examination of the profitability of this sector. However, profitability data are not declared for the entire gamut of activities in the rural non-agricultural sector in India. It is available for the rural industries segment. So we use this paradigm, to understand its growth and thereby that of the rural non-agricultural sector.

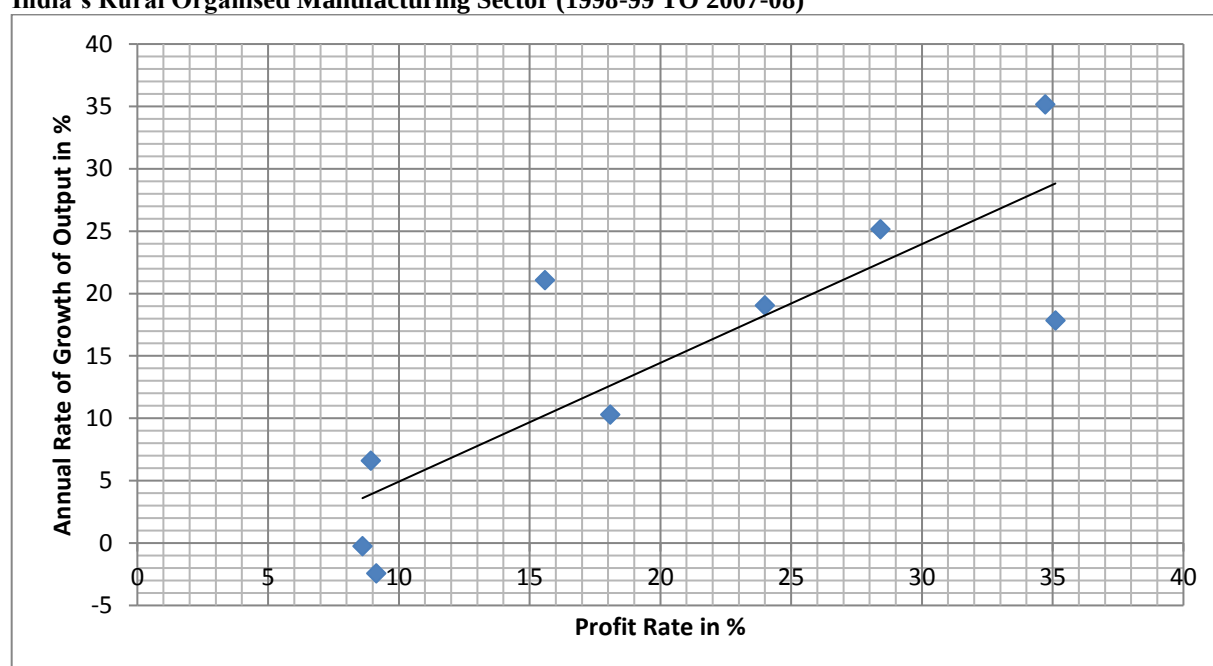
Research Objective 1: To understand from the existing body of literature the nature of growth the rural non-agricultural sector in India.

Research Objective 2: To examine profit rates, growth in output (refer Fig. 1-1) and other attributes of rural industries in India; and use these findings to construct an empirical outline of this segment. To find out, how values and data trends observed in the rural industries compare with urban organised manufacturing industries¹¹.

Research Objective 3: To identify factors that are driving change in the profit rate in India's rural organised industry segment.

¹¹ Urban organised manufacturing industries is referred to as urban industries.

Figure 1-1 Scatter Plot of Annual Rate of Growth of Output (Net Value Added) and Profit Rate in India's Rural Organised Manufacturing Sector (1998-99 TO 2007-08)



Source: Computed using *Time Series Data on Annual Survey of Industries* (1998-99 to 2007-08).

Research Objective 4: To propose a theoretical framework that aids us to identify the determinants of short-run output and medium-run growth in output of the rural industries segment. The broad purpose of this framework is to explain phenomena underlying empirical observations and data trends.

To realize these objectives, we address the following research questions:

Research Question 1: What do literature and evidence say about the nature of growth of the rural non- agricultural sector in India?

Research Question 2: What has been the variation in output, profit rate, labour force size, wage rate, labour productivity, capital productivity, etc. of rural organised manufacturing industries between 1998-99 and 2007-08? How does it fare vis-à-vis urban organised manufacturing industries?

Research Question 3: What are the factors driving change in the profit rate of both rural and urban organised manufacturing industries in India?

Research Question 4: From an analytical point of view, what are the determinants of short-run output and medium-run growth in output of rural organised manufacturing industries in India?

The answers to the questions may give us a hint of the policies to pursue in order to promote gainful employment in the rural sector.

1.3 Definitions, Data Sources and Methodology

1.3.1 Definitions

Rural: The *Census* definition of Rural is “All areas, which are not categorized as Urban¹² area are considered as Rural area”. We adopt this definition.

Non-agricultural sector: There is no standard definition for the non-agricultural sector. For Haggblade *et al.* (2010), the non-agricultural sector includes all activities that are not in the purview of the primary sector: namely, “mining, manufacturing, utilities, construction, commerce, transport and a full gamut of financial, personal and government services”. A similar definition is provided by Lanjouw and Lanjouw (1995) and Chadha (1993, cited in Ranjan, 2006). Saith’s (1992, cited in Ranjan 2006) definition has a broader purview. It includes “auxiliary activities like fishing and aquaculture, dairying and animal husbandry, poultry rearing and beekeeping” (Ranjan, 2006). Saith (*ibid*) states that the significance of the non-agricultural sector in the rural economy is rising due to the “limitations placed by agricultural land (and productivity)”. Hence, all activities that “tend to bypass this agricultural constraint” are included by

¹² As per *Census*, Urban Unit (or Town) is, all places with a municipality, corporation, cantonment board or notified town are committee, etc. (known as Statutory Town) and all other places which satisfied the following criteria (known as *Census* Town): A minimum population of 5,000; at least 75 per cent of the male main workers engaged in non-agricultural pursuits; and a density of population of at least 400 per sq. km.

Saith in this category. Our study adopts Haggblade *et al.*'s (2010) definition. No further typography is being introduced at this juncture.

Rural non-agricultural sector: Lack of standard definition also exists on whether rural non-agricultural employment refers to the employment of rural households in any location or non-agricultural employment in rural locations. Saith (1992, cited by Ranjan) points out that “rural sector should include all economic activities which display sufficiently strong rural linkages, irrespective of whether they are located in designated rural areas or not”. This is a valid argument as production units may be set up in the vicinity of rural locations and driven by the rural sector in terms of capital, labour and raw inputs, due to the paucity of land in the villages. Such units generate employment for the rural populace and cannot be overlooked. However, at this stage, we adhere to rural non-agricultural employment as employment located in rural locations.

An absence of standard definitions for this sector is perhaps due to the fact that it “is a poorly understood component of the rural economy of developing countries” (Lanjouw and Lanjouw, 2001). They point out that this lack of understanding persists as not much research work has been done on this sector “both at the theoretical and the empirical level” although evidence shows that it has grown across the developing world (Lanjouw and Lanjouw, 2001).

1.3.2. Data Sources and Methodology

We studied selected books, journal articles, conference papers from the existing body of literature on the rural non-agricultural sector, to understand the growth of this sector (i.e. the first objective). Our analysis is primarily based on several rounds of *NSSO Reports* (<http://mospi.nic.in>). *Census* data has been used, in cases where *NSSO* data is not

available. In our analysis, the reference period for employment and unemployment data is 1972-73 to 2009-10. Data from three quinquennial rounds: 50th Round (1993-94), 66th round (2009-10) and the 68th round (2011-12) of *NSSO Reports on Employment and Unemployment in India* have been used for analysis of distribution of rural usual status (both principle and subsidiary) workers across the rural agricultural and non-agricultural sectors, state-wise distribution across various industry segments of the rural non-agricultural sector and rural unemployment rates of current daily status, current weekly status and usual status rural workers. Data for 1972-73 (27th Round), 1977-78 (32nd Round), 1983 (38th Round), 1987-88 (43rd Round), 1993-94 (50th Round), 1999-00 (55th Round) and 2004-05 (61st Round) and associated estimates have been obtained from literature to get a view on the distribution of rural non-agricultural workforce across industrial segments, increment in rural non-agricultural workforce, distribution of non-agricultural workforce by employment status. Data from *NSSO Reports: 2000-01* (56th Round), 2002 (58th Round), 2004 (60th Round), 2005-06 (62nd Round), 2006-07 (63rd Round), 2007-08 (64th Round) and 2011-12 (68th Round) on *Household Consumption Expenditure in India* have been used to gauge changing rural consumption patterns.

To compute and analyse profit rates and growth in output of the rural organised manufacturing segment (i.e. the second objective), the data source is *Time-Series Data on Annual Survey of Industries (1998-99 to 2007-08)*, published by the Ministry of Statistics and Programme Implementation, Central Statistical Organization (CSO). The results are based on analysis of data of twenty-three industries, industry code 15 to 37 of the aforementioned report, which provides nominal values of key characteristics (output, profits, capital stock, wage bill, number of workers) of rural and urban industries in the organised sector. We had to limit the period of analysis to these ten years because to our knowledge, *ASI* has not released disaggregated data of urban and rural sectors of other

years. Appropriate statistical and econometric tools and software have been used to calculate the relevant estimates. To realize the next part of the second objective, that is to compute levels and growth of other attributes (workforce size, labour productivity, capital productivity, labour compensation etc.) of the rural organised manufacturing segment, we use the aforementioned data source.

To identify the factors driving profit rate in the rural, organised manufacturing segment (i.e. the third objective), we use Basu and Das's (2015) two-factor profit rate decomposition from a medium-run perspective, which is based on Weisskopf's (1979) theoretical framework. We focus on the role played by the two factors, profit share and output-capital ratio, in driving profit rate. As our analysis is restricted to a limited time period, we did not divide the period into shorter time spans, as has been done by Weisskopf (1979) and Basu and Das (2015). Appropriate statistical and econometric tools and software have been used to calculate the relevant estimates.

To construct an analytical framework, to identify the determinants of short-run output and medium-run growth in output of the rural organised, manufacturing segment (i.e. the fourth objective), we use simple yet powerful relations provided by macroeconomic theory. We use the relationship between profit rate and the rate of growth of output provided by Pasinetti (1962) and Robinson's (1962, cited in Basu and Das, 2016a) investment function, which illustrates the relationship between investment and profit rate.

1.4. Chapter Outline

There are seven chapters in this thesis, including the present one.

Chapter 2, gives in brief, an overview of rural occupational diversification in other developing economies. This chapter primarily is a review of selected literature on the growth of the rural non-agricultural sector in India. Besides discussing existing methods of assessing the growth of this sector, it also presents our method of analysing profit rates to gauge the growth of a segment of this sector. Other aspects connected to the growth of this sector, namely its emerging segments, spatial variations, patterns of employment, wage rates etc. are also discussed. Chapter 2 partly addresses the first research question.

Chapter 3 is a review of the literature on the causes for expansion of the rural non-agricultural sector in India. Existing theoretical frameworks that show how the performance of the agricultural sector drives the growth of the rural non-agricultural sector are discussed at the outset of this chapter. Chapter 3 addresses the remaining part of the first research question.

Chapter 4 discusses the data trends of profit rate and output of rural industries, during the period 1998-99 to 2007-08. Respective growth rates are also discussed. The consistency of empirical evidence with Pasinneti's relationship is also checked. This chapter primarily focuses on identification of the factors driving change in profit rate in rural industries. To do so, two-factor profit rate decomposition analysis that is based on Weisskopf's (1979) theoretical framework is carried out. This analysis provides an empirical measure of changes in the distribution of income, capital productivity, labour productivity and capital intensity that lead to change in the profit rate of rural industries. For the purpose of comparison, the aforementioned calculations and analysis are also extended to urban industries. Chapter 4 partly addresses the second research question and the third research question.

Chapter 5 addresses the remaining part of the second research question. The data trends and growth rates of workforce size, wage bill, output-labour ratio, output-capital ratio, capital-wage ratio in the period 1998-99 to 2007-08 are analysed, in this chapter. The same exercise is extended to urban industries. Empirical evidence and data trends discussed in Chapter 4 and Chapter 5 indicate certain facets of the rural industrial segment. Based on statistical tests, the nature of relationships between key variables (like the output of this segment and labour productivity, growth in the output of this segment and labour productivity, so on and so forth.) are arrived at.

Chapter 6 discusses our theoretical framework that explains phenomenon underlying empirical observations, discussed in Chapter 4 and Chapter 5. Our framework models the rural industrial sector and captures the influence of the agricultural sector. It shows the impact of the distribution of income between the capitalists' and the workers as well as the wage rate and productivity of industrial workers on short-run output and medium-run growth in the output of the industries segment. Thereby, this chapter addresses the fourth research question.

Chapter 7 consists of the conclusions drawn, from our findings and results, policy suggestions, caveats in the study and possible future direction of research.

Chapter 2

Rural Occupational Diversification in India

2.1 An Overview from Developing Economies

The rural non-agricultural sector has been growing at a rapid rate in India. A rising share of the rural non-agricultural sector in the rural National Domestic Product (NDP) and the expansion of the rural non-agricultural workforce indicate that it is pulling ahead of the rest of the rural economy (Bhalla 2006; Bhaumik 2007, 2013; Chadha 2007; Chadha and Sahu 2002; Chandrasekhar and Ghosh 2007; Coppard, 2001; Ghosh, 1995; Himanshu *et al.*, 2011; Jatav and Sen 2013; Kotwal *et al.* 2011; Papola and Sahu 2012; Reddy *et al.*, 2014). It can be argued that the rural non-agricultural sector provides relatively stable income in the face of the vagaries of the agricultural sector. Perhaps it also helps in curbing rural-urban migration. As per *Census* 2001, rural-to-rural migration registered the major share of internal migrants in 2001. It was 67.16 per cent of the total number of internal migrants. All this happened when the agricultural sector was going through a downturn.

The growth of the rural non-agricultural sector (often referred to as the rural non-farm economy in literature) is a phenomenon witnessed not only in India; but also in other developing nations like China, Bangladesh, Indonesia, countries in sub-Saharan Africa, to name a few. It has been since the 90s, that rural occupational diversification became pronounced in developing countries (Reardon, 1997, cited in Ellis, 2004; Ellis, 2000, cited in Ellis, 2004; Barrett *et al.*, 2001, cited in Ellis, 2004). In developing economies, most of the rural poor engage in multiple livelihoods and several scholars (Lanjouw and Lanjouw, 2001; Ellis, 2004; Ranjan, 2006, Haggblade, Hazell and Reardon, 2010) have

found that they draw a significant share of their income from rural non-agricultural activities. Earnings from non-agricultural activities amount to 35–50% of the income of rural households in developing economies (Haggblade, Hazell and Reardon, 2010). FAO (1998, cited in Ranjan, 2006) estimates that it was 32 per cent for Asia. Ellis (2004) found the mean proportion of income of rural households from rural non-agricultural activities is often around 60 per cent in South Asia, 50 per cent in sub-Saharan Africa and about 40 per cent in Latin America. In the Philippines, 56 per cent of the total rural income came from the non-agricultural sector in 1985 and in Costa Rica in 1997, it was as high as 59 per cent (Lanjouw and Lanjouw, 2001). Aggregate statistics on the rural non-farm economy reported by Lanjouw and Feder (2001, cited in Carletto *et al.*, 2007) report similar findings. However, the countries do differ in the occupational composition of this sector. In China, the rural non-agricultural sector burgeoned with the introduction of the labour-intensive Township and Village Enterprises (Bardhan, 2010). This brought about the industrialisation of the rural sector, a model distinct from that pursued by South Korea. In South Korea, industrial growth took place in urban pockets. Bangladesh has a diverse bunch of rural non-agricultural livelihoods like manufacturing, trade and restaurant, transport, community and personal service etc. (Bakht, 1996). India is no different from Bangladesh in the type of rural non-farm livelihoods. Coppard (2001) finds that most jobs have been generated in the rural tertiary sector. In China, non-agricultural employment changed from 11 per cent of total rural employment in 1980 to 20 per cent in 1986; in Vietnam in 1993 was as high as 70 per cent; in Taiwan it increased from 47 per cent in 1966 to 67 per cent in 1980; in Bangladesh it increased from 25 per cent in 1982 to 34 per cent in 1991. Similar, trends have been observed in Africa and Latin America (Lanjouw and Lanjouw, 2001).

Lanjouw and Lanjouw (2001) state that this sector is marked by heterogeneity, and is viewed as a low productivity sector producing low-quality goods. Several village level studies (Bhalla, 2006; Chandrasekhar, 1993; Unni, 1997, cited in Unni, 1998) reveal that rural non-agricultural sector in India is indeed heterogeneous and comprises of small, owner-operated enterprises producing miscellaneous goods and services spanning manufacturing, construction, small-time trade, transport, repairs etc.. Chandasekhar's (1993) extensive study on the rural non-agricultural sector in West Bengal, found industries engaged in producing low cost, low-quality items using traditional techniques (like *beedi* making, bamboo work, etc.), agro-processing industries (like rice milling and production of puffed rice) and some modern industry. Based on her field studies in Haryana, Bhalla (2006) found that most of these rural industries comprised of rural enterprises and establishments producing goods and services that require low levels of capital and labour. She remarked that what is happening in rural India is not akin to rural industrialisation (Bhalla, 2006). *NSS Survey* (2010-11), found that rural enterprises in India comprise of establishments¹³ and own account enterprises¹⁴ spread over manufacturing, trade and other service sector enterprises. Based on his survey in rural West Bengal, Chandrasekhar's (ibid) remark that the nature of these industries reflected the low per capita income of the "lower income deciles of the population" engaged in these industries, conveys the low value-added character of these ventures.

Public expenditure on the rural economy, has also given rise to a host of short-term miscellaneous activities, mostly in the construction segment. Undoubtedly, this sector is growing in terms of employment; but the nature of jobs is debatable. Lack of adequate number of regular jobs has resulted in its workforce engaged in multiple activities spanning more than one segment.

¹³ Establishments employ at least one hired worker on a fairly regular in the reference year (Source: NSSO).

¹⁴ Own Account Enterprises do not employ hired workers on a fairly regular basis in the reference year (Source: NSSO).

2.2 Rural Non-Agricultural Sector in India: An Outline

Visaria and Basant's (1994, cited in Unni, 1998) study finds that rural occupational diversification emerged from the 1960s in India. Bhalla (1993a, 1993b) and Unni's (1998)

review of evidence on non-agricultural employment in rural India in the 60s, 70s, 80s and 90s provides an insight on the gradual change in the nature of rural employment. Sen (1998) gives an evidence-based account of the shift of rural employment from the agricultural sector to the non-agricultural sector during the period 1971 to 1991. However, the change in the sectoral distribution of the rural workforce has become more pronounced in the recent past with the agricultural sector not performing well.

An expanding rural non-agricultural sector since the late 90s, has spawned a body of literature on India's changing rural employment scenario (Abraham, 2009, 2011; Bhalla, 1993a, 2006; Bhaumik, 2007, 2013; Binswanger-Mkhize, 2012; Chadha, 2007; Chandrasekhar and Ghosh, 2007; Himanshu, 2011; Himanshu *et al.*, 2011; Jatav and Sen, 2013; Lanjouw and Shariff, 2000; Papola and Sahu, 2012; Sundaram, 2007; Unni, 1998; Unni and Raveendran, 2007).

Inquiries on the growth of the rural non-agricultural sector in India have explored diverse aspects.

- i) The sectoral distribution of rural workforce to understand structural changes in the rural economy (Bhaumik, 2007, 2013; Chadha, 2007; Chadha and Sahu, 2002; Chand *et al.*, 2017; Chandrasekhar and Ghosh, 2007; Binswanger-Mkhize, 2012; Himanshu, 2011; Jatav and Sen, 2013; Papola and Sahu, 2012; Reddy *et al.*, 2014; Unni, 1998).
- ii) The sector-wise employment of the incremental workforce (Bhaumik, 2007).

- iii) The sectoral rates of growth of rural employment (Bhalla, 1993a, 2003; Bhaumik, 2007, 2013; Chadha and Sahu, 2002; Chandrasekhar and Ghosh, 2007; Himanshu *et al.*, 2011; Jatav and Sen, 2013; Kotwal *et al.*, 2011; Papola and Sahu, 2012) that give a picture of changing rural labour markets.
- iv) The pattern of rural employment to understand whether the growth of this sector is leading to increased casualisation of the workforce (Abraham, 2009, 2011; Chadha and Sahu, 2002; Chandrasekhar and Ghosh, 2007; Himanshu, 2011; Himanshu *et al.*, 2011; Jatav and Sen, 2013; Sundaram, 2004, 2007; Unni and Raveendran, 2007; Vaidyanathan, 1986).
- v) Emerging sectors of this rural non-farm economy (Bhalla, 1993a; Bhaumik, 2007, 2013; Binswanger-Mkhize, 2012; Himanshu *et al.*, 2011; Jatav and Sen, 2013; Papola and Sahu, 2012; Unni, 1998).
- vi) The factors driving growth of the sector (Abraham, 2009, 2011; Bhalla, 1993b; Bhaumik, 2007; Binswanger-Mkhize, 2012; Himanshu, 2011; Himanshu *et al.*, 2011; Jatav and Sen, 2013; Kotwal *et al.*, 2011; Lanjouw and Shariff, 2010; Reddy *et al.*, 2014; Srivastav and Dubey, 2002; Unni, 1998; Vaidyanathan, 1986).
- vii) Spatial variations in the growth of the rural non-agricultural workforce (Abraham 2009, 2011; Bhalla, 1993a; Bhaumik, 2007; Binswanger-Mkhize, 2012; Jatav and Sen, 2013; Vaidyanathan, 1986) and whether there exists any correlation between the growth of the rural non-agricultural sector and level of development of the concerned region (Abraham, 2009, 2011).
- viii) Changes in male and female employment in the rural workforce with the growth of this sector (Abraham, 2011; Bhalla, 1993a; Bhaumik, 2007, 2013; Chadha, 2007; Unni, 1998).

- ix) Impact of a growing rural non-agricultural sector on rural wage rates and inter-sectoral wage differentials (Abraham, 2009; Binswanger-Mkhize, 2012; Chandrasekhar and Ghosh, 2007; Himanshu *et al.*, 2011; Jatav and Sen, 2013).

Several regional level studies on the nature and growth of the rural non-agricultural sector, strengthen and add nuances to findings at the all-India level (Chandrasekhar, 1993; Bhaumik, 2009; Bhalla, 1995, 2006; Dutta, 2007; Rawal *et al.*, 2008).

This chapter focuses on constructing an empirical picture of the growth of the rural non-agricultural sector in India, through a review of the literature. It addresses the questions i) to v) that follow: i) What are the ways of assessing this growth? What does this assessment reveal about the growth of this sector in India? ii) What are the industrial segments driving this growth? iii) Is this growth uniform all over India or are there spatial variations? iv) What are the ensuing patterns of rural employment? v) What is the impact of a growing rural non-agricultural sector on rural wages, rural monthly per capita expenditure (RMPCE) and consumption patterns? The question vi) What are the causes of this growth? is addressed in Chapter 3. The rest of the chapter will take each of the above questions in separate sections.

2.2.1. Assessing Growth of the Rural Non-Agricultural Sector

In most studies (Bhalla, 2003; Bhaumik, 2007, 2013; Chadha and Sahu, 2002; Chandrasekhar and Ghosh, 2007; Himanshu *et al.*, 2011; Jatav and Sen, 2013; Kotwal *et al.*, 2011; Papola and Sahu, 2012) growth in rural non-agricultural employment is examined to assess the growth of the rural non-agricultural sector, in India (section 2.2.1.2). Perhaps this could be an indirect way of assessing growth: the underlying rationale being that when the output of a labour-intensive sector increases, it is likely to increase the volume of work opportunities.

As mentioned in chapter 1, rural and urban domestic products are not computed separately in India. CSO defined sector-wise break-up of rural National Domestic Product, gives an approximate view of the growth of the rural non-agricultural sector, for a limited number of periods (Chadha, 2007; Papola and Sahu, 2012).

As mentioned earlier, an alternative way to assess the growth of the rural non-agricultural sector could be through the examination of the profitability of this sector¹⁵. In a recent study, Basu and Das (2015) examine the profitability of India's manufacturing sector over the last three decades to understand its growth. To drive home their point they have commented: "it seems natural therefore that research analysing growth would give primacy to the profit rate" (Basu and Das, 2015). We compute profit rates of rural manufacturing industries in the organised sector: industry code 15 to 37 (section 2.2.1.3) to gauge the growth in output.

It is true that these industries (industrial code 15 to 37) in the rural organised, manufacturing sector present a part of the entire gamut of the rural non-agricultural sector activities in India. Nevertheless, it cannot be overlooked as in 2007-08 it employed 4.6 million workers and the net value added was rupees 2382.7 billion rupees. Moreover, rising profit rates make an industry lucrative for investors. If the organised rural sector reflects the growth momentum of the rural non-agricultural sector at a particular point of time, then it is likely to attract investment and if that happens, it will have a favourable impact on rural macroeconomic indicators.

2.2.1.1. Share of Rural Non-Agricultural Sector in Rural NDP

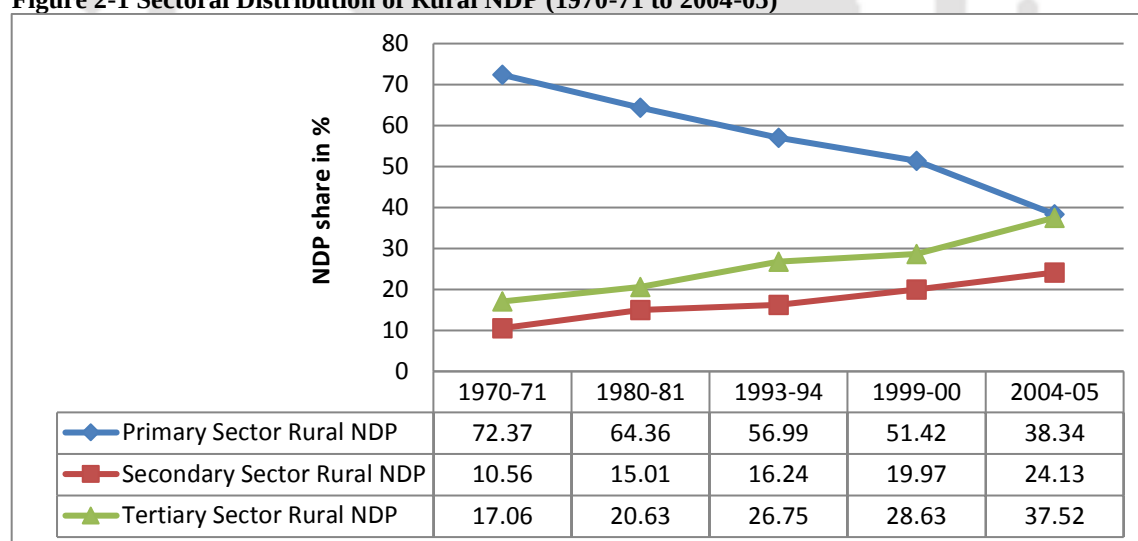
The share of the rural non-agricultural sector in rural National Domestic Product is the sum of shares of the secondary and tertiary sectors, if we ignore the small primary, non-

¹⁵ The underlying rationale is that growth rate (g) is a function of profit rate (r). Hence as long as $r > 0$, output growth rate will be positive, that is $g > 0$. As long as $g > 0$ it follows that $dY > 0$ that is, output (Y) of that industry is rising.

agricultural sector. Figure 2-1 reveals that there has been a progressive increase in the shares of both the secondary and tertiary sectors in rural NDP from 1970-71 to 2004-05, with the share of the latter exceeding the share of the former throughout this period. The share of the rural non-agricultural sector in rural National Domestic Product increased from 27.62 per cent in 1970-71 to 61.65 per cent in 2004-05, which was above the half-way mark. The rise was particularly sharp in the period 1999-00 to 2004-05. In 2009-10, the rural non-agricultural share in rural NDP increased to 65 per cent (Reddy *et al.*, 2014).

Binswanger-Mkhize's (2012) study reveals that post-80s rural non-agricultural GDP has been growing at a rapid pace. It grew at the rate of 7.1 per cent, in the period 1983-2004 and it peaked to 7.7 per cent in the period 1993-2004.

Figure 2-1 Sectoral Distribution of Rural NDP (1970-71 to 2004-05)



Source: Calculated using data obtained from Papola and Sahu, 2012, Table 6, pp.12

2.2.1.2. Growth in Size of Rural Non-Agricultural Workforce

The size of the rural non-agricultural workforce (in millions) almost trebled in the period 1972-73 to 2009-10 (refer Table 2-1). The increase was particularly steep from 1999-00 to 2004-05 (Bhaumik, 2007, Himanshu *et al.*, 2011; Jatav and Sen, 2013; Papola and

Sahu, 2012). In the said period the increase was 4.53 million persons per year (refer Table 2-2), a sharp climb from 1.58 millions per year during 1993-94 to 1999-00 (Bhaumik, *ibid*).

Table 2-1 All-India Size of Rural Non-Agricultural Workforce (1972-73 to 2004-05)

NSS Round/Year	Size of non-farm employment (in million)		
	Male	Female	Persons
27th (1972-73)	25.27	9.96	35.24
32nd (1977-78)	27.06	9.43	36.49
38th (1983)	34.89	11.04	45.92
43rd (1987-88)	41.82	14.14	55.96
50th (1993-94)	48.63	14.56	63.18
55th (1999-00)	57.00	15.64	72.64
61st (2004-05)	74.16	21.11	95.28
66th (2009-10)	-	-	107.51*

Source: Bhaumik, 2007, Table 1, pp. 43; *Papola and Sahu, 2012, pp. 12

Rural non-agricultural employment grew at a rate of 5.58 per cent in the period 1999-00 to 2004-05 against 2.72 per cent in the period 1972-73 to 1999-00. Himanshu *et al.*'s (2011) finding was almost similar. Their study found that rural non-agricultural employment increased from 3.3 per cent during 1983 to 1999 to 4.8 per cent during 1999 to 2004.

Table 2-2 All-India Change per Annum in Rural Non-Agricultural Employment (UPSS basis)

Period	Male (in million)	Female (in million)	Person (In million)
1972-73 to 1977-78	0.38	-0.11	0.26
1977-78 to 1983	1.42	0.29	1.71
1983 to 1987-88	1.54	0.69	2.23
1987-88 to 1993-94	1.13	0.07	1.2
1993-94 to 1999-00	1.4	0.18	1.58
1999-00 to 2004-05	3.43	1.09	4.53
2004-05 to 2009-10	-	-	2.45

Source: Bhaumik, 2007

The growth rate of female employment (5.8 per cent) surpassed that of male employment (5.1 per cent) in this sector during 1999-00 to 2004-05 (Jatav and Sen, 2013). However, these growth rates did not get sustained, as evident from few studies spanning the period 2004-05 to 2009-10. It declined to 2.8 per cent during 2004-05 to 2009-10 (Papola and Sahu, 2012). The growth rate of male and female rural non-agricultural employment dropped to 3.3 per cent and 0.9 per cent respectively (Jatav and Sen, 2013).

Evidence shows a sharp change in the rural labour market since the mid-90s. The share of the rural incremental labour force in agriculture and allied activities declined from 61.58 per cent in 1983 to 1993-94 to 0.05 per cent in 1993-94 to 2009-10 and that in rural non-agricultural activities increased from 38.43 per cent to 99.95 per cent respectively, in the period 1993-94 to 2009-10 (Bhaumik, 2013). Himanshu *et al.* (2011) also found that the growth of new rural jobs in the non-agricultural sector surpassed the agricultural sector, in the period 1993 to 2004.

Kotwal *et al.*'s (2011) study looks at the overall increase in non-agricultural employment in the economy rather than providing a disaggregated picture of rural and urban sectors. They examined the absolute growth of non-farm employment in the periods 1983 to 1993 and 1993 to 2004. They found the increase in the non-agricultural workforce was 35.59 million from 1983 to 1994 and in the period 1993 to 2004 it was 60.20 million, of which, an increase of 39.34 million happened in the period 1999 to 2004. This is a period when there was a significant increase in the rural non-agricultural workforce too. The growth trends in rural and urban non-agricultural employment appear to be similar.

It is evident from the above discussion that significant changes have been taking place in the rural non-agricultural sector in India for the last few decades. This is particularly true for the period 1999-00 to 2004-05 when there were marked increases, both in the share

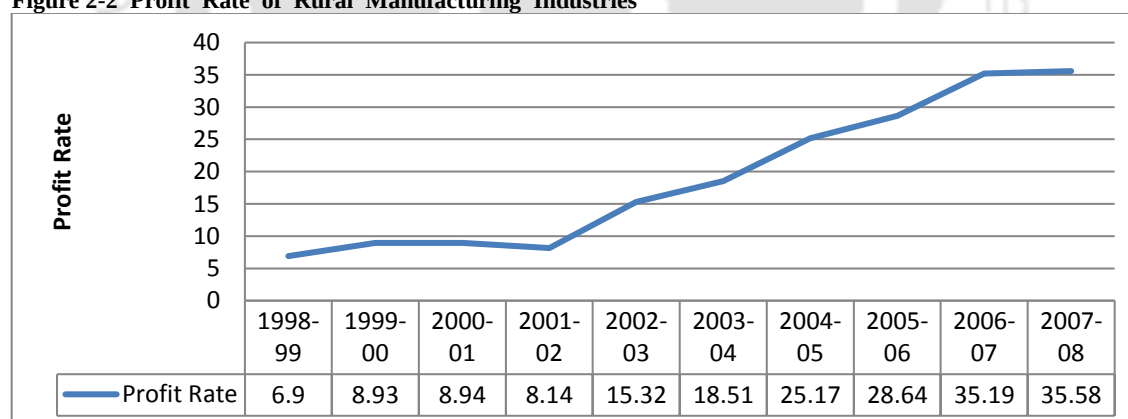
of the rural non-agricultural sector in rural NDP and in the size of the rural non-agricultural workforce. Possibly labour intensive jobs were created in the rural non-agricultural sector that resulted in increased output. But even if we keep aside those five years, a long-term trend of the relative growth of the rural non-agricultural sector is discernible.

2.2.1.3. Profit Rates of Rural Manufacturing Industries

Profit rate (R) is defined as the profits (π) earned in an enterprise over a period, which employs a certain volume of fixed capital (K). *Time-Series Data on Annual Survey of Industries Report* (1998-99 to 2007-08) provides nominal values of profits and fixed capital of rural industries.

A plot of profit rate of 'All' rural manufacturing industries in the period 1998-99 to 2007-08 (refer Figure 2-2) shows that profit rate has been progressively increasing in this period.

Figure 2-2 Profit Rate of Rural Manufacturing Industries

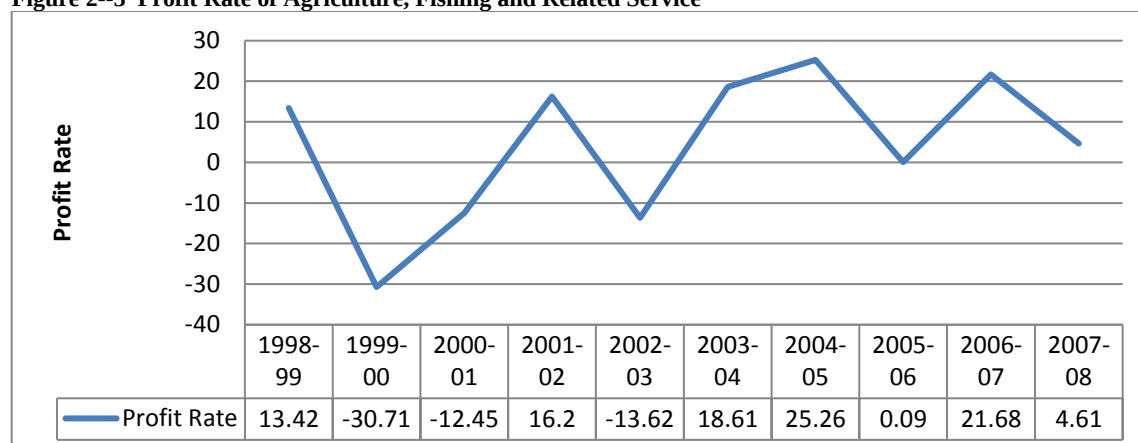


Source: Computed from *Time-Series Data on Annual Survey of Industries* (1998-99 to 2007-08)

Whereas a plot of profit rate of agriculture, hunting and related service activities (industry code 01) in the same period (refer Figure 2-3) shows that profit rate has shown sharp variations. The agriculture, fishing and related service sector consistently registered profits since 2003-04 but there have been significant fluctuations in profit

rates. It is evident from Table 2-3 that average real profit rate of all rural organised manufacturing industries was positive that is, $R > 0$ in the period 1998-99 to 2007-08.

Figure 2--3 Profit Rate of Agriculture, Fishing and Related Service



Source: Computed from Time-Series Data on Annual Survey of Industries (1998-99 to 2007-08)

This healthy profit of rural industries in contrast to what prevailed in the primary sector activities may have sustained growth of output of rural industries and of the rural non-agricultural sector.

Table 2-3 Average Real Profit Rate of Urban and Rural Industries (1997-98 to 2007-08)

IC ¹⁶	Industry Description	Average Real Profit Rate in per cent		Gap (3)-(4) =(5)
		Rural Industries (3)	Urban Industries (4)	
15	Manufacture of Food Products and Beverages	12	29.85	- 17.85
16	Manufacture of Tobacco Products	126.93	239.71	-112.78
17	Manufacture of Textiles	11.46	-0.62	+ 12.08
18	Manufacture of Wearing Apparel	25.01	40.16	- 15.15
19	Tanning of Leather	20.71	23.54	- 2.83
20	Manufacture of Wood, Cork, Straw, Plating Material Products	10.6	12.55	- 1.95
21	Manufacture of Paper and Paper Products	2.45	11.94	- 9.49
22	Publishing, Printing and Reproduction of Recorded Media	24.54	27.39	- 2.85
23	Manufacture of Cork, Refined Petroleum Products and Nuclear Fuel	49.52	21.94	+ 27.58
24	Manufacture of Chemicals and Chemical Products	27.07	21.76	+ 5.31

¹⁶ Industry Code

IC ¹⁷	Industry Description	Average Real Profit Rate in per cent		Gap
		Rural Industries (3)	Urban Industries (4)	(3)-(4) =(5)
25	Manufacture of Rubber and Plastic Products	18.02	11.12	+ 6.9
26	Manufacture of other Non-Metallic Mineral Products	14.49	14.26	+ 0.23
27	Manufacture of Basic Metals	6.38	23.24	- 16.86
28	Manufacture of fabricated metal products except machinery and equipment	18.14	33.47	- 15.33
29	Manufacture of Machinery and Equipment N.E.C.	30.28	32.31	- 2.03
30	Manufacture of office, accounting and computer machinery	164.16	14.85	+149.31
31	Manufacture of Electrical Machinery and Apparatus N.E.C.	35.12	48.11	- 12.99
32	Manufacture of Radio, Television, Communication Equipment and Apparatus	18.53	15.88	+ 2.65
33	Manufacture of Medical, Precision and Optical Instruments	63.81	36.66	+ 27.15
34	Manufacture of Motor Vehicles, Trailers, Semi-Trailers	17.10	32.88	- 15.78
35	Manufacture of Other Transport Equipment	64.4	30.19	+ 34.21
36	Manufacture of Furniture, Mfg. N.E.C.	34.88	50.89	- 16.01
37	Recycling	0.66	23.34	-22.68
	All Industries	18.97	22.86	-3.89

Source: Computed using Time Series Data on Annual Survey of Industries (1998-99 to 2007-08)

2.2.2. Emerging Segments of the Rural Non-Agricultural Sector

Certain segments like manufacturing, construction, trade, hotels etc. and community, social and personal services have generated the bulk of the rural non-agricultural jobs, over the last few decades. In 1971-81, manufacturing, trade, hotels etc. and transport, storage and communications were the segments with the dominant shares of the rural non-agricultural workforce. In the manufacturing segment mineral-based, metal-based and chemical-based manufacturing units performed well while industries based on organic materials such as food, leather, cotton textiles and metal products did not do well (Bhalla, 1993a). In 1983, manufacturing had the highest share of 40 per cent of the rural

¹⁷ Industry Code

non-agricultural workforce followed by community, social and personal services with 26 per cent (Binswanger-Mkhize, 2012).

These trends showed variations post-90s. Manufacturing decreased from 32 per cent in 1993-94 to 29 per cent in 2004-05. Till 2004-05, the manufacturing segment had the highest share of the non-agricultural workforce, but thereafter it declined and shares of employment in construction and trade segments increased (refer Table 2-4). In 2009-10 share of manufacturing was 22 per cent and it declined to 17 per cent in 2016 (Basole, 2017). Increase in the number of workers per year in manufacturing dropped from 3.46 lakhs in 1983 to 1993-94 to 2.40 lakhs in 1993-94 to 2009-10 (refer Table 2-5).

Table 2-4 All-India Distribution of Workforce across Different Rural Non-Agricultural Segments (in %)

Segment	1993-94	1999-00	2004-05	2009-10
Mining and Quarrying	2.58	2.09	1.79	2.01
Manufacturing	32.46	31.15	29.47	22.32
Utilities	1.06	0.55	0.47	0.43
Construction	11.02	13.96	17.81	29.32
Trade, Hotels etc.	19.86	21.59	22.62	20.33
Transport and Communication etc.	6.71	8.66	9.11	9
Financing, Insurance, Real Estate and Business Services	1.36	1.52	1.76	1.7
Community, Social and Personal Services	24.96	20.49	16.98	14.89

Source: Papola and Sahu, 2012, Table 7, pp. 13

Construction's share, that was a mere 10 per cent in 1983 (Binswanger-Mkhize, 2012) improved to 11.02 per cent in 1993-94, 17.81 per cent in 2004-05 and jumped to 29.32 per cent in 2009-10 (refer Table 2-4). The absolute increase in the number of workers per year in the construction segment was 2.74 lakhs (from 1983 to 1993-94) to 15.5 lakhs (from 1993-94 to 2009-10) (Binswanger-Mkhize, *ibid*). Employment in the rural construction segment grew from 8.5 per cent per annum during 1993-94 to 2004-05 to 10 per cent from 2004-05 to 2009-10. This boom in rural construction coincided with the

implementation of the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS). It appears that the hapless peasant, the landless labourer, and all who were part of the surplus labour force in agriculture mostly moved to the construction segment. The rural construction segment proxied the role played by Lewis's urban industrial sector in a crude way, is possibly not a far-fetched conjecture. In Lewis's model, the modern, urban industrial sector absorbed surplus labour from agriculture. Second, it increased the agricultural wage, after the turning point was reached. In this case, it appears that the construction segment absorbed surplus labour from the agricultural sector, with a slide in the growth rate of agricultural output. Second, public works and construction activities under the aegis of MGNREGS pushed up real wages of unskilled workers in the rural agricultural and non-agricultural wages (Imbert and Paap, 2012; Nagaraj *et al.*, 2014).

In the post-90's the other segments with significant shares of the rural non-agricultural workforce were trade and community, social and personal services. Trade's share progressively increased from 19.86 per cent in 1993-94 to 20.33 per cent in 2009-10. This translated to an increase of 4.88 lakhs per year from 1993-94 to 2009-10 (refer Table 2-5). Share of rural non-agricultural workforce in community, social and personal services was significant but showed a declining trend. It declined from 25 per cent in 1993-94 to 17 per cent in 2004-05 to 15 per cent in 2009-10 (refer Table 2-4). Himanshu *et al.* (2011) found similar distribution of the rural non-farm workforce in 2004-05.

Table 2-5 All-India Shares of Incremental Workers (UPSS basis) across Rural Sectors/Segments

Sectors/Segments	Increase in Workers per year in Lakhs		Per cent Share in Incremental Workers	
	1983 to 1993-94	1993-94 to 2009-10	1983 to 1993-94	1993-94 to 2009-10
Agriculture and allied activities	26.33	0.01	61.58	0.05
Mining and Quarrying	0.49	-0.95	1.14	-3.56

Sectors	Increase in Workers per year in Lakhs		Per cent Share in Incremental Workers	
	1983 to 1993-94	1993-94 to 2009-10	1983 to 1993-94	1993-94 to 2009-10
Manufacturing	3.46	2.4	8.1	8.96
Utilities	0.22	-0.31	0.52	-1.14
Construction	2.74	15.5	6.41	57.88
Wholesale Trade	0.13	0.53	0.3	1.98
Retail Trade	3.14	4.35	7.34	16.24
Trade	3.26	4.88	7.64	18.23
Hotels and restaurants	0.45	0.81	1.06	3.04
Transport, Storage and Communication	1.42	3.47	3.33	12.96
Other Services	4.37	0.96	10.23	3.6
Non-agricultural Activities	16.43	26.76	38.43	99.95
All sectors	42.75	26.77	100	100

Source: Bhaumik, 2013, Table 7, pp. 361

2.2.3. Spatial Variations in Rural Non-Agricultural Workforce Size

Increase in rural non-agricultural employment has not been uniform across different regions of India, over the last few decades. Several scholars (Bhalla, 1993a; Chadha, 1997, cited in Unni 1998; Chadha, 2007; Himanshu *et al.*, 2011; Himanshu 2014, cited in Dev, 2017; Dev, 2017; Unni, 1991) have studied this spatial variation. Jatav and Sen (2013) found high shares of the rural non-agricultural workforce, in regions that have diverse characteristics. Agriculturally developed regions (like Punjab and Haryana), regions with moderate agricultural development (like whole of Kerala, large parts of West Bengal, some regions of Tamil Nadu and Karnataka) and regions that are not traditionally agriculturally developed (like western Rajasthan, Sikkim, northern part of Jharkhand, some parts of Jammu and Kashmir). This suggests that there is no unique

driver of this growth. They observe that agriculturally developed regions seldom had low levels of rural non-agricultural employment.

In 1977-78, Kerala was the only state with more than 25 per cent of its rural workforce in this sector. Employment shares in the rural non-agricultural sector grew since 1983, in nearly all states (Himanshu *et al.*, 2011). However, there were differences in the size of shares (refer Table 2-6) and its growth. Post-1993-94, the number of states with more than 25 per cent of employment share in the rural non-agricultural sector, progressively increased. By 1999-00 Kerala, West Bengal, Assam, Tamil Nadu, Haryana, Punjab, J&K and Himachal Pradesh figured in this group. In the period 1999-00 to 2004-05, there was a pronounced increase in the share of the rural non-agricultural workforce in Odisha. Between 2004-2005 and 2011-2012, the share of rural non-agricultural workforce increased in most of the states, including the states of Bihar, Assam, Rajasthan, Karnataka, Madhya Pradesh, Uttar Pradesh and Jharkhand (Himanshu, 2014, cited in Dev, 2017).

Some states like Kerala, West Bengal, Tamil Nadu, Punjab and Haryana consistently had relatively high shares of the rural non-agricultural workforce. Dev (2017) attributes this to the Green Revolution. He reinforces his claim by showing that states like Maharashtra, Karnataka and Madhya Pradesh, with low agricultural productivity, had relatively lower shares of rural non-agricultural employment. Chadha (2007) attributes the high shares in Kerala, West Bengal and Tamil Nadu to their prominent rural manufacturing segment that traditionally employed females in rural handicrafts. In these states, employment in the rural manufacturing segment varied from 13.2 per cent to 15.1 per cent in 1993-94 and from 12 per cent to 19 per cent in 2011-12 (refer Table 2-7). By 2011-12, Punjab

Table 2-6 Share of Rural Non-Agricultural Workers in Rural Workforce (in %)

1977-78\$	1983	1993-94	1999-00	2004-05*	2011-12#
Kerala (34.6)	Kerala (36.9)	Kerala (43.9)	Kerala (51.2)	Kerala (58.1)	Kerala (71)
West Bengal (24.4)	West Bengal (26.3)	West Bengal (36.4)	West Bengal (37.0)	West Bengal (37.3)	Tamil Nadu (52)
Tamil Nadu (22.0)	Tamil Nadu (25.1)	Tamil Nadu (29.6)	Assam (32.3)	Haryana (36.4)	West Bengal (48)
Punjab (18.5)	Haryana (22.3)	Haryana (28.1)	Tamil Nadu (31.7)	Tamil Nadu (34.8)	Orissa (39)
Haryana (18.3)	Orissa (20.8)	Punjab (25.4)	Haryana (30.2)	Punjab (33.3)	Bihar (34)
Andhra Pradesh (17.6)	Assam (20.0)	J&K (24.4)	Punjab (27.1)	Orissa (31.1)	Gujarat (26)
Uttar Pradesh (17.3)	J&K (19.8)	Gujarat (21.3)	J&K (27.0)	Uttar Pradesh (28.4)	Chattisgarh (16)
Bihar (15.3)	Andhra Pradesh (19.7)	Assam (21.2)	Himachal Pradesh (25.2)	Andhra Pradesh (28.4)	
Karnataka (15.2)	Punjab (17.4)	Andhra Pradesh (20.7)	Uttar Pradesh (23.6)	Rajasthan (27.2)	
Orissa (15.0)	Bihar (16.4)	Rajasthan (20.2)	Rajasthan (22.1)	Assam (25.3)	
Maharashtra (14.2)	Karnataka (15.5)	Uttar Pradesh (20.0)	Orissa (21.4)	Bihar (25.1)	
Gujarat (13.0)	Gujarat (14.8)	Himachal Pradesh (19.8)	Andhra Pradesh (21.2)	Gujarat (22.7)	
Himachal Pradesh (12.2)	Maharashtra (14.2)	Orissa (19.0)	Gujarat (19.6)	Maharashtra (20.1)	
Rajasthan (11.6)	Rajasthan (13.3)	Maharashtra (17.4)	Bihar (19.3)	Karnataka (19.0)	
Madhya Pradesh (8.6)	Himachal Pradesh (12.4)	Bihar (15.8)	Karnataka (17.8)	Madhya Pradesh (17.0)	
	Madhya Pradesh (12.8)	Madhya Pradesh (10.1)	Madhya Pradesh (12.8)		

Source: \$Unni, 1991; *Bhaumik, 2007; Chadha, 2007; # Dev, 2017

also had a two-digit share of the workforce in the rural manufacturing segment. The share of the workforce in construction also increased to two-digit figures in the states of Punjab and Haryana in 2011-12. The spectacular high shares of the rural non-agricultural workforce in Kerala: 58 per cent in 2004-05 (Bhaumik, 2007) and 71 per cent in 2011-12 (Dev, 2017) were due to a significant increase in the construction, wholesale and retail

trade and financial and insurance services segments. Increase in rural workforce shares also took place across similar segments in Tamil Nadu but the quantum of increase was

Table 2-7 All-India and Selected State-wise Distribution of UPSS Rural Workers (in %) across Industry Sections for the 50th and 68th Rounds¹⁸

State	Manufacturing		Construction		Wholesale/Retail Trade etc.		Transport and Storage		Financial, Insurance Activities		Community etc. services Note1	Services Note 2
	1993-94	2011-12	1993-94	2011-12	1993-94	2011-12	1993-94	2011-12	1993-94	2011-12	1993-94	2011-12
Haryana	5.2	9.8	6	14.3	6.7	6.5	4.8	3.6	0.3	3.1	13.1	6.0
Himachal Pradesh	3.9	4.1	8	15.3	3.5	3.2	1.1	3.4	0.2	4.7	6.5	7.4
J&K	5.3	8	9.1	20.3	3.7	5.7	4	2.7	0.8	2.1	11	9.5
Punjab	6.2	11	4.5	16.2	6.1	5.6	3.4	3.6	0.5	6.8	10	7.5
U.P.	6.7	8.6	2.3	13.4	4.6	5.5	1.7	2.6	0.2	1.8	5.9	4.5
Assam	2.3	5.5	0.8	6.6	7.3	12.1	1.5	3.2	0.3	2.2	8.7	6.7
Bihar	3.6	4.8	1.3	10.4	4.8	7.1	1.1	2.4	0.2	2.9	4.8	6.5
Orissa	6.1	9.6	2.1	12.3	4.8	6.0	0.8	2.4	0.1	2.2	5	5.7
West Bengal	15.1	19	2.8	8.4	8.4	6.4	3.2	3.5	0.5	4.2	8	5.9
Gujarat	10.4	8.3	2.7	4.3	3.2	4.8		2.8	0.4	1.4	4.8	3.9
M.P.	3.4	4.8	0.9	12.9	1.7	3.8	0.5	1.3	0.1	2.2	2.8	3.5
Maharashtra	5.2	5.9	2.5	5.2	3.2	4.2	1.2	2	0.4	2.8	5	2.1
Rajasthan	4.1	5.2	8.2	20.3	2.7	4.5	1.2	2.6	0.2	0.6	4.5	4.0
Andhra Pradesh	6.9	7.8	1.8	6.7	4.5	5.2	1	3.2	0.2	2.9	5.7	5.0
Karnataka	6.9	9.4	1.6	4.3	3.8	4.8	0.8	3.3	0.2	4.4	5.3	5.4
Kerala	13.4	12	6.4	18.5	10.2	11.1	4.6	8	1.2	15.3	10.2	9.9
Tamil Nadu	13.2	15	2.4	15.5	4.8	5.2	2.2	3.7	0.9	7.7	6.5	6.3
all-India	7.1	8.6	2.6	11.1	4.6	5.6	1.6	2.9	0.3	3.3	5.9	5.3

Source: Computed from NSSO 50th and 68th quinquennial surveys on Employment and Unemployment in India

smaller. Unlike Kerala and Tamil Nadu, West Bengal did not see a major expansion of its construction segment. The observed increase in rural non- agricultural employment across most states in 2011-12, was primarily driven by increased employment

¹⁸ Note1: Community etc. services was an industry section in the industry section nomenclature used in Report No. 409: Employment and Unemployment in India, 1993-94: NSS 50th Round but absent in the nomenclature of National Industrial Classification Key Indicators of Employment and Unemployment in India, 2011-12: NSS 68th Round

Note2: In the report, Key Indicators of Employment and Unemployment in India, 2011-12: NSS 68th Round distribution of workers as per National Industrial Classification 2008 is followed. National Industrial Classification 2008 introduced further activity classification. The activities Accommodation, Food Services; Education; Other Services and Public Administration were absent in Report No. 409, NSS 50th Round as it is based on an earlier National Industrial Classification. These new activity classifications have been clubbed together as Services

opportunities in the construction segment followed by wholesale and retail trade and transport and storage and financial services segments.

Bihar, Chattisgarh, Madhya Pradesh, Maharashtra, Karnataka were some of the states with low rural occupational diversification. Jatav and Sen (2013) attribute low shares of rural non-agricultural workforce in Maharashtra and Karnataka, to a well-developed urban non-agricultural sector that provided employment opportunities to rural job seekers. Varying factors such as economic backwardness, low agricultural productivity were responsible for low shares of rural non-agricultural workforce in the states of Madhya Pradesh, Uttar Pradesh, Chattisgarh, Maharashtra and Karnataka (Dev, 2017). Odisha, a poor state emerged as an exception due to expansion of construction activities.

2.2.4. Rural Employment Patterns

The changing rural employment pattern with increased rural occupational diversification has been commented upon by several scholars (Abraham, 2009, 2011; Chadha and Sahu, 2002; Chandrasekhar and Ghosh, 2007; Dev, 2017; Himanshu, 2011; Himanshu *et al.*, 2011; Jatav and Sen, 2013; Sundaram, 2004, 2007; Unni and Raveendran, 2007; Vaidyanathan, 1986). Table 2-8 gives the employment pattern of male and female workers in the self-employed, regular wage and casual categories across the rural sectors, in the period 1983 to 2004-05.

2.2.4.1. Self-Employment

The share of self-employed rural male workers declined sharply in the industry sector and showed a mild rise in the services sector in the period 1983 to 2004-05. Contrary trends were observed for self-employed rural female workers. There was a significant increase in its share in the industry sector, possibly due to the growth of women's self-

help groups. Their share declined in the services sector. There was a decline in growth in number of self-employed male workers and especially female workers from 2004-05 to 2009-10 (refer Table 2-9). Perhaps this decline is a fallout of better wage rates and increased employment opportunities for female casual workers. However, it needs to be corroborated with evidence.

2.2.4.2. Regular Wage Employment

Since the 90s, the bulk of rural regular wage male and female workers were employed in the services sector. For rural males, roughly half that share was employed in the industrial sector and that for rural females it was around one-fourth. In the period 1983 to 2004-05, there was a sharp decline in the shares of both male and female regular wage workers in the industry sector. The share of regular wage male workers also declined in the service sector. Himanshu *et al.* (2011) attribute the decline in employment in the regular wage category to a lack of growth in social services employment, since 1993. However, the share of rural female regular wage workers increased in the service sector in the said period. The number of regular wage rural female workers increased at the rate of 5.47 per cent from 1993-94 to 2004-05. This high growth rate of rural female workers in the regular wage category is perhaps due to the emergence of segments like trade, hotel and restaurant and financial, insurance activities, post-90s. In other words, segments that generally require employees with soft-skills.

Table 2-8 All-India Sector-wise Distribution (in %) of Rural Male and Female by Employment Status

		Rural Male			Rural Female		
		Self-employed	Regular	Casual	Self-employed	Regular	Casual
Primary	1983	63.2	4.3	32.6	54.7	1.2	44.1
	1987-88	61.4	4.2	34.4	56.7	2.5	40.9
	1993-94	60.4	1.8	37.9	50.8	0.5	48.7
	1999-00	58.1	1.9	40.1	48.5	1	50.5
	2004-05	63.1	1.4	35.5	56.6	0.5	42.9
Secondary	1983	50.4	30.4	19.3	52.6	18.4	28.9
	1987-88	48.1	29	22.9	51.3	17.9	30.8

		Rural Male			Rural Female		
	NSS	Self-employed	Regular	Casual	Self-employed	Regular	Casual
	1993-94	36.7	18.3	45	52.4	9.5	38.1
	1999-00	36.4	18.2	45.5	63.6	9.1	27.3
	2004-05	34.5	15.5	50	61.5	7.7	30.8
Tertiary	1983	na	na	na	na	na	na
	1987-88	na	na	na	na	na	na
	1993-94	54.9	34.1	11	56.3	31.3	12.5
	1999-00	52.4	34.5	13.1	50	37.5	12.5
	2004-05	57.7	32	10.3	50	44.4	5.6

Source: Abraham, 2009

2.2.4.3. Casual Employment

The share of the rural casual male workforce in the industry sector leapt from 19.3 per cent in 1983 to 50 per cent in 2004-05, implying a marked casualisation of the male workforce in the rural industry sector. Their share in the service sector declined. The rate of growth of casual male workers in the rural non-agricultural sector as a whole increased from 5.28 per cent (1993-94 to 2004-05) to 8.9 per cent (2004-05 to 2009-10), as evident from Table 2-9. We attribute this to a booming construction segment that generated casual employment.

The major share of rural female casual workers continued to be in agriculture. Their share registered a mild rise in the industry sector and a decline in the service sector, in the period 1983 to 2004-05. Overall the number of female casual workers grew at a faster pace (13.2 per cent) than male casual workers (8.9 per cent) from 2004-05 to 2009-10.

Several scholars studied the pronounced casualisation of the rural workforce post-90s. Himanshu *et al.* (2011) found that 75 per cent of the new jobs created after 1993-94 were in construction, trade, transport and communications, in other words, segments that create casual jobs. Similar trends were noted by Himanshu (2011), Chadha and Sahu (2002). For Chadha and Sahu (2002), overall increase in casual labour at the cost of self-

employed in rural India may imply a fall in cultivators and a rising population of landless agricultural labourers. They substantiate their argument using data from population *Census* that reveals an increase of the landless agricultural workforce from 16 per cent in 1961 to 32 per cent in 1991. Jatav and Sen (2013) largely attribute this growth of casualisation from 2004-05 to 2009-10 to MGNREGS. This claim is based on their study on the distribution of the casual labour force in public works and in other works, which showed that the growth rate of employment of male casual workers in public works was as high as 41 per cent and for females as high as 63.6 per cent.

Table 2-9 Average Annual Growth (in %) of Self and Wage Employment in Agriculture And Non-Agriculture (UPSS basis)

		Agriculture		Non-Agriculture		
		Self Employed	Casual	Self Employed	Casual	Regular Wage
Male	1983 to 1993-94	0.99	3	3.31	5.09	2.71
	1993-94 to 2004-05	0.82	-0.14	3.67	5.28	2.52
	2004-05 to 2009-10*	-0.9	1.9	0.6	8.9	0.7
Female	1983 to 1993-94	0.29	2.21	5.79	3.04	3.21
	1993-94 to 2004-05	2.12	-0.15	3.43	1.13	5.47
	2004-05 to 2009-10*	-6.0	-1.3	-5.2	13.2	0.9

Source: Unni and Raveendran, 2007;* Jatav and Sen, 2013

2.2.4.3.1. Subsidiary Status Employment

Increased casualisation of the rural workforce indicates lack of continuity of employment as well as income for a certain share of the rural workforce. The rise in subsidiary status workers across all employment categories in the rural non-agricultural sector corroborates the short-term nature of generated jobs (Unni and Raveendran, 2007). The growth rate of subsidiary status workers was 1.27 per cent in the self-employed category, 2.83 per cent in the casual category and 7.79 per cent in the regular wage category in the period 1993-94 to 2004-05.

The increase in subsidiary status female workers has been particularly high in the regular wage category (10.56 per cent for females and 4.94 per cent for males) in the period 1993-94 to 2004-05. Perhaps this is due to a rise in low skill jobs like packaging, labelling etc., which prefer female workers. A contrary trend was observed in the agricultural sector, where there was a decline in subsidiary status workers in the casual employment category, in the period 1993-94 to 2004-05. This possibly indicates that with the decline in the growth rate of agricultural output small jobs in this sector dried up.

2.2.5. Rural Wage Rates

Rural livelihood diversification, government stimulus to the rural labour market through its rural employment generation programmes, changes in patterns of employment and a decline in the performance of the agricultural sector are some of the changes that are impacting rural income. Several studies (Sen, 1998; Usami, 2011; Choudhury, 2011; Imbert and Paap, 2012; Nagaraj *et al.*, 2014; Gulati *et al.*, 2013, cited in Wiggins and Keats, 2014; Wiggins and Keats, 2014) reveal that rural wage rates of both male and female workers have been rising in India. Few field studies (Chandrasekhar, 1993; Bhalla, 2006; Rawal *et al.*, 2008; Bhaumik, 2009; Karmakar and Sarkar, 2013) in India have looked into the impact of diversification on levels of rural income.

2.2.5.1. Rural Income: Evidence from Field Studies

A common finding from most of the field studies is that rural workers employed in the rural non-agricultural sector earned more than their counterparts in the agricultural sector. Chandrasekhar's (1993) field study that spanned six villages in West Bengal, shows that a village (Magurmari) that was in an early phase of agricultural development and had the least per capita agricultural output among all the surveyed villages had a

relatively high per capita income (rupees 3483.50). Chandrasekhar attributes this to rural livelihood diversification. Bhaumik's (2009) field study spanning an advanced district and a backward district of West Bengal found that workers employed in the rural non-agricultural sector had higher total earnings. Karmakar and Sarkar's field study (2013)

found that for marginal, small and medium size-class farmers, the share of income from non-agricultural sources exceeded that from agricultural sources and the landless got their total income from rural non-agricultural sources. However, Rawal *et al.*'s (2008) findings based on a field study in undivided Andhra Pradesh do not corroborate that rural non-agricultural sector jobs were more remunerative.

Bhalla's (2006) field study discusses the steep spatial variations in rural income from rural enterprises in the states of Andhra Pradesh and Haryana. She found average earnings from rural enterprises in Haryana was as high as rupees 33,204 and that in Nalgonda, Andhra Pradesh was as low as rupees 14,766.

2.2.5.2. Rural Wages: Studies Based on Secondary Data

Studies based on secondary data also concur that real wage rates in the rural non-agricultural mostly exceeded that in the agricultural sector (Hazell and Haggblade, 1990; Lanjouw and Shariff, 2010; Jatav and Sen, 2013; Reddy, 2015). However, there were instances of real wages of unskilled labour being at par with real wages of agricultural labour (Usami, 2011) and real wages of male casual workers in MGNREGS being lower than casual agricultural workers (Jatav and Sen, 2013).

Rural real wage rates have been increasing for agricultural and non-agricultural work since the mid-70s for both rural male and female workers (Sen, 1998). Since, the late 90s rural real wage rates increased in both the sectors with some intermittent vacillations (Usami, 2011; Wiggins and Keats, 2014; Reddy, 2015). The rise in agricultural real wage

rates with declining performance of the agricultural sector was an outcome of tightening of the rural labour market with the growth of the rural non-agricultural sector. However, there are spatial variations in both levels and growth in rural wage rates. Punjab, Haryana, Kerala, Himachal Pradesh, Jammu and Kashmir emerged as the high wage rate states, Madhya Pradesh, Bihar, Orissa, Uttar Pradesh and Karnataka came across as the very low wage rate states and the rural wage rates in other states like Gujarat, West Bengal and Maharashtra figured in between (Usami, 2011; Reddy, 2015). It is observed that some of the high wage rate states had developed rural non-farm economies, high agricultural productivity and the reverse is true for the very low wage rate states.

Agricultural and rural non-agricultural real wage rates increased in most states during 1998-99 to 2004-05, showed a mild decline in 2005-06 to 2008-09 for most rural occupations in many states barring Andhra Pradesh and again improved after 2007-08 especially in the poor states of Bihar, Madhya Pradesh, Orissa and Uttar Pradesh (Usami, 2011). Findings however differ. Choudhury (2011), Binswanger-Mkhize (2012) and Jatav and Sen (2013) found that at the all-India level rural real wage rates improved in the period 2004-05 to 2009-10. In this period, rural real wages of male casual workers increased by 4.5 per cent and female casual workers by 6.2 per cent. Gulati *et al.* (2013, cited in Wiggins and Keats, 2014) found that agricultural real wages declined (-1.8 per cent) in the early 2000s and increased in the second half of 2000 (6.8 per cent). Even with these vacillations a trend of rising rural wages is discernible over the last few decades.

Scholars differ on the impact of MGNREGS on rural wage rates. Some estimates state that the increase in rural wage rates with implementation of the MGNREGS varied from 4 per cent to 8 per cent (Nagaraj *et al.*, 2014; Wiggins and Keats, 2014). However, the 64th Round NSSO Survey found earnings under MGNREGS to be roughly 12 per cent

higher than the average daily earnings of casual labourers (Imbert and Paap, 2012). Usami (2011) argues that the implementation of MGNREGS 2005 did not result in any significant rise in the wages of agricultural labourers and non-agricultural unskilled labourers.

Table 2-10 tabulates real wage rates of various rural occupations in the period 1998-99 to 2008-09 and Table 2-11 the real wage growth rates of some occupations in the rural economy. Our calculations on real wage rates and growth in the real wage rate of workers in rural industries show that rural industrial wage rates are lower than urban industrial wage rates; but better than wage rates of most other rural occupations.

Table 2-10 Rural Selected Occupation-wise Real Wage Rate, Urban Industrial Wage Rate (Base: 1986-87)

Period	Rural Agriculture				Rural Non-agriculture					Urban
	Plough	Sow	Transp-lant	Harvest	Carpenter	Blacksmith	Mason	Unskilled Labourer	Industrial Worker*	Industrial Worker*
1998-99	21.9	19.22	17.44	18.61	32.07	26.32	34.06	18.01	28.14	38.07
1999-00	22.35	19.84	17.79	18.97	32.99	26.98	34.89	18.34	28.99	39.55
2000-01	21.72	19.52	17.09	17.78	31.91	25.24	34.76	17.37	30.91	42.52
2001-02	22.26	19.87	17.63	18.1	33.01	25.68	35.88	17.77	31.33	40.62
2002-03	22.37	19.58	17.9	17.96	33.1	25.63	35.8	17.77	30.11	31.82
2003-04	22.18	19.63	17.95	18.11	32.57	25.47	35.64	17.77	30.94	42.14
2004-05	21.25	19.4	18.16	18.11	32.55	25.21	35.5	17.62	31.73	41.89
2005-06	21.35	19.17	18.3	18.17	32.31	25.06	35.12	17.5	31.51	41.62
2006-07	21	18.95	17.96	17.64	31.27	23.95	33.99	17.17	32.18	41.32
2007-08	21.82	18.93	17.79	18.04	31.16	23.58	34.22	17.54	32.8	42.26
2008-09	22.06	19.32	17.84	18.84	31.3	23.2	34.7	18.71		

Source: Usami (2011), * Computed using Time Series Data on ASI (1998-99 to 2007-08)

Agricultural operations and activities requiring unskilled labour had some of the lowest wage rates (refer Table 2-10). The rural industrial wage rate exceeded the highest paid agricultural occupation (ploughing) by 28 per cent to 53 per cent in the period 1998-99 to

2007-08. This corroborates Lewis's (1954) statement on the relationship and the gap between the wage rate of agricultural workers and the wage rate of industrial workers.

“Earnings in the subsistence sector set a floor to wages in the capitalist sector, but in practice wages have to be higher than this, and there is usually a gap of 30% or more between capitalist wages and subsistence earnings”.

Findings so far indicate that agricultural wage rate sets the wage floor in the rural economy. We shall capture this notion in our model in chapter 6. Agricultural wage rate not only sets the rural wage floor but also influences the rural industrial wage rate in our framework.

Table 2-11 Rural Selected Occupation-wise Real Wage Growth Rate

Period	Occupation	Real wage growth rate (in %)
1998-99 to 2008-09	Agricultural Worker (Harvesting)	0.38
	Unskilled Labourer	0.12
1998-99 to 2007-08	Industrial Worker	1.72

Source: Computed using Usami (2011), *Time Series Data on ASI (1998-99 to 2007-08)*

A review of factors influencing agricultural wage formation and its variation in rural India is germane at this juncture. A brief discussion follows.

2.2.5.3. Factors Impacting Wage Rates in Agriculture

Several studies (Osmani, 1988; P. Bardhan, 1984, cited in Osmani, 1988; K. Bardhan, 1977a, 1977b, 1977c; Binswanger and Rosenweig, 1984, cited in Osmani 1988, Lal, 1984 cited in Osmani, 1988) have revealed that there is no standard institutional mechanism of formation of agricultural wage rate in India and it depends on prevailing conditions. This challenged the stylized fact that emerged in early research in development economics that the supply curve of labour is horizontal in rural markets of poor, agrarian economies (Osmani, 1988). The studies discussed below reveal that a host

of criteria that vary with time and place impact agricultural wage rates and its formation in India.

Demand conditions, productivity, use of better practices in agriculture rather than subsistence or nutrition-based efficiency levels impacted agricultural wage rate of casual and permanent labourers in the state of West Bengal (Bardhan, 1979). The institution of labour-tying contracts that employ workers in the lean season to ensure labour availability in the peak season reduced inter-seasonal variations in wage rates (P.Bardhan, 1984; K.Bardhan, 1977a, 1977b, 1977c). Krishnaiah's (1998) study based in two villages, Aurapelle and Dokur of Andhra Pradesh, found that regular farm labour (RFL) contracts, a labour tying arrangement, fetched lower wage rates than agricultural labourers under the casual labour system. The cropping patterns, volume and duration of labour tying contracts impacted seasonal variation of wage rates (K.Bardhan, 1977a, 1977b, 1977c). Rodger (1975, cited in Bardhan, 1979) found that workers with a larger number of dependents drew a higher wage rate to maintain minimum nutrition and hence productivity, in the state of Bihar. This is contrary to Bardhan's (1984, cited in Osmani, 1988) findings that workers burdened with a larger number of dependents have a lower elasticity of supply and so get a lower wage rate. The agricultural wage rate was found to be lower in areas where employers' have greater monopsony power (Bardhan, 1979). Sen (1998) in his study on rural labour markets in the period 1977-78 to 1987-88 found that the observed rise in agricultural real wage rates was an outcome of all-India tightening of the agricultural labour market rather than agricultural prosperity. Agricultural wage rates increased with the implementation of the rural programme MGNREGS (Imbert and Paap, 2012; MGNREGA Sameeksha, 2012; Nagaraj et al, 2014).

The aforementioned discussion indicates that there are instances of market forces impacting agricultural wage rate in India. The degree of influence is decided by the levels of unemployment and underemployment. To keep matters simple, considering that agricultural wage rate is primarily determined by rural employment rate may be a fair enough approximation. This is what we consider in our theoretical framework.

2.2.6. Rural Monthly per Capita Expenditure and Consumption Pattern

Rural consumption expenditure indicates rural purchasing power. Rising rural wages lead to increase in demand and consumption of goods and services. The causation may run the other way also. Rising demand for goods and services may necessitate an increase in production capacity that could increase demand for labour and further push up the rural wage rate.

Some of the high wage states like Haryana, Punjab, Kerala have high rural monthly per capita consumption expenditure (refer Table 2-12), as well as a prominent rural non-agricultural workforce. Kerala had the steepest increase in rural monthly per capita expenditure during 1972-73 to 2004-05. After 1993-94, rural monthly per capita consumption expenditure in Kerala jumped to three digit figures. Table 2-12 indicates that even states (Assam, Bihar, Uttar Pradesh) with relatively low rural monthly per

Table 2-12 Rural Monthly Per Capita Consumer Expenditure (MPCE) (Rs.) at constant* prices

State	1972-73	1977-78	1983	1987-88	1993-94	1999-00	2004-05	% Growth 1973-2005
Andhra Pradesh	39.79	57.11	66.24	72.65	73.87	71.96	83.37	109.53
Assam	41.67	48.71	57.27	60.05	55.41	58.1	69.81	67.53
Bihar	41.2	56.23	55.48	65.45	59.35	66.69	67.89	64.78
Gujarat	51.7	60.53	69.4	66.02	70.68	81.42	79.33	53.44
Haryana	70.07	77.77	85.6	87.24	82.26	98.35	103.92	48.31
Karnataka	44.53	59.05	66.25	67.44	68.19	76.26	74.1	66.4
Kerala	42.19	65.14	75.53	83.67	82.74	105.58	121.73	188.53
Madhya Pradesh	40.72	53.47	60.37	66.61	65.51	64.74	67.24	65.13

State	1972-73	1977-78	1983	1987-88	1993-94	1999-00	2004-05	% Growth 1973-2005
Maharashtra	41.55	66.81	63.17	70.18	70.6	78.69	79.1	90.37
Orissa	34.96	41.76	43.55	49.22	53.1	54	57.39	64.16
Punjab	74.62	96.24	96.05	99.25	92.51	102.3	103.06	38.11
Rajasthan	51.98	96.31	80.66	77.12	76.1	81.3	80.38	54.64
Tamil Nadu	37.7	50.43	52.63	58.84	67.36	75.35	77.17	104.69
Uttar Pradesh	42.12	60.77	60.82	63.48	62.88	67.76	71.22	69.09
West Bengal	38.45	50.99	53.99	64.05	68.82	70.77	80.01	108.09
all-India	44.17	60.15	62.28	68.11	67.85	73.66	77.83	76.21

Source: Chand, 2007 Note1: Colour code used to indicate top five states in rural MPCE, % Growth in MPCE

Note 2: * adjusted for inflation using deflators derived from state specific poverty lines for each of the years.

capita consumption expenditure showed healthy rises during this period. This implies that a rising trend in rural monthly per capita consumption expenditure is an all-India phenomenon that is connected to changing rural consumption patterns.

NSSO Reports indicate that post-90s, consumption pattern of rural labourers' has changed with rising rural monthly per capita expenditure. Expenditure on food items decreased and that on non-food items increased during 1993-94 to 2011-12. In the non-food item category the highest share of spending was on miscellaneous goods and services, during 1999-00 to 2004-05. Since 2009-10, the share of rural spending on durable goods was comparable to the spending on clothing and bedding implying that the rural poor no longer only spend on food and clothing. High demand for non-agricultural products may have pushed up production of segments producing these goods and services.

The higher monthly per capita consumption expenditure (MPCE) classes in the rural economy showed significant increases in expenditure on cereals, milk and milk products, processed food, durables, consumer services and fuel and light. Changes in the purchasing power of the rural population in the post-90s have changed the demand patterns for both agricultural and non-agricultural produce.

2.3. Chapter Summary

The growth of the rural non-agricultural sector is a phenomenon that is noticeable not only in India; but several developing economies in Asia, Latin America and sub-Saharan Africa. Rising shares of the rural non-agricultural sector in the rural NDP, expansion of the rural non-agricultural workforce and rising profit rates of rural industries indicate that the rural non-agricultural sector in India is growing at a healthy momentum. This transformation of rural India is of import as the bulk of India's population and workforce live in rural India. Moreover, growth in rural non-agricultural employment props up the rural employment rate.

Some specific segments in the rural sector like construction, manufacturing, trade, transport, storage and communication are generating most of the jobs for the rural workforce. In India, there are regional variations in sizes of the rural non-agricultural workforce as well as rural income. It is generally observed that most agriculturally developed regions have a well- formed rural non-agricultural sector, whereas most economically backward regions have relatively low rural occupational diversification. In Kerala, the share of the rural non-agricultural workforce was as high as 71 per cent in 2011-12. Some of the other states with high shares of rural non-agricultural workforce are West Bengal, Haryana, Punjab and Tamil Nadu.

Increased rural occupational diversification has brought about a change in rural employment patterns. There has been a decline in the shares of the self-employed and regular wage workers and a leap in the share of casual workers in the rural industrial sector. In the rural services sector, however the major share of the employed workforce was in the self-employed category. During 2004-05 to 2009-10, the rate of growth of both male and female casual workers in the rural non-agriculture sector were as high as

8.9 per cent and 13.2 per cent respectively. This implies that most of the new jobs in the rural economy did not provide continuity of employment and income.

These developments in the rural economy have resulted in a rise in rural real wages. Although wages in the rural non-agricultural sector are higher than in the agricultural sector, they are still low compared to wages in urban industries. Improved rural purchasing power has brought about a change in rural consumption patterns. Rural consumption expenditure on non-food items increased in the period 1993-94 to 2011-12. The share of rural spending on durable goods has been comparable to spending on clothing and bedding, since 2009-10.

The next chapter explores the factors driving the growth of the rural non-agricultural sector in India. At the outset, we detail out frameworks that theorise the impact of agriculture's performance on the growth of the rural non-agricultural sector. This is followed by empirical analyses of various scholars, on the causes of the growth of this sector in India.

Chapter 3

Rural Occupational Diversification in India: Causes

3.1. Linkages between Agriculture and Non-Agriculture: Review of Selected Theories and Evidence

No single reason is driving the growth of employment in the rural non-agricultural sector across India (Chandrasekhar, 1993; Bhalla, 1993b; Jatav and Sen, 2013; Unni, 1991). There are instances of both distress induced growth and agricultural prosperity induced growth of the rural non-agricultural sector. The former is attributed to the low employment elasticity of a stagnating agricultural sector. The latter is arising either due to agricultural prosperity or due to improved rural connectivity, which increases demand for rural produce. Increased returns to the agricultural sector improve purchasing power. Hence, demand for rural goods and services increase.

It is evident from the foregoing discussion that the performance of the agricultural sector determines whether the expansion of the rural non-agricultural sector is growth-induced or distress-induced. Vaidyanathan's hypothesis (1986), and Mellor's postulate (1966, cited in Olmstead and Rhode, 2009) theorise these two aspects respectively.

In the context of a developing economy like India, Chandrasekhar's (1993) theoretical framework and analysis of several other scholars (Abraham, 2009, 2011; Bhalla, 1993b, Bhaumik, 2007; Binswanger-Mkhize and Hans, 2012; Himanshu, 2011; Himanshu *et al.*, 2011; Jatav and Sen, 2013; Lanjouw and Shariff, 2010; Sen, 1998; Srivastav and Dubey, 2002) provide an understanding of the causes driving growth of the rural non-agricultural sector in India.

Examination of linkages between the agricultural and non-agricultural sectors started as early as the 18th century. In the context of early America, Benjamin Franklin viewed these sectors as competitive whereas Alexander Hamilton viewed them as complementary. Hamilton's Report on Manufacturers dated 1791 states that "the aggregate prosperity of manufacturers and the aggregate prosperity of agriculture are intimately connected" (Olmstead and Rhode, 2009). He showed that agricultural prosperity enhanced the non-agricultural sector by providing cheaper raw materials, food for workers, larger markets for produce from the non-agricultural sector. This, in turn, created a larger market for agricultural products. However, in an open economy the inter-sectoral linkage is weak. Olmstead and Rhode (2009) point out that in an open economy agricultural prosperity and comparative advantage in agriculture slow down the development of the non-agricultural sector, as was observed in America's South. On the other hand, in a closed economy if demand for food follows Engel's Law then with agricultural prosperity the non-agricultural sector grows.

3.1.1 Mellor's Posit and Its Relevance in Developing Economies

Mellor's postulate (1966) also termed as Mellor's law is an extension of Hamiltonian views. The essence of Mellor's postulate is that increased productivity of technology-based farming leads to increased income, which results in agriculture-led rural livelihood diversification and a structural change in the economy. A "secular decline of the agricultural sector" takes place (Johnston and Mellor, 1961). Agriculture plays a role in economic development when *i)* Food consumption patterns follow Engel's Law that is the income elasticity of demand for food is less than 1 and declining; *ii)* There is a possibility of an increase in the output of the agricultural sector even with a constant or declining labour force. This posit was satisfied in 19th century Europe, the U.S.A. or in an Asian economy like Japan, as the rate of job creation kept pace with the rate of

growth of population. In contrast, in a developing country like India we do find there has been a sharp decline in agriculture's share in the nation's GDP over the last few decades; but more importantly the decline of the workforce in agriculture has just been moderate.

In India, the states of Punjab and Haryana are probable instances of Mellor's theory. Mellor (1976, cited in Lanjouw and Shariff, *ibid*) and Mellor and Lele's (1972, cited in Lanjouw and Shariff, *ibid*) linkages literature referred to rural areas in India that had attained Green Revolution and expanded the non-agricultural sector with farmers surplus capital and the increased demand for goods. Papola (1987, cited in Unni, 1991) found that in different states of India, the performance of the rural industrial sector "was broadly related with the levels of agricultural productivity and more closely with the growth rate of agricultural output". He showed that the former affects the latter through both direct impact (increased supply of raw materials to the latter and increase in demand for inputs and allied services) and indirect impact (increased consumption demand and generation of "investible surplus"). The indirect impact of the growth of agricultural output on the growth of rural industries was more pronounced. However, unlike developed economies the growth-induced expansion of the rural non-agricultural sector in Punjab and Haryana was not accompanied by a significant reduction in the size of the workforce in agriculture or in Mellor and Johnston's words a "secular decline" of the agricultural sector. Perhaps, Ishikawa's (1967, 1978, cited in Vaidyanathan, 1986) study on the impact of technology and institution on labour intensity in agriculture provides the answer. In the early stages of technological advancement, biochemical technology (irrigation, HYV, fertilizers) is land augmenting and requires more labour input per acre. On the other hand, mechanisation of operations (like the use of tractors, mechanized tillers etc.) is labour-displacing. When labour enhancing technologies (biochemical technology) compensate the outcome of labour displacing technologies (mechanisation

of operations), a sharp decline of the agricultural workforce does not take place although agricultural prosperity drives rural livelihood diversification.

In contemporary times, such Hamiltonian view that is the complementarity of the agricultural and non-agricultural sectors has been expressed by Indian economist Rakshit (2009). However, there is a stark difference in the socio-economic and historical conditions of the nations in which, Hamilton and Mellor and Rakshit's analysis of linkages are premised. Both Hamilton and Mellor conceive economies whose agricultural sector did not have supply constraints. Hence, the introduction of technology in agriculture lead to capital formation in agriculture, which eventually lead to the classical structural change and growth of the economy. This scenario is largely not true for developing Third World economies that are marked by lack of capital, inadequate infrastructure, imperfect markets etc..

Agriculture development induced growth of the rural non-agricultural sector did take place in India but mostly did not follow the path outlined by Mellor. The Indian case as available from literature is discussed in this section. Lerche (2013) provides a grim picture on agrarian transition in India. He states that India's slow, non-classical agrarian transition has been eclipsed by neoliberal globalization. It does not significantly assist the growth of the non-agricultural sector through a transfer of capital or creation of a rural market for industrial goods. Rather the generated surplus in agriculture has spawned few non-agricultural activities like money lending, setting up of agro-industries. Sankaranarayanan (1980, cited in Unni, 1991) found that the level of commercialisation of agriculture rather than agricultural prosperity impacts growth of the rural non-agricultural activities. Hazell and Haggblade's (1990) examination of state level and district level data of selected states reveals that for every one rupee of value added in

agriculture, rupee 0.64 of value gets added to the rural non-agricultural sector. He found that value added in the rural non-agricultural sector was 0.93 in Punjab and Haryana and 0.64 in Madhya Pradesh and Bihar. The impact of the multiplier was influenced by rural infrastructure, rural population density and per capita agriculture income. Chandrasekhar's (1993) seminal work on agrarian change and rural occupational diversification in West Bengal provides a non-linear relationship between agricultural prosperity and growth in rural non-agricultural development. His framework is discussed in section 3.1.3.

3.1.2 Vaidyanathan's Hypothesis

Vaidyanathan's (1986) postulate is known as the Residual Sector Hypothesis. It states that when rural workers cannot get employment in the agricultural sector they spill into rural non-agricultural activities. They take up such activities as a last resort. This is more prominent in places where rural traditional systems have not been able to take care of surplus labour in the agricultural sector and have given way to wage labour and commercialisation. It is obvious under such circumstances when rural labour supply is in excess rural unemployment rates will increase. The wage rates in the rural non-agricultural sector will largely be decided by the "extent of imbalance between labour supply and demand in the rural areas" (Vaidyanathan, 1986).

Vaidyanathan examined data (*Census*, 1971; *NSSO*, 1972-73) of fourteen states of India and found *i*) a significant positive relationship between rural unemployment rate and share of the rural non-agricultural workforce. He also examined data for the periods 1972-73, 1977-78, 1983-84 of sixteen states. He found that *ii*) changes in the ratio of rural non-agricultural employment to agricultural employment is positively correlated (the correlation coefficient was 0.87) with a change in rural unemployment.

Vaidyanathan advanced two propositions for establishing the validity of his hypothesis. His empirical observations that spanned the period from the early 70s to the mid-80s across fourteen states, got encapsulated in his first proposition that states that the rural unemployment rate (RUR) is positively related to the share of rural non-agricultural employment (RNAE). In other words, when the rural unemployment rate rises due to lack of employment opportunities in agriculture, then the labour force seeks employment in the rural non-agricultural sector out of distress. The eventual outcome is an increase in the size of the rural non-agricultural workforce and a decline in the rural unemployment rate. The second proposition states that RUR is negatively related to wage rate in the rural non-agricultural sector or the ratio of the wage rates in the rural non-agricultural sector and the agricultural sector. The second proposition is a fallout of the first proposition. When RUR is high the labour force joins the rural non-agricultural sector out of distress and they bring down the ratio of the wage rates.

3.1.2.1 Critique of Vaidyanathan's Hypothesis

The first proposition got validated by several scholars. Unni (1989, cited in Sen, 1998) and Dev (1989, cited in Sen, 1998) substantiated the first proposition using disaggregated data across several regions of India. It got validated by Singh (1989, cited in Bhalla, 1993b) in his study spanning the eastern districts of Uttar Pradesh.

Murty (2005) furnishes several reasons as to why the second proposition may not be valid even if the rural non-agricultural sector is residual in character. He cites that rural government schemes may stymie fall in rural wage rates and those pushed out of agriculture may get self-employed. In these scenarios there will be no impact on the prevailing wage rates. The view that Vaidyanathan's hypothesis cannot be tested using cross-section data has gained ground (Dev, 1990, Unni, 1991, Basant and Parthasarathy,

1991, cited in Murty, 2005; Visaria, 1995, cited in Murty, 2005). Unni (1991) and Dev (1990) were unable to test the second proposition as data on wage rates at the regional level were unavailable.

The other reason for the residual sector hypothesis not gaining ground, is the argument that the wage rates in the rural non-agricultural sector have been better than the agricultural sector. This implies that a move out of agriculture is for better quality employment rather than distress (Sen, 1998). Papola's (1991, cited in Sen, 1998) analysis based on NSS data revealed that all-India average wage of regular workers in the rural non-agricultural sector was 2.7 and 2.4 times the wage of regular agricultural workers in 1977-78 and 1987-88 respectively. The wage of casual rural non-agricultural workers was 40 per cent more than casual agricultural workers in both years. Bhalla (1991, cited in Sen, 1998) found that barring the segments construction, mining and quarrying, workers in other segments of the rural non-agricultural sector were better off than their counterparts in the agricultural sector. However, Sen (1998) points out that the data set used by Bhalla and Papola, do provide some contrary indications that reconfirm the residual character of the rural non-agriculture sector. Dev (1989, cited in Sen, 1998) found that agriculture was the sector with the highest poverty incidence at the all-India level in 1977-78 but at the disaggregated level this was true only in the states of Andhra Pradesh, Tamil Nadu and West Bengal. In the rest of the states, one of the industrial segments in the rural non-agricultural sector had the highest incidence of poverty. The identified segments were construction in seven states, mining and quarrying in three states and manufacturing in two states. In 1983 at the all-India level agriculture had the highest poverty; but it is evident from the state-wise data given by Bhalla (1991, cited in Sen, 1998) that this was true in Rajasthan, Madhya Pradesh and in the above-mentioned three states. However, by 1987-88 construction overtook agriculture, as the segment with

the highest incidence of poverty. This is no longer so as construction happens to be a prosperous segment. Sen (1998) remarks that barring the segments like electricity, gas, etc., (which generated regular jobs) the other segments of the rural non-agricultural sector, (which generated casual work) were residual in character. Sen (1998) also points out he does not agree with the argument that a sector with a higher wage cannot be a residual sector¹⁹.

Given these divergent views on Vaidyanathan's hypotheses, we look at other analytical frameworks in the subsequent sections. These studies examine other parameters to ascertain if the growth of the rural non-agricultural sector in many regions in India can be viewed as extensions of distress driven spill-over due to stagnation and low employment elasticity of the agricultural sector.

3.1.3 Chandrasekhar's Analytical Framework

Chandrasekhar's study (1993) on West Bengal explained the relationship between agricultural prosperity and growth in rural non-agricultural development with an inverted U-hypothesis, with farm labour productivity or output per capita on the X-axis and the share of non-agricultural employment on the Y-axis. For Chandrasekhar, the share of the workforce in the rural non-agricultural sector is determined by "simultaneous operation of both push and pull factors. Both sets of factors are discussed in terms of forces originating in agriculture" (Bhalla, 1993b). The level of agricultural development determines the demand for agricultural labour as well as demand for consumer goods, that is the produce of the rural non-agricultural sector.

Chandrasekhar (1993) identified three phases of evolution of this demand. The pre-Green Revolution phase of agricultural development is characterized by the low use of

¹⁹ Refer Sen (1998) for his arguments.

technology, low levels of productivity and low employment elasticity of agriculture. Then labour is pushed out from agriculture. At very low levels of agricultural income, demand for non-agricultural goods does not pick up, so the share of rural non-agricultural workforce remains low. As income grows and crosses a certain threshold value, rural non-agricultural activities start picking up and the share of its workforce increases.

In the early Green Revolution phase technology is land augmenting hence labour intensity increases and push from agriculture diminishes. Himanshu *et al.*'s(2011) empirical study showed that when agricultural growth rates recovered between 2004-05 and 2007-08, there was a decline in labour force shifts from the agriculture sector to the rural non-agricultural sector. As labour moves to agriculture with an increase in agricultural output, the share of the rural non-agricultural workforce further declines. A better performing agriculture sector increases demand for agricultural support services. Increase in demand for rural non-agricultural produce counters the decline in the share of the rural non-agricultural workforce. Chandrasekhar (ibid) says the overwhelming factor is decided by the social, historical and agro-climatic factors of that specific region. However, in this analysis he prefers to consider that as agricultural output increases more labour is pushed towards agriculture. Thereby the share of the rural non-agricultural workforce declines.

In Green Revolution regions that are marked by low levels of adoption of labour displacing technology, agriculture continues to have the greater share of the rural workforce. Whereas in regions in the matured Green Revolution phase as witnessed in Punjab, technology becomes labour displacing. The share of the rural non-agricultural workforce increases with an increase in agricultural output per capita. Then the inverted-U takes an upward turn.

Sen (1998) and Sen and Ghosh (1993, cited in Sen, 1998) empirically validated Chandrasekhar's (ibid) analytical framework. Sen (1998) used state-wise data from NSS rounds 27, 32, 38 and 43 to plot a scatter between the person day employment in non-agriculture per rural person and agriculture value-added per rural person. He obtained a pattern that agreed with Chandrasekhar's framework. Sen and Ghosh (ibid) also performed a regression analysis using time series and pooled cross-section data across NSS rounds and across states. They found that agricultural output trends do have the hypothetical shape, in line with Chandrasekhar's argument. When the agricultural sector performed well there was a shift from rural non-agriculture to agriculture. Based on the correlation coefficient between growth rates of agricultural employment and rural non-agricultural employment, Bhaumik (2002, cited in Jatav and Sen, 2013) states that whenever employment in the agricultural sector declined, employment in the rural non-agricultural sector increased. This he found both at the all-India level and state level. His finding reinforces Chandrasekhar's claim as well as Vaidyanathan's hypothesis.

3.1.4 Distress Driven Growth: Other Findings

Some studies (Abraham 2009, 2011; Bhaumik, 2007; Himanshu, 2011; Himanshu *et al.*, 2011; Jatav and Sen, 2013) besides Vaidyanathan's (1986) claim that the growth of the rural non-agricultural sector in India is distress driven. They examine parameters other than those specified in Vaidyanathan's proposition. Abraham, (2009, 2011); Himanshu, (2011); Himanshu *et al.*, (2011) base their analysis in a period (1999-00 to 2004-05) of agrarian crisis to justify their claim.

Himanshu *et al.* (2011) analysed employment trends emanating from the 61st Round (2004-05) of NSSO Survey when there was a pronounced spurt in Labour Force

Participation Rate²⁰ (LFPR). All this happened during the period 1999-00 to 2004-05 that was marked by agrarian crisis, a decline in GDP growth rates in agriculture as well as in overall GDP. In his study on agriculturally distressed and non-distressed regions²¹ he found that share of both male and female workforce in the rural non-agricultural sector was higher in the distressed regions and so was unemployment. He argues that rise in Work Force Participation Rate²² (WFPR) and LFPR of the older population, females of all ages, children and adolescents in the age group of 10-19 years and stagnating growth rates of rural wages, between 1999-00 and 2004-05 signal that expansion of the rural non-agricultural sector was agricultural distress induced. Abraham's claim is supported by Himanshu (2011). He points out that the rise in female unemployment rates and fall in growth in wage rates for regular and casual workers indicate distress-driven growth of rural non-agricultural employment.

Jatav and Sen (2013) uses the parameters, extent of landlessness among rural households, land available per household, rural dependency ratio and rural usual unemployment rates to establish the same. Decline in self-employment in the agricultural sector and rise in casualisation in both the rural sectors made them infer that there has been "dispossession of land-based livelihoods". Their distress-driven hypothesis was further reinforced, when the official data revealed that 52.82 per cent of the usually employed rural non-agricultural workers, who changed their industry in 2011-12 had earlier belonged to the agricultural sector. Moreover, given the poor asset base of this

²⁰ Labour Force Participation Rate (LFPR) is defined as the number of persons in the labour force per 1000 persons (Source: NSSO).

²¹ The Expert Group on Agricultural Indebtedness formed under the behest of ministry of finance, government of India; and headed by R Radhakrishna had identified 100 distress affected districts in the country. GoI (2007). The criteria for identifying the distressed and less developed region were as follows: the list includes the 31 distressed districts identified by the government, where the prime minister's special rehabilitation package is being implemented. The remaining 69 districts have been included in the following criteria: (1) the district ranks low on the three-year average land productivity for 2001-02 to 2003-04, (2) the credit-deposit ratio of the district is less than 60% for 2006, (3) the proportion of urban population in the district is less than 30% in 2001 (Source: GOI, 2007).

²² Work Force Participation Rate (WFPR) or Worker Population Ratio (WPR) is defined as the number of employed persons per 1000 persons (Source: NSSO).

sector, one is likely to infer that the rural non-agricultural sector is growing out of distress in the rural economy.

Bhaumik (2007) observes that post-90s, three backward states of India registered the highest three growth rates in rural non-farm employment. They were Bihar (6.24 per cent), Orissa (6.20 per cent) and Madhya Pradesh (6.02 per cent). In these agriculturally backward regions the growth of the rural non-agricultural sector appears to be distress induced.

3.1.5 Growth of the Rural Non-Agricultural Sector: Other Factors

3.1.5.1 Increase in Public Expenditure

Increases in government employment in rural areas, public expenditure in rural schemes and investment in rural public infrastructure promoted the growth of the rural non-agricultural sector. Sen (1998) found that in the period 1977-78 to 1987-88, 5.53 million government jobs were generated in the rural areas of which, 3.2 million were regular jobs and 2.33 were casual jobs. In the more recent past Binswanger-Mkhize (2012) found that before the commencement of the Eleventh Plan, public expenditure on rural programs increased. In 2012 rural public expenditure was around rupees 158,000 crores. This resulted in increased rural non-agricultural employment and boosted rural purchasing power.

Srivastav and Dubey (2002) show that the non-agricultural sector in rural areas expands with increased urbanisation. They found that as one moves from less urbanised to more urbanised regions, the level of rural non-agricultural activity increases due to improved rural roads and rural literacy. This implies that public expenditure on building infrastructure improves urbanisation and promotes the growth of this sector.

3.1.5.2 Increase in Private Investment

As mentioned earlier, the rural manufacturing segment in India is mostly dotted with own account enterprises (OAE) and small establishments. These have mushroomed with the formation of private investible capital. Lanjouw and Shariff (2000) remark that imperfections in the rural credit market and the nascent stage of rural credit institutions in developing economies make family capital the main source of finance for small enterprises.

Raj (1976, cited in Unni, 1991) found that regions in India, which registered moderate to high rates of growth of agricultural output had conditions that favoured widespread and fast-paced growth of small-scale industries, in line with Mellor's hypothesis. Papola (1987, cited in Unni, 1991) observed that agricultural productivity and growth in agricultural output improves levels of investible surplus in existing rural industries that go towards increasing the efficiency of existing industries and spawns new ones. Upadhyay's (1988) study dwells on the emergence of a new business class out of the capitalist farmers of coastal Andhra Pradesh. She finds that increase in agricultural yield resulted in the accumulation of investible surplus with the wealthy farmers of coastal Andhra Pradesh and Kongunad. The farmers invested the agrarian surplus in trade and the mercantile surplus in business. The presence of traditional merchant communities like the Komatis and Marwaris prevented the wealthy farmers gain complete control of the rural economy. It promoted the flow of farmer's surplus to other sectors of the economy. Thus, the virtuous cycle emanating out of farmers' surplus lead to the growth of the rural non-agricultural sector.

Based on Vijverberg (1988, cited in Lanjouw and Shariff, 2000) and Banerjee (1996, cited in Lanjouw and Shariff, 2000) findings, Lanjouw and Shariff (2000) state that a

part of these enterprises gets set up in the rural economy due to an absence of alternative opportunities for investment. Banerjee and Munshi's (2000, cited in Lanjouw and Shariff, 2000) study spans the knitted garment industry in Tirupur in Tamil Nadu. This industry emerged in the mid-1980s and accounted for 70 per cent of exports of knitted garments from India. It is primarily owned by the Gounder caste, which is traditionally an agricultural caste. They find that the Gounders, who have less experience and ability in this industry when compared with the migrant castes compensated for this gap by investing more than the migrant castes. This they also attribute to lack of other investment opportunities for the Gounders, who amassed a significant amount of capital in agriculture.

Harriss-White's (2008) study finds the growth of rice mills in the rice-bowl districts of Birbhum and Bardhaman in West Bengal are linked to the siphoning of agricultural surplus. The rice mills are run by entrepreneurs, who exercise control over the shipping of rice grain from farm to metropolitan markets by providing money advances to small and marginal farmers. Thus, by doubling up as money lenders, the entrepreneurs have devised effective means to transfer capital from the agricultural sector to their own ventures in the rural non-agricultural sector, without getting engaged in farming.

3.2 Chapter Summary

Different factors (prosperity of the agricultural sector, low employment elasticity of the agricultural sector, increase in government spending on the rural economy, private investment etc.), as elucidated above are driving the expansion of both output and workforce size of the rural non-agricultural sector in India. There are instances of both agricultural growth induced expansion (Mellor) and distress induced expansion (Vaidyanathan) of the rural non-agricultural workforce, in India. Chandrasekhar's (1993)

framework provides a more nuanced explanation of the change in rural non-agricultural employment with the evolution of agriculture. It uses an inverted-U to explain distress-induced growth when agriculture is in an early phase of development and agricultural prosperity induced growth, when agriculture has attained the Green Revolution stage.

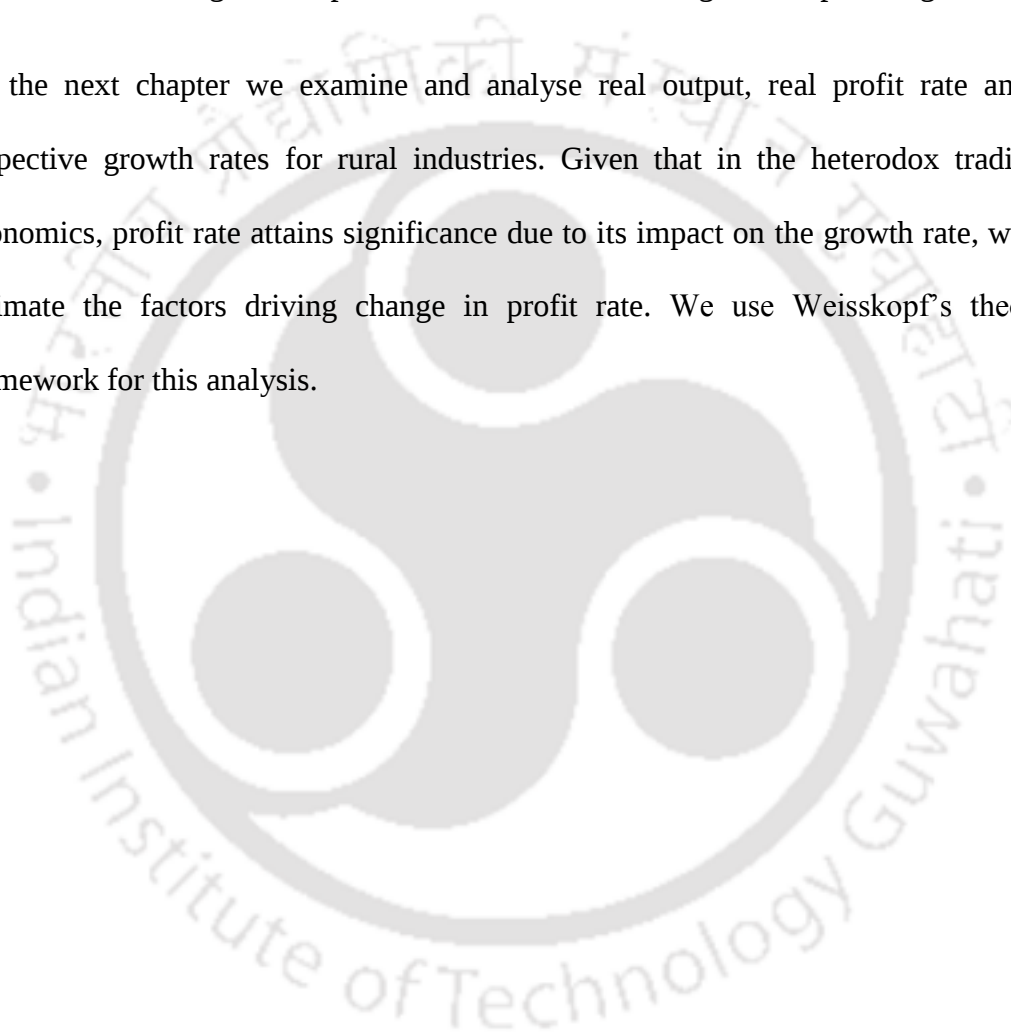
Papola (1987) finds that the indirect impact (increase in consumption demand and formation of investible surplus) of agricultural growth on the expansion of the rural non-agricultural sector to be more pronounced than the direct impact (triggering of forward and backward linkages). Sen (1998) and Binswanger-Mkhize (2012) have found that an increase in public expenditure on the rural economy also promoted the growth of the rural non-agricultural sector.

In the recent past, distress induced increase in rural non-agricultural sector employment seems to have gained currency with slide in performance of agriculture, increase in LFPR of old men, women and children in the period 1999-00 to 2004-05, increase in unemployment, landlessness etc.. Jatav and Sen (2013) point out that the process that is driving growth of the rural non-agricultural sector has a bearing on the extent of casualisation of the workforce, rural wage outcomes and quality of produce. Distress driven growth and increased casualisation (as discussed in Chapter 2) of the rural non-agricultural sector in India, reinforces the issue of inadequacy in the number and quality of rural jobs.

As articulated before, this research attempts to assess growth of rural industries through analysis of its profitability trends. Profit-led growth is implicit in Mellor's hypothesis that the surplus (profits) in agriculture leads to the growth of the rural non-agricultural sector. The distress-induced analysis of growth of the rural non-agricultural sector examines the change in the workforce size. These theories are capturing the growth of

this sector due to factors external to this sector. We attempt to analyse the profits generated within a segment of this sector and show how investment of surplus plays a role in furthering growth. In Mellor the prosperity is rooted in the agricultural sector, which leads to growth of the rural non-agricultural sector. In our profitability analysis, the profit of a segment of the rural non-agricultural sector is examined. This helps us to get an understanding of how parameters intrinsic to the segment impact its growth.

In the next chapter we examine and analyse real output, real profit rate and their respective growth rates for rural industries. Given that in the heterodox tradition of economics, profit rate attains significance due to its impact on the growth rate, we try to estimate the factors driving change in profit rate. We use Weisskopf's theoretical framework for this analysis.



Chapter 4

Profitability Analysis of Rural Organised Manufacturing Industries

4.1 Profit Rate and Growth in Output: The Relationship

It is assumed in mainstream economic theory and in Marxist literature that profit maximization is the sole motive of capitalist firms. Profit is the *raison d'être* of all economic activities driven by the motive of profit maximization. This is true for all capitalist enterprises' situated in a market economy. This research focuses on rural organised²³ manufacturing industries of India, which are essentially capitalist enterprises, focusing on profits. Our empirical analysis concentrates on the growth of this segment by examining the profitability of these industries. This is premised on the simple relationship provided by Pasinetti²⁴ (1962) between the profit rate and the growth in output.

Typically, in a capitalist economy, investment in capital stock is guided by the capitalist's profit expectation, which in turn is determined by the average rate of profit (Weisskopf, 1979). A rising profit rate indicates increasing returns to capital. This not only attracts new investments, but also results in the expansion of capacity of existing industries due to increase in the capitalist's savings (Balakrishnan and Kumar, 2003; Basu and Das, 2016a). Basu and Das (ibid) analysed the impact of profit rate on short-

²³ These have been defined as manufacturing firms which, either (a) use power and employ more than 10 workers, or (b) do not use power and employ more than 20 workers.

²⁴ The equilibrium condition in the goods market or the IS relation gives us that investment is equal to savings. S is savings, I is investment, π is profit, R is profit rate, K is capital stock, s is the propensity to save, Y is output, g is the long-run steady state growth rate.

$$S = I$$

$$S = sY = I = s\pi \quad (\text{Refer Pasinetti, 1962, pp.272, on the assumption only capitalists save})$$

$$\pi = \frac{S}{K} = \frac{I}{K}$$

$$R = \frac{\pi}{K} = \frac{1}{s} \cdot \frac{S}{K} = \frac{1}{s} \cdot \frac{I}{K} = \frac{1}{s} \cdot \frac{dK}{K} = \frac{1}{s} \cdot g, \text{ as } \frac{dK}{K} = \frac{dY}{Y} = g$$

Hence, a decline in R , will result in a decline of g .

run and long-run investments in India's organised manufacturing sector. They found that profit rate impacts investment in the long-run through improvements in output to capital ratio and profit share. In other words, technology advancements and improvements in internal finance available to capitalists due to rising profit rates improve investment.

In contrast to the heterodox macroeconomic tradition, which we have been referring to; if we consider the neoclassical growth framework, Solow's growth theory provides us with an explanation on how technological progress and rate of growth of labour force determine the growth of aggregate output in the economy in the long-run (Ray, 2011). Undoubtedly, the precursor to any technological progress has to be an investment in capital stock (both physical and human). Improved levels of profit rate bring about fresh investments in capital stock. This results in capital accumulation which, eventually leads to technical progress in the long-run, thereby sustaining the growth of output in the economy. Thus, synthesizing the centrality of profit (in heterodox tradition) with the centrality of technical progress (of neoclassical tradition) is not as far-fetched as it may appear.

On the other hand, a declining profit rate brings about an economic crisis. The link between the profit rate and economic crises²⁵ has been investigated over the last few decades in the heterodox economics literature. In his seminal work, Weisskopf (1979) elucidates how a decline in the profit rate brings about an economic crisis. A fall in the average profit rate implies that the profitability of new investment is likely to fall and this acts as a deterrent to further investments. Eventually this could throw the economy in a crisis by impacting levels of output, employment and wages. The discussion on the

²⁵ Capitalist economies have periodically faced economic crises that have had a global impact. Such a crisis is termed as a *general crisis* in literature. It is marked by long periods of stagnation, stagflation that has a bearing not only on the economic sphere but also on the social and political spheres of the economy. Besides *general crisis*, economies also undergo *partial crisis* that is generally event driven and erratic in occurrence and *business cycles* that are cyclical fluctuations in the economy's output (Shaikh, 1978).

central role profit rate plays in the functioning of capitalist macro economies has spawned a rich body of literature (Weisskopf, 1979; Shaikh, 1978, 1987; Boddy and Crotty, 1975; Basu and Vasudevan, 2013), that concretise the Marxian crisis theory. The focus of this body of literature has been an examination of the empirical evidence to understand profitability trends in capitalist economies. They decompose the profit rate to identify factors driving variations in profit rate. They explain profit rate linked crises in capitalist economies on the basis of Weisskopf's empirical interpretation of the Marxist framework to a price equivalent form from the value form²⁶. In short, they have provided the empirical analyses of the crisis of capitalist economies.

Profitability analysis studies have been also extended to developing economies (like Brazil, India), which have pockets of capitalist mode of production as in the organised manufacturing sector (Sau, 1989; Felipe and Kumar, 2010; Basu and Das, 2015, 2016a). Sau (1989) argues that India qualifies as an underdeveloped capitalist economy given the presence of a “relatively, strong industrial bourgeoisie”, a labour force in the organised sector, whose size is comparable to those in developed countries and the fact that “... the top decile of its population constitutes a powerful consuming class”. Basu and Das's (2015) rationale for extending profitability analysis studies to India's organised manufacturing sector in India is its size and output, which cannot be overlooked. “In 2012-13, the organised manufacturing sector, a subset of the capitalist sector in India had 222,120 factories employing 10 million workers. In the same year, it produced a net value added of 8602 billion Indian rupees (about 139 billion US dollars) that accounted for about 10 per cent of Indian GDP” (Basu and Das, *ibid*). As mentioned earlier in chapter 1, existing studies (Sau, 1989; Felipe and Kumar, 2010; Basu and Das, 2015, 2016a) on India's organised manufacturing sector do not provide industry-wise rural and

²⁶ Refer Appendix 2, A2-1 for Weisskopf's translation of the Marxist framework to a price equivalent form.

urban break-up of profitability trends. In this chapter we address this gap. We empirically analyse levels and growth of profits, the profit rate and output of the rural organised manufacturing segment. Definitions of variables used for analysis are provided in Appendix 1, Table A1-1.

4.2 Profits, Profit Rate and Output: An Empirical View from India's Rural and Urban Organised Industries

4.2.1 Profits

Profit is the surplus that resides with the capitalist class after making payments to contributors to production, including labour. Literature provides multiple definitions of profit. The Marxist definition of profit is the broadest: profit here is defined as that part of income, which is left with the capitalist after he has paid the working class (the productive labour). In terms of *ASI* data definitions, the Marxist value of profit (π_m) can be written as, (net value added - monetary remuneration for workers - provident fund and welfare expenses to workers). Weisskopf's (1979) theoretical framework for profit rate decomposition analysis is based on the Marxist definition of profit. We have followed the same definition for profit rate decomposition analysis. *ASI* provides a much narrower definition of profit: profit (π_n) is defined as (net value added – total emoluments – rent paid – interest paid). In other words, the *ASI* definition is the capitalist's income after he has paid workers, supervisors, the rent and interest.

In our analysis we have used the deflated²⁷ value of π_n as we wanted to construct an empirical picture, in terms of *ASI* data²⁸. However, at the aggregate level the profit rate has been calculated using both the definitions of profit. This was done to examine if the results change with alternative definitions.

²⁷ To remove the effect of inflation, the nominal value is divided by the price index to arrive at the deflated or real value.

²⁸ Refer Appendix 3, Table A3-2 for values of real profit of rural and urban industries.

4.2.2 Profit Rate

Real²⁹ profit rate, R (hereafter referred to as profit rate) is the real profit income over a period divided by the real stock of capital at the beginning of the period. For a quick assessment of how organised manufacturing industries fared in the rural sector vis-à-vis the urban sector, we computed the industry-wise average profit rate³⁰ for the period 1998-99 to 2007-08 (Table 4-1a).

The average profit rate of the industries in the rural segment varied from 0.66 per cent in the recycling industry (industry code 37) to 164.16 per cent in the office, accounting and computer machinery industry (industry code 30). In the urban sector, the average profit rate varied from -0.62 per cent in the textile manufacturing industry (industry code 17) to 239.71 per cent in the tobacco manufacturing industry (industry code 16). On the whole, a greater number of urban industries (14/23) registered higher profit rate in the study period (Table 4-1a, column 5), implying that more number of urban industries had higher returns to capital compared to rural industries. The other non-metallic mineral products manufacturing industry (industry code 26) registered comparable average profit rates in both the sectors. A steep gap in the average profit rates between the rural sector and the urban sector is observed for the tobacco products industry (industry code 16) and the office, accounting and computer machinery (industry code 30) manufacturing industries. Most industries (15/23 in the rural sector and 13/23 in the urban sector) registered an average profit rate in the range $0\% \leq R_a \leq 30\%$ (refer Table 4-1b). Mostly similar industries in the rural (6/23) and urban sectors (8/23) had an average real profit rate in the range $30\% < R_a \leq 100\%$. One industry each in the rural (office, accounting and computer machinery, industry code 30) and urban (tobacco products manufacturing)

²⁹ Refer Appendix 1, Table A1-2 for deflator values (Base Year: 2004-05)

³⁰ Average profit rate is arithmetic mean of year-to-year real profit rates over the study period

sectors registered an average profit rate greater than 150%. The textile manufacturing industry (industry code 17) in the urban sector is the only industry that incurred a loss in this period.

At the aggregate level, the average profit rate (refer Table 4-1a) of urban industries (22.86 per cent) exceeded that of rural industries (18.97 per cent). The above was about average profit rates in industry segments when averaging is done across the years. An alternative way to analyse the data would be to make a year-wise comparison.

Table 4-1a Average Real Profit Rate of Urban and Rural Industries (1997-98 to 2007-08)

IC ³¹	Industry Description	Average Real Profit Rate in per cent		Gap
		Rural Industries (3)	Urban Industries (4)	(3) - (4) = (5)
15	Manufacture of Food Products and Beverages	12	29.85	- 17.85
16	Manufacture of Tobacco Products	126.93	239.71	-112.78
17	Manufacture of Textiles	11.46	-0.62	+ 12.08
18	Manufacture of Wearing Apparel	25.01	40.16	- 15.15
19	Tanning of Leather	20.71	23.54	- 2.83
20	Manufacture of Wood, Cork, Straw, Plating Material Products	10.6	12.55	- 1.95
21	Manufacture of Paper and Paper Products	2.45	11.94	- 9.49
22	Publishing, Printing and Reproduction of Recorded Media	24.54	27.39	- 2.85
23	Manufacture of Cork, Refined Petroleum Products and Nuclear Fuel	49.52	21.94	+ 27.58
24	Manufacture of Chemicals and Chemical Products	27.07	21.76	+ 5.31
25	Manufacture of Rubber and Plastic Products	18.02	11.12	+ 6.9
26	Manufacture of other Non-Metallic Mineral Products	14.49	14.26	+ 0.23
27	Manufacture of Basic Metals	6.38	23.24	- 16.86
28	Manufacture of fabricated metal products except machinery and equipment	18.14	33.47	- 15.33
29	Manufacture of Machinery and Equipment N.E.C.	30.28	32.31	- 2.03
30	Manufacture of office, accounting and computer machinery	164.16	14.85	+149.31
31	Manufacture of Electrical Machinery and Apparatus N.E.C.	35.12	48.11	- 12.99
32	Manufacture of Radio, Television, Communication Equipment and Apparatus	18.53	15.88	+ 2.65

³¹ Industry Code

IC ³²	Industry Description	Average Real Profit Rate in per cent		Gap
		Rural Industries (3)	Urban Industries (4)	(3) - (4) = (5)
33	Manufacture of Medical, Precision and Optical Instruments	63.81	36.66	+ 27.15
34	Manufacture of Motor Vehicles, Trailers, Semi-Trailers	17.10	32.88	- 15.78
35	Manufacture of Other Transport Equipment	64.4	30.19	+ 34.21
36	Manufacture of Furniture, Mfg. N.E.C.	34.88	50.89	- 16.01
37	Recycling	0.66	23.34	-22.68
	All Industries	18.97	22.86	-3.89

Source: Computed using *Time Series Data on ASI* (1998-99 to 2007-08)

A year-wise comparison of profit of profit rates of industries in the rural and urban sectors shows that in the periods 1998-99, 1999-00, 2001-02, 2003-04, 2004-05, 2005-06 and 2007-08 a greater number of urban industries had a higher rate of profit than its rural counterpart; whereas in the periods 2000-01, 2002-03 and 2006-07 a greater number of rural industries had a higher rate of profit than its urban counterpart³³. It is noted that few rural industries (industry codes 22, 23, 26, 32, 36) showed a rising profit trend 2003-04 onwards. It is difficult to decipher a profit rate trend at the disaggregated level as profit rates of industries have been diverse and vacillating³⁴.

Table 4-1b Grouping of Industries according to Average Profit Rate (R_a)

Avg. Profit Rate	$R_a < 0\%$		$0\% \leq R_a \leq 30\%$		$30\% < R_a \leq 100\%$		$100\% < R_a \leq 150\%$		$150\% < R_a$	
Sector	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
IC ³⁵		17	15,17-22,24-28,32,34,37	15,19-27,30,32,37	23,29,31,33,35,36	18,28,29,31,33-36	16		30	16
No. of industries in each range in each of the sectors		01	15	13	06	08	01		01	01

Source: Derived from Table 4-1a.

A look at variation in profit rate at the aggregate level (Figure 4-1a) during the study period, reveals that the profit rate of organised manufacturing industries in both the

³² Industry Code

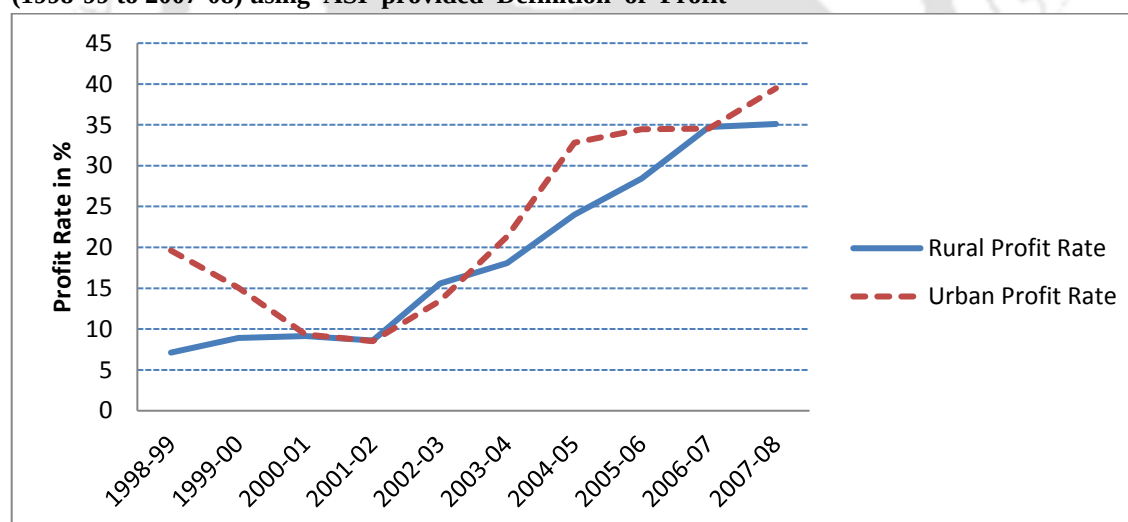
³³ Refer Appendix 3, Table A3-4

³⁴ Refer Appendix 3, Table A3-3a and A3-3b

³⁵ Refer Appendix 3, Table A3-1 for industry description

sectors shows rising trends. The aggregate profit rate of rural sector industries increased in the period 1998-99 to 1999-00 and thereafter remained flat, until 2001-02. Post-2001-02 it has been steadily climbing. In the urban sector, the aggregate profit rate declined in the period 1998-99 to 2001-02 and increased post-2001-02. It appears from the data that although the average profit rate of urban industries is higher, it has not been as steady as that of rural industries. Similar profit rate trends were exhibited for both the sectors (refer Figure 4-1 b) when we adopted the Marxist definition of profit for profit rate computation. As expected average aggregate profit rate values were higher using this definition. It was 44.34 per cent for urban sector industries and 31.32 per cent for rural sector industries.

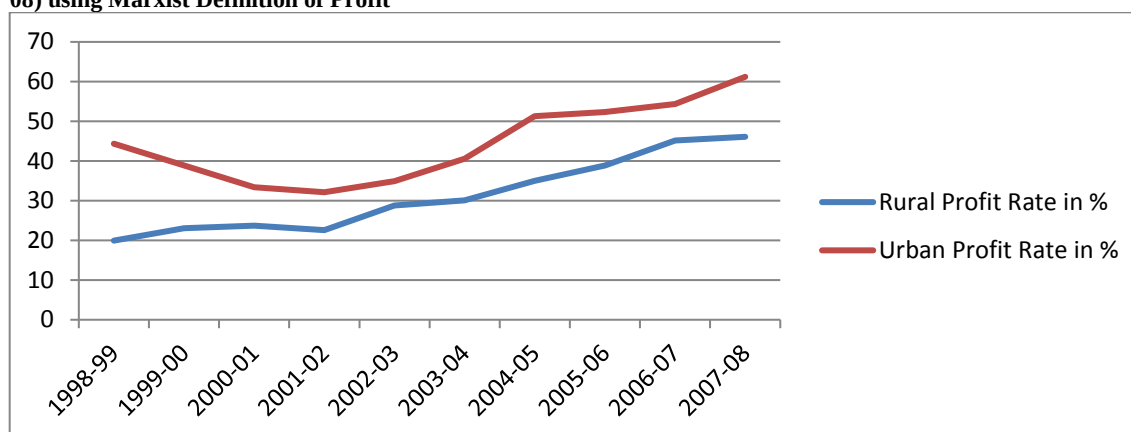
Figure 4-1a Profit Rate of Organised Manufacturing Industries in Rural and Urban Sectors (1998-99 to 2007-08) using ASI provided Definition of Profit



Source: Computed using data from Time Series Data on Annual Survey of Industries, 1998-99 to 2007-08.

Using the Marxist definition of profits, we found that growth of profit rate in rural areas has been more consistent than in urban areas. Our findings reveal that profit rates of rural and urban organised manufacturing industries in India are higher than profit rates registered by the U.S. non-farm, nonfinancial corporate business sector, as revealed by Basu and Vasudevan's (2011) study.

Figure 4-1b Profit Rate of Organised Manufacturing Industries in Rural and Urban Sectors (1998-99 to 2007-08) using Marxist Definition of Profit



Source: Computed using data from *Time Series Data on Annual Survey of Industries, 1998-99 to 2007-08*.

The absolute levels of profit rate provide an idea on returns on capital and viability of an industry. On the other hand, the quantum of growth in profit rate of an industry provides an understanding on the *increase* in returns to capital. The next section examines the growth in the profit rate.

4.2.3 Growth of Profit Rate

To understand variation in industry-wise profit rate in the period 1998-99 to 2007-08, both compound annual growth rate (CAGR)³⁶ and exponential growth rate (EGR)³⁷ of profit rate have been computed (refer Table 4-2a). This has been done to confirm the robustness of computed values. Although the compound annual growth rate is the most frequently used measurement of growth it is highly affected by the terminal values,

³⁶ CAGR of Profit Rate = $\left(\left(\frac{SV_{pr}}{EV_{pr}} \right)^{\frac{1}{n}} - 1 \right)$, where SV_{pr}, EV_{pr}, n are start and end values of profit rate and n the number of time periods (in this case, 9) over which growth of profit rate is being studied.

³⁷ The following steps are followed to calculate EGR of variables (like profit rate, wage bill, output, workforce size etc.) in this study. The regression equation takes the form, $\ln y = a + bt$.

1. The real values of the variable (say y) whose growth rate is to be found out is either computed (for eg. real profit rate, real capital stock to wage bill ratio, real output etc.) or obtained from the ASI report (for eg. workforce size) for all the ten time periods (viz. 1998-99, 1999-00, 2000-01, 2001-02, 2002-03, 2003-04, 2004-05, 2005-06, 2006-07, 2007-08);
2. The logarithmic values of the variable are found out for all the time periods.
3. The logarithmic value corresponding to each of the ten periods is fed into STATA. STATA returns the value of b, which is the growth rate of the variable being considered.

whereas exponential growth rate is free from this bias. However, exponential growth rate estimation suffers from the difficulty that it cannot handle zero and negative values of the variable being considered.

In most cases, we observed that the differences in the computed values of compound annual growth and exponential growth of profit rate were not significant. However, the gap for few rural industries (industry codes 16, 18 and 32), was relatively high. This inconsistency is noted for industries whose profit rates either fluctuated during the study period or there were sharp differences in the start and end values.

Although the exponential growth of profit rate could not be computed for industries that incurred loss (negative profit rate), our analysis (refer Table 4-2b) primarily considers exponential growth rate estimates. This is so as the profit rate in each of the nine time periods, is taken into account.

Table 4-2a Rate of Growth of Profit Rate of Rural and Urban Industries (1997-98 to 2007-08)

IC ³⁸	EGR of Profit Rate of Organised Industries in the Rural Sector (1)	EGR of Profit Rate of Organised Industries in the Urban Sector (2)	CAGR of Profit Rate of Organised Industries in the Rural Sector (3)	CAGR of Profit Rate of Organised Industries in the Urban Sector (4)	Gap in CAGR of Rural and Urban Industries (3) - (4)=(5)
15	0.065	0.0585	0.0181	-0.0299	0.048
16	0.094	0.0425***	0.3265	0.036	0.2905
17	-	-	0.2075	-0.0948	0.3023
18	-0.080	-0.1133***	-0.2057	-0.1004	-0.1053
19	-0.030	0.0321	-0.0099	-0.0402	0.0303
20	-	-	0.0637	0.3919	-0.3282
21	-	-	0.2925	0.1735	0.119
22	0.173**	0.1655	0.1879	0.0507	0.1372

³⁸ Refer Appendix 3, Table 3-1 for industry description corresponding to industry code (IC)

IC ³⁹	EGR of Profit Rate of Organised Industries in	EGR of Profit Rate of Organised Industries in the Urban Sector	CAGR of Profit Rate of Organised Industries in the Rural Sector	CAGR of Profit Rate of Organised Industries in the Urban Sector	Gap in CAGR of Rural and Urban Industries
23	—	0.1850**	0.2411	0.0167	0.2244
24	0.072***	0.0507	0.0583	-0.0216	0.0799
25	0.067***	-	0.0854	0.0638	0.0216
26	—	0.1938***	0.4361	0.2301	0.206
27	—	0.2608**	0.7163	0.1706	0.5457
28	—	0.2016***	0.197	0.1243	0.0727
29	0.132***	0.2123***	0.106	0.2046	-0.0986
30	-0.035	-	-0.0416	-0.161	0.1194
31	0.222***	0.4027**	0.1797	0.0731	0.1066
32	0.024	0.0027	0.239	0.0077	0.2313
33	0.181**	0.2604**	0.1061	0.4237	-0.3176
34	-	-	0.2307	0.2241	.0066
35	0.167***	0.079	0.123	0.052	0.072
36	0.050	-0.015	0.091	0.030	0.062
37	-	-	-0.186	-0.143	-0.043

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08). Significance levels: *p<0.1; **p<0.05; ***p<0.01.

Table 4-2b Grouping of Industries (in terms of Industry Code) in Rural and Urban Segments, according to Exponential Growth of Profit Rate (g_r)⁴⁰

EGR of Profit Rate	$g_r < 0\%$		$0\% \leq g_r \leq 10\%$		$10\% < g_r \leq 25\%$		$25\% < g_r \leq 50\%$	
Sector	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
IC ⁴¹	18,19,30	18,36	15,16,24,25,32,36	15,16,19,24,32,35	22,29,31,33,35	22,23,26,28,29		27,31,26
No. of industries in each range	03	02	06	06	05	05		03

Source: Derived from Table 4-2a

³⁹ Refer Appendix 3, Table 3-1 for industry description corresponding to industry code (IC)

⁴⁰ Exponential growth rate of profit rate could be only calculated for 14 of 23 rural industries and 16 of 23 urban industries.

⁴¹ Refer Appendix 3, Table 3-1. for description of industry codes (IC)

The exponential growth rate of profit rate could be calculated for 14/23 industries in the rural sector and 16/23 industries in the urban sector. Most number (six each) of industries in the rural and urban sectors registered a growth of profit rate in the range $0\% \leq g_r \leq 10\%$, where g_r is the rate of growth of the profit rate. The next highest group of industries (five each) figured in the range $10\% < g_r \leq 25\%$. Only three urban industries had a profit rate in the range $25\% < g_r \leq 50\%$. A greater number (18/23) of rural industries had a higher compound annual growth rate of real profit rate than their urban counterparts in the study period. This indicates the potential for the growth of rural industries vis-à-vis urban industries.

At the aggregate level, the rate of growth of profit rate in the rural organised industrial segment (19.85 per cent) was higher than that in the urban segment (14.85 per cent). The higher rate of growth of profit rate in the rural sector vis-à-vis the urban sector augurs well for the rural economy. However, the observed higher value is possibly due to low initial values of profit rate of most rural industries and the sector as a whole. Rising profit rates may prompt higher growth in output. This is what we turn to next. Examination of the quantum of change in the output of organised manufacturing industries follows.

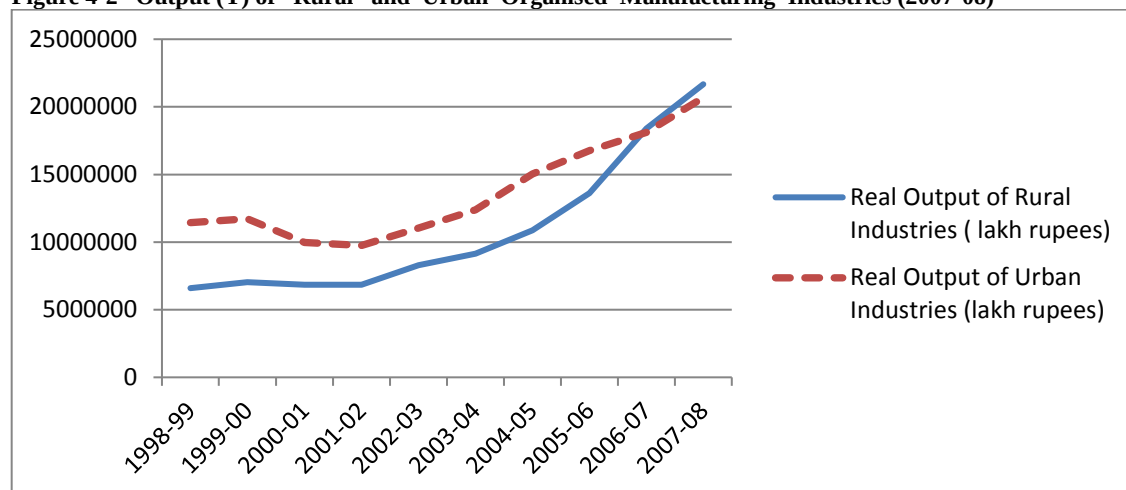
4.2.4 Output and Growth in Output

Output (Y) is the real value of Net Value Added⁴². Figure 4-2 displays aggregate output of rural and urban organised manufacturing industries in the period 1998-99 to 2007-08. The output of the rural sector exceeded that of the urban sector since 2006-07. Comparison of the industry-wise average output of both the sectors in the study period

⁴²Refer Appendix 3, Table A3-5a and Table 3-5b. for industry-wise, year wise output of industries.

reveals that 8/23 rural industries have higher levels of output than their urban counterparts, indicating that output levels of most urban industries are better⁴³.

Figure 4-2 Output (Y) of Rural and Urban Organised Manufacturing Industries (2007-08)



Period	Real Output of Rural Industries	Real Output of Urban Industries
1998-99	6593871.05	11450330
1999-00	7028860.61	11718662
2000-01	6857280.84	9963721
2001-02	6840084.13	9750887
2002-03	8281929.04	11038887
2003-04	9134010.2	12389968
2004-05	10874046	15041016
2005-06	13607745.1	16770107
2006-07	18390012.9	18114891
2007-08	21670323.6	20681818

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08),.

The industry-wise and sector-wise exponential rate of growth of output⁴⁴ ($\hat{Y}$) of organised industries (see Table 4-3) shows diverse trends across industries and sectors. All rural industries showed a positive growth rate of output in the range of 4.68 per cent to 28.95 per cent in the period 1998-99 to 2007-08. 14/23 industries registered a two-digit rate of growth of output. Most (18/23) rural industries had a higher rate of growth of output than their urban counterparts. In the earlier sections, we found that i) in certain time periods, a greater number of rural industries had a higher profit rate than corresponding urban industries; ii) during the study period, the rate of growth of profit

⁴³ Refer Appendix 3, Table A3-7 for comparison of industry-wise average output of rural industries and urban industries.

⁴⁴ Refer Appendix 3, Table A3-6 for compound annual growth rate of output of rural and urban industries.

rate of rural industries was higher than urban industries. The latter implies that the profit rate of rural industries was growing faster. The observed higher growth of output in rural industries is perhaps a reflection of the faster rise in profit rates. Urban industries registered an output growth rate in the range -0.11 per cent to 20.77 per cent. In fact, output growth decelerated in some urban industries (industry code 16, 24 and 32). At the aggregate level, rural industries registered an output growth rate of 13.55 per cent, whereas urban industries registered 7.55 per cent. This robust growth rate of output especially of rural industries spells well for the rural economy.

We wanted to assess statistically the nature of the relationship between profit rate and the rate of growth of output of rural industries. We found that irrespective of the regression model used, the rate of growth of rural industrial output is positively dependent on profit rate and it is statistically significant (refer Appendix 4, A4-9). Therefore, in a subsequent section we diagnose profit rate to find out which, component of profit rate is driving growth in output. To identify the drivers of profits, we carried out two-factor profit rate decomposition from a medium run perspective, which is premised on Weisskopf's (1979) theoretical framework.

Table 4-3: Exponential Growth Rate of Output and Labour in India's Organised Manufacturing Industries in the Rural and Urban Sectors (1997-98 to 2007-08)

IC	Industry Description	Exponential Growth Rate of Output in Organised Industries in the Rural Sector	Exponential Growth Rate of Output in Organised Industries in the Urban Sector
15	Manufacture of Food Products and Beverages	0.0575*	0.0298*
16	Manufacture of Tobacco Products	0.0989	-0.0513
17	Manufacture of Textiles	0.0638**	0.0284**
18	Manufacture of Wearing Apparel	0.1410***	0.0593***
19	Tanning of Leather	0.0468	0.0503**
20	Manufacture of Wood, Cork, Straw, Plating Material Products	0.1019***	0.0378
21	Manufacture of Paper and Paper Products	0.0963***	0.1149
22	Publishing, Printing and Reproduction of Recorded Media	0.1146**	0.076***

IC	Industry Description	Exponential Growth Rate of Output in Organised Industries in the Rural Sector	Exponential Growth Rate of Output in Organised Industries in the Urban Sector
23	Manufacture of Cork, Refined Petroleum Products and Nuclear Fuel	0.2895***	0.2031***
24	Manufacture of Chemicals and Chemical Products	0.0670***	-0.0011
25	Manufacture of Rubber and Plastic Products	0.0579***	0.0313
26	Manufacture of other Non-Metallic Mineral Products	0.1536***	0.0981***
27	Manufacture of Basic Metals	0.2273***	0.1425***
29	Manufacture of Machinery and Equipment N.E.C.	0.1095***	0.0317
30	Manufacture of office, accounting and computer machinery	0.2087***	0.0523
31	Manufacture of Electrical Machinery and Apparatus N.E.C.	0.1489***	0.085**
32	Manufacture of Radio, Television, Communication Equipment and Apparatus	0.0656**	-0.0061
33	Manufacture of Medical, Precision and Optical Instruments	0.0618	0.0783*
34	Manufacture of Motor Vehicles, Trailers and Semi-Trailers	0.2038***	0.2077***
35	Manufacture of Other Transport Equipment	0.1760***	0.0248
36	Manufacture of Furniture, Manufacturing N.E.C.	0.1272***	0.0762**
37	Recycling	0.2332	0.4464***

Source: Computed using Time Series Data on Annual Survey of Industries (1998-99 to 2007-08). Significance levels: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

4.3. Profit Rate Decomposition Analysis: The Theoretical Framework

From the Marxist economics point of view, there are three ways that lead to decline in profit rate and cause a crisis. These are *i*) rising organic composition of capital (or the ROC variant), *ii*) rising strength of labour (or the RSL variant) and *iii*) realization failure (or the RF variant). The ROC variant as elucidated by Marx explains the long-run decline in the rate of profit due to an increase in the ratio of constant capital vis-à-vis variable capital. The RSL variant shows how an increase in the bargaining power of labour with a decline in the reserve army of labour brings about a decline in profit rate. Core to the RF variant of Marxian crisis theory is an inadequacy of demand for produced goods, which results in lowering of the profit rate. The former two variants in effect imply rising costs of capital and labour. They are in the realm of production and

distribution. The third variant is in the realm of circulation, that is fall in demand results in capitalists failing to sell the full stock of produced commodities.

In his seminal work, Weisskopf (ibid) translates the three dimensions (variants) of the Marxist crisis theory that are based on labour-value concepts into price equivalent forms⁴⁵. He then decomposes profit rate (R_n) as

$$[4-1] R_n = \frac{\pi_m}{Y_n} \cdot \frac{Y_n}{Z_n} \cdot \frac{Z_n}{K_n} = P_s \cdot C_u \cdot C_c$$

Here the nominal value of the profit rate is R_n , π_m is the Marxist definition of profit income over a period, K_n is the stock of capital at the beginning of the period, Y_n is the actual output (net value added) and Z_n is potential (full capacity) output. Profit rate is expressed as the product of profit share (P_s), capacity utilization rate (C_u) and capacity to capital ratio (C_c). He then establishes a relation between the price equivalent forms of the variants and profit rate, to understand the cause of the decline in profit rate. Weisskopf (ibid) used his price framework, to analyse the US economy over the period 1949 to 1975⁴⁶.

In the short-run the equilibrium output is determined by demand and is lower than the short-run full-capacity output. In other words capacity of the production unit is not fully utilized in the short-run. The middle factor the capacity utilization rate (C_u), which measures the fluctuations in demand. The current study analyses data for a far shorter period (1998-99 to 2007-08). Therefore, Basu and Das's (2015) two-factor profit rate decomposition from a medium-run perspective, which is based on Weisskopf's theory has been used. Unlike Weisskopf (1979) or Basu and Das (2015) we do not divide the period into short spans, where demand deficiency may play a bigger role. In the medium-

⁴⁵Refer Appendix 2, 2-1 for Weisskopf's translation of Marx's framework based on labour-value concepts into a price equivalent form.

⁴⁶ It could be extended to explain short-run cyclical fluctuations in the rate of profit also (Weisskopf, 1979).

run and the long-run as the equilibrium output is equal to the full-capacity output viz. $Y = Z$. So the second term in the three-factor profit rate decomposition equation [4-1] $\frac{Y}{Z}$ becomes 1 and the third term $\frac{Z}{K}$ equals $\frac{Y}{K}$. In other words, in the medium-run the production unit's full capacity gets utilized. Hence, we concentrate only on the two factors mentioned in [4-3], which expresses the profit rate as a product of profit share and output-capital ratio.

As this methodology is adopted from the Marxist body of literature, the Marxist definition of profit (π_m) has been used for analysis. Profit is the surplus value residing with the capitalist class, after payment to workers viz. productive labour, L .

$$[4 - 2] \pi_m = Y_n - W_n - b_n$$

Here Y_n is the actual output (net value added), W_n is total wage bill, b_n ⁴⁷ denotes share of benefits paid to workers.

Two-factor profit rate decomposition from a medium-run perspective is expressed in terms of the Marxist definition of profit in equation [4-3].

$$[4 - 3] R_n = \frac{\pi_m}{K_n} = \frac{\pi_m}{Y_n} \cdot \frac{Y_n}{K_n}$$

The first term on the right-hand side $\frac{\pi_m}{Y}$ denotes profit share, that is the share of output that resides with the capitalist class after paying the working class. The second term on the right-hand side $\frac{Y_n}{K}$ is the output-capital ratio, that is capital productivity. For empirical operations, the terms profit share and output-capital ratio are deflated and further decomposed in [4-4] and [4-5], in accordance to Basu and Das (2015).

⁴⁷ $b_n = \frac{B_n W_n}{(W_n + S_n)}$, where B_n is provident fund and welfare expenditure for all the employees, W_n denotes wages to workers (productive labour)

and S_n denotes salary to managers, supervisors etc. (unproductive labour).

$$[4 - 4] \frac{\pi_m}{Y_n} = \frac{(Y_n - W_n)}{Y_n} = 1 - \frac{\frac{W_n}{L}}{\frac{Y_n}{L}} = 1 - \frac{w_r}{y_r} \cdot \frac{P_{iw}}{P_{mfg}} = 1 - \frac{w_r}{y_r} \cdot \lambda_{iw.mfg}$$

Here $w_r = \frac{W_n}{(L \times P_{iw})}$ is real wage rate, $y_r = \frac{Y_n}{(L \times P_{mfg})}$ is real labour productivity and

$\lambda_{iw.mfg}$ is the ratio of the consumer price index of industrial workers to the wholesale price index of manufactured products that are used as deflators to obtain real values.

The second factor is decomposed as

$$[4 - 5] \frac{Y_n}{K_n} = \frac{y_r}{k_r} \cdot \frac{P_{mfg}}{P_{mch}} = \frac{y_r}{k_r} \cdot \frac{1}{\lambda_{mch.mfg}}$$

Here $k_r = \frac{K_n}{(L \times P_{mch})}$ is real capital per unit of labour, $y_r = \frac{Y_n}{(L \times P_{mfg})}$ is real labour productivity and $\lambda_{mch.mfg}$ is ratio of the wholesale price index of machines to the wholesale price index of manufactured products that are used as deflators to obtain real values⁴⁸. In equation [4-6] below, the Marxist profit rate is expressed as the sum of the decomposed constituents of profit share (refer equation [4-4]) and the capital-to-output ratio (refer equation [4-5]).

$$[4 - 6] R_n = \left(1 - \frac{w_r}{y_r} \cdot \lambda_{iw.mfg} \right) + \frac{y_r}{k_r} \cdot \frac{1}{\lambda_{mch.mfg}}$$

[4-6] is useful for gauging the variables at a point of time. When we look at the situation across time we resort to the following. To gauge the contribution of the two factors in driving change in the profit rate, logarithmic differentiation of equation [4-6] is carried out. The differentiation yields equation [4-7], which expresses the change of profit rate as the sum of rate of change of profit share and output-capital ratio in terms of decomposed constituents⁴⁹.

$$[4 - 7] \widehat{R_n} = \frac{W}{\pi_m} (\widehat{y_r} - \widehat{\lambda_{iw.mfg}} - \widehat{w_r}) + (\widehat{y_r} - \widehat{\lambda_{mch.mfg}} - \widehat{k_r})$$

⁴⁸ Refer Appendix 2, A2-3, for steps followed to obtain real values of analysed variables from the ASI provided nominal values.

⁴⁹ Refer Appendix 2, A2-2 for steps in differentiation of decomposed factor profit share.

Weisskopf (1979), Shaikh (1987), Basu and Vasudevan (2013), Basu and Das (2015), used this framework to empirically analyse data from different countries, including the US and India. A brief review of their works is in order.

Weisskopf (ibid) analysed non-financial corporate business (NFCB) data of the US economy, from 1949 to 1975. This period had five complete business cycles. He found that the rising strength of labour (RSL) had a more profound effect than the rising organic composition of capital (ROC), on the long-term decline in the rate of profit. The rising strength of labour variant had a partial effect on the cycle-to-cycle decline in profit rates; and within a cycle it had a significant impact on the decline in profit rate in the late-expansion phase of the cycle.

Boddy and Crotty (1975) point out that maximization of profits is the holy grail of capitalists and the business cycle is a necessity to achieve this objective. The business cycle aids capitalists to gain control over labour in their conflict with the latter over income shares. Boddy and Crotty's claim is reinforced by their and Weisskopf's empirical findings that the rising strength of labour variant contributed to a decline in the profit rate. Boddy and Crotty also found from their empirical studies that labour income share increases in the second half of the expansion in a business cycle thus reinforcing "profit squeeze" approach (Glynn and Sutcliffe, 1972, cited in Shaikh, 1987).

Shaikh's (1987) findings differ: he finds that in the period 1947-1985 capital stock to wage bill ratio increased by 103 per cent, the capital-output ratio increased by 56 per cent and the productivity to real wage ratio, which in Marxist notion signifies an index of the rate of exploitation of the labour force increased by 46 per cent. Thus, Shaikh's study reveals that rising organic composition of capital in the Marxist framework viz. $\frac{K_n}{W_n}$ ratio in the price framework rather than rising strength of labour is the determining cause for

the decline in profit rate from 1947 to 1985. This strengthens the Marxist tenet on capitalist tendencies of accumulation: fixed capital rises more in proportion to the total labour wage bill. Shaikh then proceeds to test the fallout of declining profit rate on other variables of the economy by examining empirical evidence. The theory states that a falling rate of profit results in stagnation of the total amount of profit that marks the initiation of a crisis. In the said period he found that the real pre-tax profit reached a peak in the period 1966 to 1968 and then fluctuated around a stagnant trend; he demarcates the period around 1967 as the phase when the U.S.A. entered a crisis. Data confirms the same: pre-1967 (1947 to 1967) the unemployment rates were 4.8 per cent, real labour wages increased by 50 per cent and the annual average federal deficit was \$1.7 billion. In comparison, post-1967 (1968-1985) unemployment rate peaked to 10 per cent and the real labour wages declined by 8.5 per cent revealing that the unemployment rate and real labour wages deteriorated when profits stagnated.

Basu and Vasudevan's (2013) research examines the crises of the 1970s and 2008. Their research focuses on profitability trend underlying this crisis. Their empirical findings show that since the mid-1960s, both capital productivity and profit shares declined. This resulted in a fall of profit rates leading to the first post-War crisis in the 1970s. Thereafter, the income share of the capitalist class recovered with the financial sector boom and information technology-aided increase in productivity. By the late 1990s, the impact of technology weaned off leading to a fall in capital productivity. However, profit rates did not decline as the share of the capitalists' income further improved with the increase in size and influence of financial institutions and markets and growth of working-class debt (Lapavistas, 2010 cited in Basu and Vasudevan, 2013). However, prior to the economic crisis of 2008 profit share of the capitalist class declined and this coupled with the growth of working class debt ushered in a period of financial crisis.

A recent study by Basu and Das (2015) examines profitability trends and factors driving variations in profit rate in India's organised manufacturing sector for the period 1982-83 to 2012-13 using Weisskopf's theoretical framework. They carry out long-run, medium-run and short-run analyses. They found that the long-run profit rate grew at a rate of 1 per cent annually during 1982-83 to 2012-13, driven by rising profit share. In their medium-run analysis, they found that 1982-83 to 2001-02 was a period of declining profitability and 2001-02 to 2012-13 was a period of rising profitability. They provide a more nuanced picture in their medium-run and short-run analyses: they conclude that the principal component responsible for variation in profit rate varies with the timeframe of analysis. In four of six short-run periods, technological advancement (in other words output to capital ratio) was the most important driver of change in profit rate. In line with Felipe and Kumar's (2010) findings, Basu and Das (2015) found that technological advancement brought about an increase in labour productivity without a proportional increase in labour wage rates resulting in an increase in profit share.

4.4. Profit Rate Decomposition Analysis from a Medium-Run Perspective

Change in profit share and change in output-capital ratio drives change in profit rate in the medium-run. On differentiation of equation [4-6] we get equation [4-7]. Equation [4-7] helps us analyse the role played by changes in labour productivity, wage rate and capital per capita in bringing about changes in profit share and capital productivity and thereby propel changes in profit rate.

The estimates⁵⁰ obtained for the R.H.S. terms of equation [4-7], using *ASI* data are given in Table 4-4a and Table 4-4b respectively. The change in profit rate in the rural

⁵⁰ Refer Appendix 1, A2-3 for steps followed to obtain the estimates.

organised manufacturing industries (1.285) was steeper than its urban counterpart (0.380) in the study period. Changes in profit share and the output-capital ratio also have been higher in the rural sector. The increase in profit rate has been mainly driven by a change in capital productivity, that is, output-capital ratio, in both the sectors. 82.88 per cent and 65.26 per cent of the total quantum of increase in the profit rate in the rural and urban sectors respectively, is due to the increase in capital productivity.

Empirical analysis of change in the decomposed first factor, i.e. profit share (refer equation [4-7]) reveals that rise in profit share in both the sectors was driven by a significant change in labour productivity ($\hat{y}_r$) and a small change in the wage rate ($\hat{w}_r$). The change in labour productivity in the rural sector was sharper. However, wage to profit ratio ($\frac{w}{\pi_m}$) was lower in the rural sector than the urban sector indicating a skewed distribution of income in the rural economy. This is not surprising once we recall the literature of migration and dualism of development economics. In their study on India's organised manufacturing segment, Sau (1989) and Balakrishnan and Babu (2003) had found that increased levels of income, with rising profit rates, benefited profit earners rather than labourers. Thus, the results we obtain are in line with earlier findings.

Empirical analysis of change in decomposed second factor output-capital ratio (refer R.H.S. of equation [4-7]) shows that a rise in capital productivity in both the sectors was driven by a large change in labour productivity and a small change in real capital per capita ($\hat{k}_r$). $\hat{k}_r$ in the rural sector was lower than that in the urban sector during the study period. This low value of $\hat{k}_r$ coupled with a higher value of change in labour productivity ($\hat{y}_r$) resulted in a greater increase of output-capital ratio ($\frac{\hat{y}}{\hat{k}}$) in the rural sector. This implies capital intensity (i.e., capital vis-à-vis labour) did not rise much in the rural sector although labour productivity increased. Urban industries displayed a

Table 4-4a Profit Rate Decomposition Analysis for Rural Organised Manufacturing Industries (1998-99 to 2007-08)

Change in Profit Rate $(\widehat{R}_n)$	Change in profit share $(\frac{\widehat{\pi}_m}{Y_n})$	Change in output to capital $(\frac{\widehat{Y}_n}{K_n})$	Decomposition of change in profit share $(\frac{\widehat{\pi}_m}{Y_n})$				Decomposition of change in output-capital ratio $(\frac{\widehat{Y}_n}{K_n})$		
			Change in real labour productivity $(\widehat{Y}_r)$	Change in real wage share $(\widehat{W}_r)$	Change in ratio of P_{iw} to P_{mfg} $(\widehat{\lambda}_{iw.mfg})$	Wage to profit ratio G.M. $(\frac{W}{\pi_m})$	Change in real labour productivity $(\widehat{Y}_r)$	Change in real capital per unit of labour $\widehat{K}_r$	Change in ratio of P_{mch} to P_{mfg} $\widehat{\lambda}_{mch.mfg}$
1.285	0.107	1.065	1.181	0.123	0.054	0.128	1.181	0.038	0.018

Source: Computed using data from *Time Series Data on Annual Survey of Industries, 1998-99 to 2007-08*

Table 4-4b Profit Rate Decomposition Analysis for Urban Organised Manufacturing Industries (1998-99 to 2007-08)

Change in Profit Rate $(\hat{R}_n)$	Change in profit share $(\frac{\hat{\pi}_m}{Y_n})$	Change in output to capital $(\frac{\hat{Y}_n}{K_n})$	Decomposition of change in profit share $(\frac{\hat{\pi}_m}{Y_n})$				Decomposition of change in output-capital ratio $(\frac{\hat{Y}_n}{K_n})$		
			Change in real labour productivity $(\hat{Y}_r)$	Change in real wage share $(\hat{W}_r)$	Change in ratio of P_{iw} to P_{mfg} $(\hat{\lambda}_{iw.mfg})$	Wage to profit ratio G.M. $(\frac{W}{\pi_m})$	Change in real labour productivity $(\hat{Y}_r)$	Change in real capital per unit of labour $\hat{K}_r$	Change in ratio of P_{mch} to P_{mfg} $\hat{\lambda}_{mch.mfg}$
0.380	0.105	0.248	0.563	0.070	0.054	0.194	0.563	0.230	0.018

Source: Computed using data from *Time Series Data on Annual Survey of Industries, 1998-99 to 2007-08*.

contrary trend: $\hat{k}_r$ was higher and $\hat{y}_r$ lower than that in the rural sector. It appears that growth of capital per capita in the rural sector was lower because the capital intensity in rural sector industries was already much higher than in urban sector industries, during the study period.

4.5 Chapter Summary

In the period 1998-99 to 2007-08 profit rates of most⁵¹ rural and urban organised manufacturing industries were in two-digit figures. At the aggregate level, the profit rate of urban industries exceeded that of rural industries. However, it is observed that the profit rate increased more steadily in the rural sector than in the urban sector. As for output, rural industries reported a higher growth rate of output⁵² with rising profit rate levels. Statistical tests revealed a statistically significant, positive relationship between profit rate and growth in output of rural industries. Both at the disaggregate and aggregate levels, rural industries fared better than their urban counterparts in terms of growth of profit rate and growth of output.

Two-factor profit rate decomposition from a medium-run perspective revealed that primarily growth in capital productivity led to growth in profit rate in both the sectors. A closer look reveals that growth in real labour productivity that was particularly high in the rural sector boosted capital productivity. However, the rural industrial labour did not get a wage commensurable with his labour productivity.

In the next chapter, we try to understand quantitative changes in labour force, productivities, wages, capital to wage ratio in the rural organised manufacturing segment

⁵¹ 19/23 in the rural sector and 22/23 in the urban sector registered a two-digit average profit rate.

⁵² Growth rate of output in the rural and urban sectors were 13.55 per cent and 7.52 per cent.

with rising profit rate and output. The relationship between selected pairs of variables and data trends are also examined.



Chapter 5

Changes in Economic Indicators of Rural Organised Manufacturing Industries

5.1 Economic Indicators

In this chapter we analyse the changes that have taken place in other attributes (like the employment level, labour productivity, capital productivity, wage bill, etc.) of rural organised manufacturing industries, from 1998-99 to 2007-08. For the sake of comparison, the same exercise is carried out for corresponding urban industries. The purpose of making these analyses is to discern patterns of behaviour of these variables (and possibly a pattern of relationship between the variables) over time. These pointers would help in framing the next chapter, which is about building an analytical model of the rural industrial sector. In this context, two earlier studies that link growth in the organised manufacturing sector with various economic indicators need mention. Balakrishnan and Babu's (2003) study on growth of India's organised manufacturing sector from 1973 to 2000, analyses whether a change in output brings about commensurable changes in employment, profit rate, investment, productivity growths, wage rate etc.. Kannan and Raveendran's (2009) study examines the impact of growth in India's organised manufacturing sector on employment. In the same vein, this study examines the levels and changes in labour force, labour productivity, capital productivity, wage bill and capital stock to wage bill ratio ($\frac{K_n}{W_n}$) with the growth of India's rural industries segment.

5.1.1 Labour Force Size, Productivity

Changes in output generally bring about changes in labour force size. However, the latter's increase or decrease depends on whether the output increase is driven by labour, capital, technology, or some other factor. Barring the recycling industry (industry code 37) all rural industries had a higher labour force size than their urban counterparts⁵³, indicating that the former are generating more jobs. The labour force size increased in all rural industries between 1998-99 and 2007-08 (refer Table 5-1). In both the sectors the highest exponential growth rate of the labour force⁵⁴ was registered in the recycling industry (industry code 37) followed by the wearing apparel industry (industry code 18). All rural industries excepting wood, cork, straw, plating material products manufacturing industry; medical, precision and optical instruments industry; other transport equipment manufacturing industry and recycling industry (industry code 20, 33, 35, 37) had a higher rate of growth of labour force size than the urban counterpart. Thus, labour employed tended to rise more in rural than in urban as output rises in both sectors. This is possibly one reason for rural industries registering a lower growth in capital per capita compared to urban industries (Table 4-4a and Table 4-4b).

In many industries in both the sectors a positive relationship is observed between the labour force and output (refer Table 5-1). However, in most industries⁵⁵ in both the rural and urban sectors labour force growth rate was lower than the output growth rate. Infact some urban industries⁵⁶ recorded negative output and labour force growth rates. Perhaps some part of this increase in output growth rate can be attributed to technical change, which displaced labour.

⁵³ Refer Appendix 3, Table A3-8a and Table A3-8b

⁵⁴ Appendix 3, Table A3-9 gives the CAGR of labour force in rural and urban industries during 1998-99 to 2007-08

⁵⁵ Excepting IC 19 and 25

⁵⁶ Like IC 16, 24 and 32

Rising levels of output indicate changes in capital per unit of labour that bring about changes in capital and labour productivity. This is what we examine next. Figure 5-1 gives the variation in $\frac{Y}{L}$, $\frac{Y}{K}$ and $\frac{K}{L}$ in both the sectors during the study period.

Table 5-1 Exponential Growth Rate of Output and Labour in India's Organised Manufacturing Industries in the Rural and Urban Sectors (1997-98 to 2007-08)

IC	Exponential Growth Rate of Output in Organised Industries in the Rural Sector	Exponential Growth Rate of Labour in Organised Industries in the Rural Sector	Exponential Growth Rate of Output in Organised Industries in the Urban Sector	Exponential Growth Rate of Labour in Organised Industries in the Urban Sector
15	0.0575*	0.0248***	0.0298*	-0.005
16	0.0989	0.0515*	-0.0513	-0.0218***
17	0.0638**	0.0373**	0.0284**	0.0008
18	0.1410***	0.1332***	0.0593***	0.0897***
19	0.0468	0.0614***	0.0503**	0.059***
20	0.1019***	0.0283**	0.0378	0.0287*
21	0.0963***	0.0513**	0.1149	0.0022
22	0.1146**	0.064***	0.076***	0.0136
23	0.2895***	0.0857***	0.2031***	0.0093
24	0.0670***	0.0347***	-0.0011	-0.0073
25	0.0579***	0.0636***	0.0313	0.02***
26	0.1536***	0.073***	0.0981***	0.0104
27	0.2273***	0.0812**	0.1425***	0.0067
28	0.1795***	0.1088***	0.1795***	0.1088***
29	0.1095***	0.0556***	0.0317	0.0042
30	0.2087***	0.0955**	0.0523	0.0739***
31	0.1489***	0.0831***	0.085**	0.0158
32	0.0656**	0.0348	-0.0061	-0.0114
33	0.0618	0.0073	0.0783*	0.0258
34	0.2038***	0.1255***	0.2077***	0.0413**
35	0.1760***	0.0102	0.0248	0.0114
36	0.1272***	0.0845***	0.0762**	0.0796***
37	0.2332	0.1372**	0.4464***	0.3281**

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08). Significance levels: *p<0.1; **p<0.05; ***p<0.01.

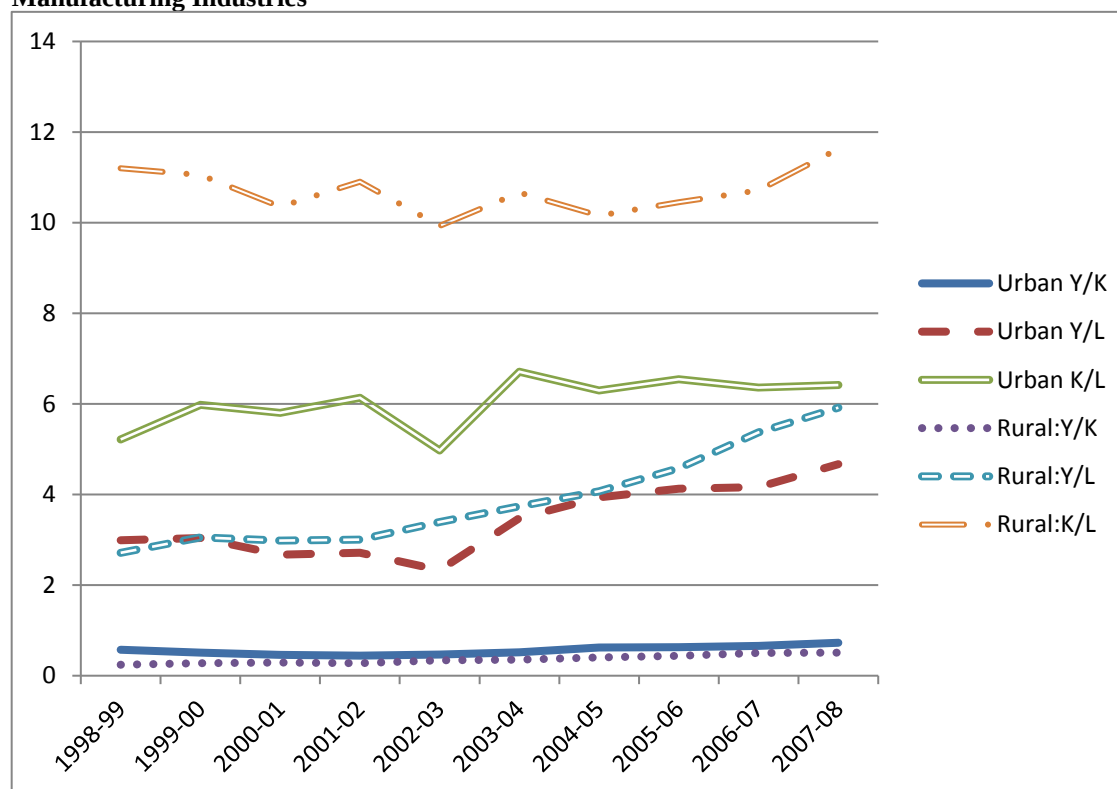
Capital productivity ($\frac{Y}{K}$) was low in the rural industries and it showed a mild rise during the study period. Both labour productivity ($\frac{Y}{L}$) and capital per capita ($\frac{K}{L}$) levels were higher in the rural industries. In the period 1998-99 to 2007-08, both $\frac{Y}{L}$ and $\frac{K}{L}$ exhibited rising trends with mild fluctuations. Since 2002-03, all the three ratios have risen consistently in the urban industries. A summary of the observed results is: i) Rural labour productivity ($\frac{Y}{L}$) > Urban labour productivity ($\frac{Y}{L}$); ii) Rural capital per capita ($\frac{K}{L}$) > Urban capital per capita ratio ($\frac{K}{L}$); iii) Rural capital productivity ($\frac{Y}{K}$) < Urban capital productivity ($\frac{Y}{K}$).

The findings indicate that capital deepening has been higher in the rural industries. This is possibly leading to higher labour productivity in rural industries, on account of the complementarity between the two factors. However, the growth of capital intensity (capital per capita) in rural industries was lower. This is attributed to the higher initial levels of capital intensity and the higher growth rate of labour in rural industries.

At the disaggregated level, labour and capital productivity growth showed distinct variations across industries. The exponential growth rates of labour and capital productivities⁵⁷ for rural and urban industries are given in Table 5-2. Labour productivity registered positive growth rates for most industries in both the sectors (17/23 rural industries and 14/23 urban industries). The exponential growth rate of labour productivity of rural industries exceeded their urban counterparts. Observed higher growth in labour productivity in rural industries is partly an outcome of lower initial values, compared to urban industries. However, it is evident there has been a significant

⁵⁷ Appendix 3, Table A3-10 gives the CAGR of labour productivity and capital productivity in rural and urban industries during 1998-99 to 2007-08.

Figure 5-1 Labour and Capital Productivity, Capital to Labour ratio in Rural and Urban Organised Manufacturing Industries



Period	Rural Y/K	Rural Y/L	Rural K/L	Urban Y/K	Urban Y/L	Urban K/L
1998-99	0.242174	2.712646	11.20123	0.57253	2.987881	5.218733
1999-00	0.276471	3.054994	11.04995	0.50882	3.041688	5.977925
2000-01	0.287804	2.979574	10.35277	0.460133	2.671139	5.805152
2001-02	0.275571	3.0055	10.90644	0.442656	2.714809	6.133
2002-03	0.341583	3.391444	9.928615	0.468714	2.33063	4.972392
2003-04	0.350617	3.738086	10.66145	0.518683	3.480236	6.70975
2004-05	0.4005	4.067952	10.15719	0.624432	3.933677	6.299606
2005-06	0.438449	4.582808	10.45231	0.630502	4.126454	6.544714
2006-07	0.501548	5.372641	10.71211	0.654487	4.165056	6.36385
2007-08	0.508745	5.916566	11.62973	0.727279	4.669404	6.420378

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08).

improvement in rural labour productivity during the study period. In 2007-08, the labour productivity of 13/23 rural industries exceeded that of their urban counterparts. Thus, both at the aggregate and disaggregate levels, improvements in the productivity of labour engaged in rural industries show similar trends. The growth of labour productivity reflects an earlier finding, that growth rate of labour is lower than the growth rate of output, in most rural and urban industries. A look at the exponential rate of growth of

Table 5-2 Exponential Growth Rate of Capital and Labour Productivity in India's Organised Manufacturing Industries in the Rural and Urban Sectors (1997-98 to 2007-08)

IC	Exponential Growth Rate of Labour Productivity in Organised Industries in the Rural Sector	Exponential Growth Rate of Capital Productivity in Organised Industries in the Rural Sector	Exponential Growth Rate of Labour Productivity in Organised Industries in the Urban Sector	Exponential Growth Rate of Capital Productivity in Organised Industries in the Urban Sector
15	0.0328	-0.0073	0.0350**	0.0705
16	-	-0.0471**	-	-0.0711
17	0.0260**	0.0217**	0.0278***	0.0406
18	-	-0.0168	-0.0298**	-0.0356
19	-	-0.0143	-0.0083	0.0171
20	-	0.0496*	-	-0.0639
21	0.0449*	0.0707***	-	0.0953
22	0.0506	0.1553***	0.062***	-0.014
23	0.2037***	0.1545**	0.1942***	0.0731*
24	0.032***	0.0400**	0.0062	-0.0013
25	-0.0056	0.0355**	0.0115	0.0147
26	0.0806**	0.1532***	0.088***	0.0373*
27	0.1462***	-0.1706***	0.1357***	0.1058***
28	0.0706***	0.0777***	0.0481***	0.0268**
29	0.0540***	0.0580***	0.0274	0.0393**
30	0.1129*	0.0484	-0.0214	-0.1552***
31	0.0659**	0.1099***	0.0687**	0.1045**
32	0.032*	-0.0124*	0.0053	0.0021
33	0.0543*	0.0877*	0.0523	0.0166
34	0.0777**	0.1329**	-	0.2182***
35	0.1657***	0.1306***	0.0134	-0.026
36	0.0481***	0.0317	-0.0034	0.0028
37	-	-	-	-

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08). Significance levels: *p<0.1; **p<0.05; ***p<0.01.

capital productivity reveals that only 6/22 rural industries⁵⁸ and 3/22 urban industries⁵⁹ registered a two-digit growth of capital productivity. In as many as 6/22 rural industries and 7/22 urban industries, capital productivity growth was negative.

Although at the aggregate level, both the sectors exhibited a mild rise in capital productivity and rising trends of both labour productivity⁶⁰ and capital per capita; at the disaggregated level two trends emerged. One with rising labour and capital productivity and capital per capita; and the other with declining capital productivity and rising labour productivity⁶¹ and capital per capita. To understand the phenomenon underlying these observed trends, we express labour productivity as a product of capital productivity and capital intensity in [5-1].

$$[5 - 1] \quad \frac{Y}{L} = \frac{Y}{K} \cdot \frac{K}{L}$$

i) In the first case, rising capital productivity and capital per unit of labour led to rise in labour productivity ([5-1]). ii) In the second case, decline in capital productivity (first R.H.S. term) is overshadowed by a faster rise in capital per unit of labour (second R.H.S. term). Hence, labour productivity (the L.H.S term) rises.

In this context, Felipe and Kumar's (2010) study on direction of technical change in India's organised manufacturing sector (without rural and urban break-up) during the period 1980 to 2007 and Marquetti's (2003) analysis of historical data on labour and capital productivities from both developing and developed countries need mention. Felipe and Kumar (ibid) found that technical change in India's manufacturing sector in

⁵⁸ Namely, IC 22,23,26,31,34,35

⁵⁹ Namely, IC 27,31,34

⁶⁰ Marquetti (2003) terms rising labour productivity and rising capital productivity as Hicks-neutral technical change

⁶¹ Marquetti (2003) terms rising labour productivity and declining capital productivity as Marx-biased technical change

the 1980s and 1990s was marked by decreasing capital productivity (capital-using) and increasing labour productivity (labour-saving). In other words, it was Marx-biased technical change. Post-2000 technical change was marked by increasing labour productivity (labour-saving) as well as increasing capital productivity (capital-saving). Although the quantum of increase differed, post-2000 they observed that technical change was Hicks-neutral. Marquetti found that Marx biased technical change dominated the process of technical innovation in capitalist countries. Instances of other forms, which he terms as non-Marx biased were also observed. Marquetti (2003) claims such trends are inevitabilities in the path of change in both developing and developed economies. Hence, our findings on labour and capital productivity trends in rural industries reflect both Felipe and Kumar's (2010) findings from India's organised manufacturing sector and Marquetti's (2003) analysis.

A snapshot of industry-wise average profit rate and growth rates of output, profit rate, labour and capital productivity and workforce size of rural and urban industries is tabulated in Table 5-3a and Table 5-3b. The purpose is to decipher patterns of interrelations, if any, between the listed variables⁶². All rural industries and 22/23 urban industries registered positive valued average profit rate and positive output growth rate. Most industries in both the sectors⁶³ had positive rates of growth of output, profit and labour and capital productivities. Among these industries, in most (9/15) rural industries and a few (3/12) urban industries the capital productivity growth rate exceeded labour productivity growth rate..

⁶² Compound annual growth rates of output, profit rate, labour productivity, capital productivity and workforce size are considered. This is so as exponential growth rate of profit rate could not be computed for all industries due to presence of negative values in data sets on profit.

⁶³ 15/23 in the rural sector and 12/23 in the urban sector

In both the sectors, industries⁶⁴ with declining profit rate registered declining capital and labour productivity. This study also finds that in 21/23 rural industries and 19/23 urban industries growth of labour productivity and output were positive and the profit rate was rising in all but IC 30 in the urban sector. Balakrishnan and Babu's (2003) study on India's manufacturing industry in the 1990s observed that faster growth in labour productivity was widespread in India's manufacturing industries. They also noted that labour productivity growth followed output growth. They concluded that "the Verdoorn Effect⁶⁵ may well be a feature of the Indian industry". Our study did not explore such nuances; but noted that both growth of output and labour productivity were positive valued⁶⁶.

Table 5-3a Compound Annual Growth Rate of Output, Profit Rate, Labour and Capital Productivity in India's Organised Manufacturing Industries in the Rural Sector (1997-98 to 2007-08)

IC	CAGR of Output in Organised Industries in the Rural Sector	CAGR of Profit Rate in Organised Industries in the Rural Sector	CAGR of Labour Productivity in Organised Industries in the Rural Sector	CAGR of Capital Productivity in Organised Industries in the Rural Sector	CAGR of Labour Force in Organised Industries in the Rural Sector	Average Profit Rate
15	0.0672	0.0181	0.0416	-0.0109	0.0248	12
16	0.1570	0.3265	0.1220	-0.0309	0.0308	126.93
17	0.0615	0.2075	0.0268	0.0149	0.0338	11.46
18	0.1112	-0.2057	-0.0245	-0.0697	0.1394	25.01
19	0.0531	-0.0099	-0.0144	-0.0045	0.0684	20.71
20	0.0821	0.0637	0.0556	0.0425	0.0254	10.6
21	0.1273	0.2925	0.0332	0.0801	0.0913	2.45
22	0.1381	0.1879	0.0813	0.1612	0.0524	24.54
23	0.3022	0.2411	0.1685	0.0830	0.1144	49.52
24	0.0715	0.0583	0.028	0.0372	0.0423	27.07
25	0.0747	0.0854	0.0123	0.0461	0.0618	18.02
26	0.2248	0.4361	0.1427	0.2006	0.0719	14.49

⁶⁴ Except IC 15 and 19 in the urban sector

⁶⁵ In 1949 Verdoorn defined a statistical relationship between output growth and growth in labour productivity. Based on it he stated that 'there exists a stable, long-run relation, between labour productivity and the level of output' (J.M.Katz,1968).

⁶⁶ However, output of the wearing apparel industry (IC 19) grew at a rate of 11.12 per cent and 5.93 per cent respectively in the rural and urban sectors although capital and labour productivities declined. From equation $\hat{Y} = \left(\frac{Y}{L}\right) + \hat{L}$, obtained by differentiating, $Y = \frac{Y}{L} \cdot L$, it is inferred that output is increasing in IC 19 in both the sectors on the strength of an increasing labour force.

IC	CAGR of Output in Organised Industries in the Rural Sector	CAGR of Profit Rate in Organised Industries in the Rural Sector	CAGR of Labour Productivity in Organised Industries in the Rural Sector	CAGR of Capital Productivity in Organised Industries in the Rural Sector	CAGR of Labour Force in Organised Industries in the Rural Sector	Average Profit Rate
27	0.1939	0.7163	0.1236	0.1629	0.0626	6.38
28	0.1989	0.197	0.0789	0.0482	0.1112	18.14
29	0.0943	0.106	0.0483	0.0355	0.0440	30.28
30	0.2181	-0.0416	0.0479	-0.0441	0.1624	164.16
31	0.1737	0.1797	0.0825	0.0812	0.0843	35.12
32	0.0569	0.239	0.0360	-0.0096	0.0201	18.53
33	0.0319	0.1061	0.0347	0.0588	-0.0027	63.81
34	0.2013	0.2307	0.0734	0.0767	0.1193	17.10
35	0.1244	0.1233	0.2302	-0.0010	-0.0858	64.4
36	0.1817	0.0914	0.0557	0.0584	0.1193	34.88
37	0.8636	-0.1859	0.5234	-0.0863	0.2251	0.66

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08). Significance levels: *p<0.1; **p<0.05; ***p<0.01.

Table 5-3b Exponential Growth Rate of Output, Profit Rate, Labour and Capital Productivity in India's Organised Manufacturing Industries in the Urban Sector (1997-98 to 2007-08)

IC	CAGR of Output in Organised Industries in the Urban Sector	CAGR of Profit Rate in Organised Industries in the Urban Sector	CAGR of Labour Productivity in Organised Industries in the Urban Sector	CAGR of Capital Productivity in Organised Industries in the Urban Sector	CAGR of Labour Force in Organised Industries in the Urban Sector	Average Profit Rate
15	0.0119	-0.0299	0.0137	0.0705	-0.0019	29.85
16	0.0075	0.036	0.0261	-0.0711	-0.0184	239.71
17	0.0186	-0.0948	0.0247	0.0406	-0.0060	-0.62
18	0.0667	-0.1004	-0.0167	-0.0356	0.0848	40.16
19	0.0666	-0.0402	-0.071	0.0171	0.0746	23.54
20	0.0590	0.3919	0.0895	-0.0639	0.0583	12.55
21	0.0119	0.1735	0.0515	0.0953	0.0046	11.94
22	0.0075	0.0507	0.0767	-0.014	0.0108	27.39
23	0.0186	0.0167	0.1294	0.0731	-0.0119	21.94
24	0.0667	-0.0216	-0.59	-0.0013	-0.0055	21.76
25	0.0666	0.0638	0.0542	0.0147	0.0175	11.12
26	0.1535	0.2301	0.1173	0.0373	0.0116	14.26
27	0.0561	0.1706	0.1184	0.1058*	0.0163	23.24
28	0.0882	0.1243	0.037	0.0268*	0.0738	33.47
29	0.1160	0.2046	0.06	0.0393*	-0.0060	32.31
30	-0.0114	-0.161	-0.0482	-0.155*	0.0790	14.85
31	0.0730	0.0731	0.0362	0.1045*	0.0152	48.11
32	0.1303	0.0077	0.0046	0.0021	-0.0119	15.88

IC	CAGR of Output in Organised Industries in the Rural Sector	CAGR of Profit Rate in Organised Industries in the Rural Sector	CAGR of Labour Productivity in Organised Industries in the Rural Sector	CAGR of Capital Productivity in Organised Industries in the Rural Sector	CAGR of Labour Force in Organised Industries in the Rural Sector	Average Profit Rate
33	0.1367	0.4237	0.1115	0.0166	0.0235	36.66
34	0.1135	0.2241	0.0637	0.2182*	0.0419	32.88
35	0.0857	0.0516	0.0518	-0.026	0.0133	30.19
37	0.4773	-0.1433	0.0735	-0.0199	0.3749	23.34

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08. Significance levels: *p<0.1; **p<0.05; ***p<0.01.

No definite relationship is observed between the improvements in capital and labour productivities and workforce size. In both the sectors, in very few industries improvements in productivities brought about a decline in workforce size. In most workforce sizes crawled up along with growth in capital and labour productivities.

The next section examines labour compensation (the level and the change in wage rate).

It also examines the variation in $\frac{K}{W}$, which is the price equivalent form of rising organic composition of capital. The purpose is to understand whether this capitalist sector in India's economy displayed trends akin to capitalist economies, as defined in the literature⁶⁷ (Weisskopf, 1979; Shaikh, 1978,1987).

5.1.2 Wage Bill, Capital Stock to Wage Bill Ratio

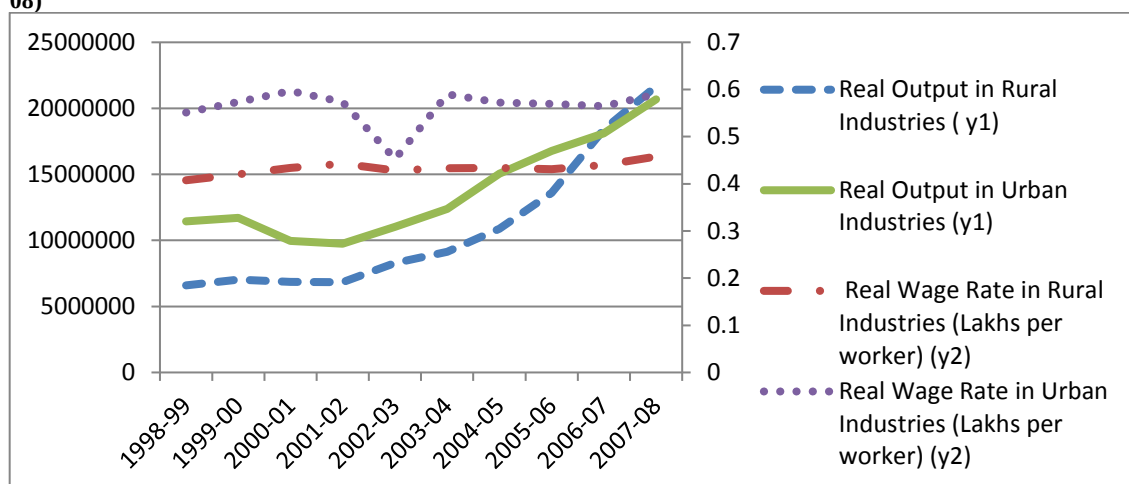
For our purpose, wage bill (w) refers to the real wage bill, the product of the real wage rate (w_r) and workforce size. In 19/23 urban industries the average wage rate⁶⁸ exceeded that of rural industries⁶⁹, implying that urban workforce is better paid than the rural workforce. Figure 5-2 reveals that at the aggregate level, wage rate in urban industries has been consistently higher, during the study period.

⁶⁷ Refer Chapter 4.

⁶⁸ Average wage rate is average wage bill/average workforce size in the study period.

⁶⁹ Refer Appendix 3, Table A3-13 for average wage rate in rural and urban industries.

Figure 5-2 Wage Rates and Output in Rural and Urban Manufacturing Industries Segments (1998-99 to 2007-08)



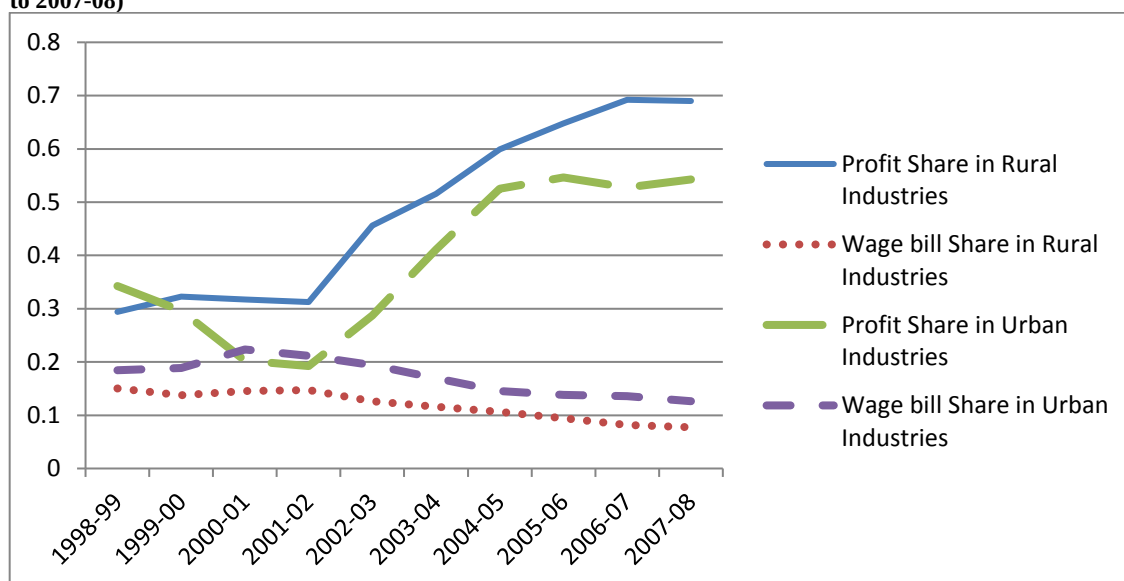
Period	Real Output in Rural Industries	Real Wage Rate in Rural Industries (Lakhs per worker p.a.)	Real Output in Urban Industries	Real Wage Rate in Urban Industries (Lakhs per worker p.a.)
1998-99	6593871.05	0.407526	11450329.85	0.551263
1999-00	7028860.61	0.420286	11718661.82	0.573413
2000-01	6857280.84	0.433783	9963721.394	0.596775
2001-02	6840084.13	0.442538	9750887.403	0.57373
2002-03	8281929.04	0.42824	11038887.27	0.452592
2003-04	9134010.2	0.43286	12389968.12	0.5896
2004-05	10874046	0.433523	15041016	0.57226
2005-06	13607745.1	0.431288	16770107.42	0.569602
2006-07	18390012.9	0.439551	18114890.94	0.564419
2007-08	21670323.6	0.457767	20681818.34	0.589774

Source: Computed using Time Series Data on Annual Survey of Industries (1998-99 to 2007-08)

At the disaggregated level, 18/23 rural industries registered a higher exponential growth rate of the wage bill than in the urban sector (refer Table 5-4). The growth rate figures were typically single digit implying a modest rise in wage bill levels, in most rural industries. Earlier findings revealed that at the aggregate level, the rate of growth of wage rate in the rural sector exceeded that in the urban sector.

In the rural sector, labour share ($\frac{W}{Y}$) in the total pie was lower (refer Figure 5-3) than that in the urban sector. This reflects an earlier finding that distribution of output among classes was less even in the rural sector.

Figure 5-3 Profit Share and Wage bill Share in Rural and Urban Manufacturing Industries Segments (1998-99 to 2007-08)



Period	Profit Share in Rural Industries	Wage bill Share in Rural Industries	Profit Share in Urban Industries	Wage bill Share in Urban Industries
1998-99	0.29404	0.150232	0.342272	0.1845
1999-00	0.322957	0.137573	0.296385	0.188518
2000-01	0.317198	0.145585	0.202689	0.223416
2001-02	0.31235	0.147243	0.192328	0.211334
2002-03	0.456184	0.126271	0.287211	0.194193
2003-04	0.515854	0.115797	0.411078	0.169414
2004-05	0.599188	0.10657	0.525478	0.145477
2005-06	0.648067	0.09411	0.546375	0.138037
2006-07	0.692165	0.081813	0.527816	0.135513
2007-08	0.690018	0.07737	0.542807	0.126306

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08).

How has the rising share of income of the capitalist class impacted the organic composition of capital, i.e. $\frac{K}{W}$ ratio in both rural and urban industries? Our interest in levels and growth of the organic composition of capital stems from the fact that this is one of the factors that pulls down the profit rate in Marx's analysis. We find that at the disaggregated level, both rural and urban industries had a $\frac{K}{W}$ ratio greater than 1⁷⁰. In the rural sector $\frac{K}{W}$ varied from 1.13 in the recycling industry (IC 37) in 2000-01 to 135.41 in the cork, refined petroleum products and nuclear fuel manufacturing industry (IC 23) in 2001-02. In the urban sector it varied from 1.18 in tobacco products manufacturing

⁷⁰ Refer Appendix 3, Table A3-14a and Table A3-14b for $\frac{K}{W}$ ratio in rural and urban industries respectively.

industry (IC 16) in 2001-02 to 45.18 in basic metals manufacturing industry (IC 30) in 2003-04. Thus, the capitalist's capital stock was many more times than the capitalist's wage bill. A comparison of capital stock to wage bill ratio of rural and urban industries reveals that barring a few, for most industries the ratio in the rural sector exceeded that in the urban sector. This reinforces the observation that rural industries are more capital intensive than urban industries. A probable reason for the observed higher rural capital stock to wage bill ratio could be higher capital accumulation coupled with low rural wage rates that kept the wage bill in check in rural areas. It also means that low labour wage rate did not apparently prompt a labour intensive production technology, as would be predicted by the standard neoclassical economics.

At the disaggregated level, 12/23 rural industries and 8/23 urban industries registered a declining rate of capital stock to wage bill ratio⁷¹ in the study period (refer Table 5-4). This indicates that a fair number of industries still register rising capital stock to wage bill ratio.

While the $\frac{K}{W}$ ratio was consistently higher in the rural sector than the urban sector, the rural sector showed a mild decline (-0.62 per cent) in the $\frac{K}{W}$ ratio and the urban sector a mild rise (1.67 per cent) in the study period, at the aggregate level. The profit rate in both the sectors showed substantial improvement in the same period (refer Figure 5-4). This implies that unlike capitalist economies (Weisskopf, 1979⁷²; Shaikh, 1987; Felipe and Kumar, 2010⁷³) capital stock accumulation did not bring down profit rates in India's organised manufacturing industries, in either sector. In other words, it is generally

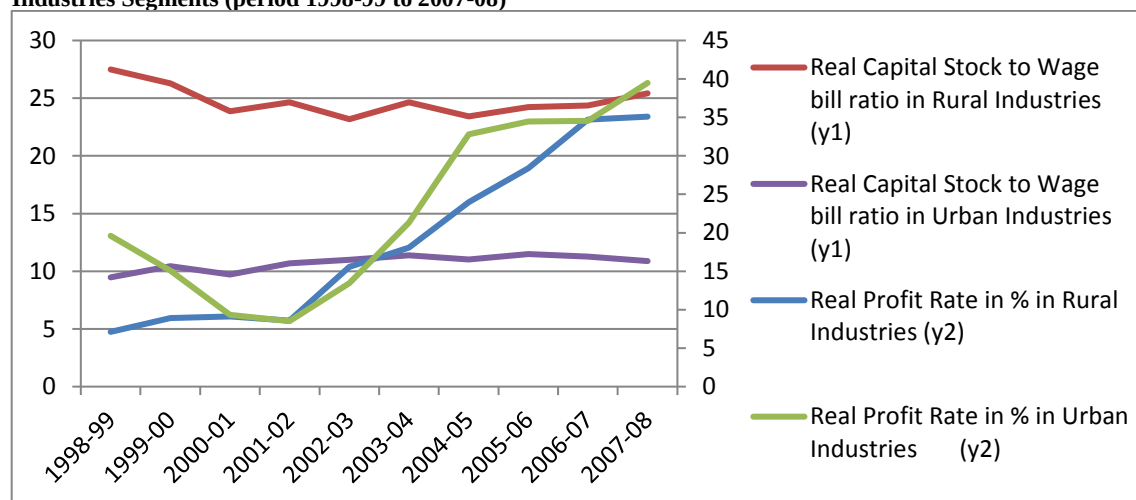
⁷¹ Appendix 3, Table 3-15 gives the CAGR of $\frac{K}{W}$ ratio in rural and urban industries respectively.

⁷² Refer Appendix 2,2-1, for Weisskopf's translated framework.

⁷³ Felipe and Kumar(2010) comment that "Capital accumulation and the need to innovate, which comes with the drive to increase profit rates, therefore ultimately causes a fall in the profit rate".

theorised, as the organic composition of capital (K/W) rises, Y/K falls (since it is labour which produces surplus), which reduces the rate of profit. This mechanism did not hold [4-3⁷⁴]. This is so, as the profit rate in India was propped up by rising profit share (at the cost of wage share), as evident in Figure 5-3.

Figure 5-4 Real Capital Stock to Wage Bill Ratio and Real Profit Rate in Rural and Urban Manufacturing Industries Segments (period 1998-99 to 2007-08)



Period	Real Profit Rate in % in Rural Industries	Real Capital Stock to Wage bill ratio in Rural Industries	Real Profit Rate in % in Urban Industries	Real Capital Stock to Wage bill ratio in Urban Industries
1998-99	7.12	27.49	19.60	9.47
1999-00	8.93	26.29	15.08	10.43
2000-01	9.13	23.87	9.33	9.73
2001-02	8.6	24.65	8.51	10.69
2002-03	15.58	23.18	13.46	10.99
2003-04	18.09	24.63	21.32	11.38
2004-05	24	23.43	32.81	11.01
2005-06	28.41	24.24	34.45	11.49
2006-07	34.72	24.37	34.54	11.27
2007-08	35.1	25.41	39.48	10.89

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08).

⁷⁴ $R = \frac{\pi}{K} = \frac{\pi}{Y} \cdot \frac{Y}{K}$

Table 5-4 Exponential Growth Rate of Wage Bill and Capital Stock to Wage Bill ratio in India's Organised Manufacturing Industries in the Rural and Urban Sectors (1997-98 to 2007-08)

IC	Exponential Growth Rate of Wage Bill in Organised Industries in the Rural Sector	Exponential Growth Rate of Wage Bill in Organised Industries in the Urban Sector	Exponential Growth Rate of Capital Stock to Wage Bill ratio in Organised Industries in the Rural Sector	Exponential Growth Rate of Capital Stock to Wage Bill ratio in Organised Industries in the Urban Sector
15	0.0329***	-0.0402	0.0319***	0.0210**
16	0.0693***	0.0483	0.077	0.0056
17	0.0375**	-0.0416*	0.005	0.0445***
18	0.1736***	0.0528	-0.0155	-0.0364***
19	0.0741***	-0.0091	-0.0127	-0.0319***
20	0.0414**	0.1374*	0.0105	0.0330
21	0.0272***	0.0158	-0.0015	-0.0090
22	0.0821***	0.0247**	-0.1231***	0.0837
23	0.0677**	0.0990*	0.0650	0.0774**
24	0.0588***	-0.0655*	0.0288*	0.0192
25	0.0769***	-0.0547	-0.0463***	-0.0064
26	0.0597***	0.0193**	-0.0593**	0.0417**
27	0.0656*	0.0253**	-0.0092	0.0125
28	0.1251***	0.0564***	-0.0748	0.0259*
29	0.0479*	-0.0007*	-0.0156	0.0345***
30	0.1552***	0.0975***	0.0052	0.1096
31	0.0889**	0.0138	-0.0495	-0.0337*
32	0.0781***	0.0091	0.0001	-0.0175
34	0.1401***	0.0295**	-0.0693**	-0.0394**
35	0.0379	0.0231**	0.0742	0.0152
36	0.0951***	0.1041***	0.0006	-0.0411
37	0.0845	0.4285***	0.481***	0.0383

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08). Significance levels: *p<0.1; **p<0.05; ***p<0.01.

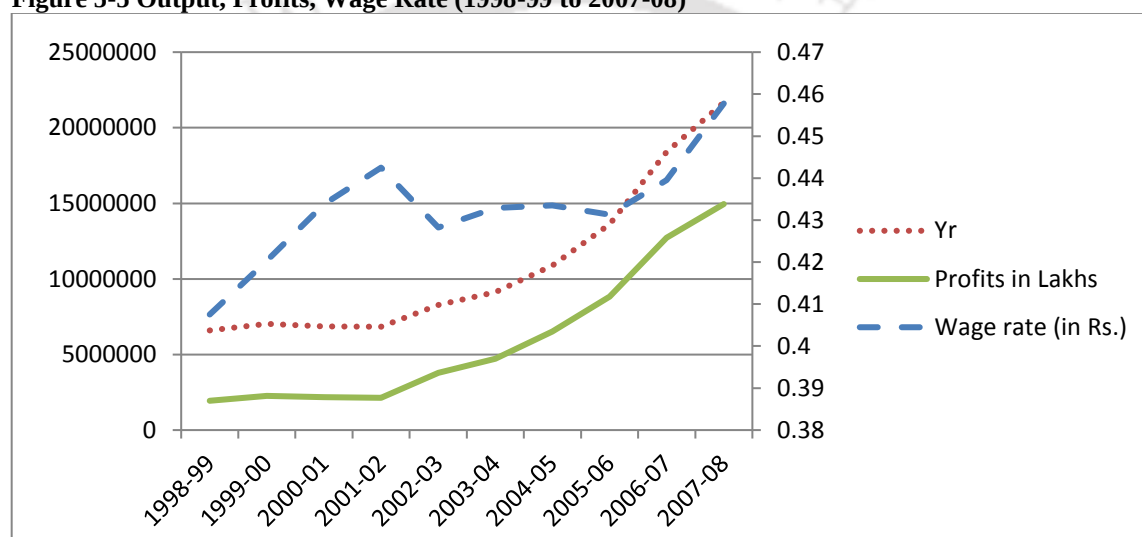
5.2 Data Trends and Relationships between Variables

Empirical evidence discussed in Chapter 4 and Chapter 5 reveal certain data trends and relationships between selected pairs of variables. These provide pointers to some aspects of the rural industries segment. We summarise the same below.

The broad data trends of rural industries (refer Figure 5-5 and Figure 5-6) show that i) the real output (Y) has increased steadily since 2002-03. Since 2002-03, the output growth rates (g) are positive and in double-digit figures. ii) Real profits (π), profit rate

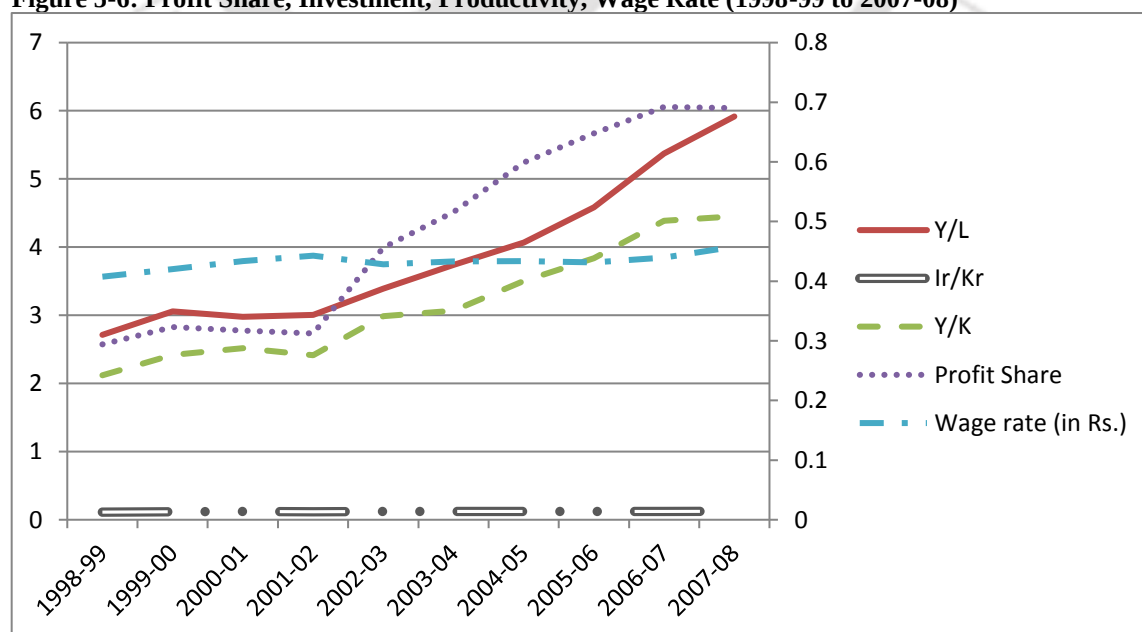
(R), profit share (θ) exhibit rising trend with minor dips around 2001-02. *iii*) There has been a steady but small rise in rural industrial worker's real wage rate (w) since 1998-99, with dips in 2002-03 and 2006-07. *iv*) Real investment (normalized to capital) ($\frac{I}{K}$) has risen since 1998-99, with dips in 2001-02 and 2005-06. *vi*) There has been a significant rise in real labour productivity ($\frac{Y}{L}$) since 2001-02. *vii*) The rise in capital productivity ($\frac{Y}{K}$) has been moderate since 1998-99, with a small dip in 2001-02.

Figure 5-5 Output, Profits, Wage Rate (1998-99 to 2007-08)



Source: Computed using Time Series Data on ASI (1998-99 to 2007-08)

Figure 5-6: Profit Share, Investment, Productivity, Wage Rate (1998-99 to 2007-08)



Source: Computed using Time Series Data on ASI (1998-99 to 2007-08).

Statistical tests on datasets of key variables in our model yielded results as mentioned below. Positive correlations exist between i) w and Y ; ii) $\frac{Y}{L}$ and Y ; iii) g and $\frac{Y}{K}$; iv) g and θ ; v) θ and $\frac{Y}{L}$; vi) θ and w . Statistically significant relationships at the 0.05, 0.01 and 0.001 levels were obtained for the above pairs of data sets excepting between θ and w .

Based on data trends and observed relationships between variables two propositions are in order:

[P1] The output of the rural organised, manufacturing sector increases with increases in the real wage rate and labour productivity of rural industrial workers;

[P2] The growth rate of output increases with an increase in the real wage rate and real labour productivity of rural industrial workers.

5.3 Chapter Summary

This chapter examined changes in levels and growth rates of economic indicators to construct an empirical outline of the rural industries. The findings in brief follow.

Rural industries generated more jobs and the workforce grew more than urban industries, as indicated by its larger workforce and higher workforce growth rate. However, in most rural and urban industries the labour force growth rate lagged the output growth rate. Labour was more productive in rural industries and capital was more productive in urban industries. Higher levels of capital per capita in rural industries indicate that greater capital deepening took place in this segment. Labour productivity showed a steady increase in rural industries. Capital productivity showed a mild increase in both rural and urban industries. At the disaggregated level, in both the sectors some industries showed Marx-biased technical change whereas others showed Hicks-neutral technical change.

During the study period, rural labourers' monetary compensation was lower than that of urban labourers, although rural labour productivity was higher. However, the wage bill growth rate was higher in the rural industrial segment. In both rural and urban industry segments, wage share was lower than profit share.

The capital stock to wage bill ratio (i.e. the organic composition of capital in the Marxist framework) was higher in the rural industries. There was a small decline of capital stock to wage bill ratio, in the rural industrial segment and a mild rise in the urban industrial segment, during the study period.

Empirically, industries in both the sectors showed rising profits, profit rate, output, productivities, capital intensity, wage rates. The quantum of increase varied across rural industries and urban industries.

Statistically significant relationships were observed between output (net value added) and wage rate; output (net value added) and labour productivity; growth in output and profit rate and growth in output and capital productivity.

Based on empirical observations and data trends discussed in chapter 4 and chapter 5, we present an analytical model in the next chapter. This model would enable us to explain the mechanisms underlying the aforementioned empirical observations and possibly validate our propositions on the rural organised manufacturing segment. In our model, the rural organised manufacturing sector is definitely not a standalone sector. We capture the influence of the agricultural wage rate on the rural industrial wage rate. But unlike the dual sector models (discussed in Chapter 6) the linkages between the agricultural sector and the rural organised manufacturing sector are not explored explicitly. Partly because there already exists rich expositions (Hymer and Resnick, 1969; Ranis and

Stewart, 1993) on inter-sectoral dynamics in a rural economy. And majorly because our focus is to emphasise the potential of the rural organised industries segment in India.



Chapter 6

A Model of Rural Industries

6.1 The Objective

The intent of the chapter is to explain how the distribution of income of the rural industrial sector between wages (the income of labourers) and profits (the income of capitalists) as well as how wage rate and labour productivity impact output and growth of output of the rural industrial sector. The industrial wage rate determines the labourers' purchasing power and profits that of the capitalists. The sum of the resultant consumption demand of capitalists and labourers contributes towards the aggregate demand for rural industrial produce. The aggregate demand determines the output of this sector (i.e. the output is demand determined and the price is fixed on a markup rule). Profits play a dual role here. First, in expanding the market for rural industrial produce in the short-run. Second, in determining the level of investment, which in turn impacts growth in the output of the rural industrial sector in the medium-run. Investment augments capital stock (both human and physical stocks) that brings about technical progress in the long-run. Technical progress manifests through an increase in productivities of both labour and capital.

Macroeconomic theories (Kaldor, 1955-56, 1961; Pasinetti, 1962) provide simple yet powerful relations between the rate of profit, distribution of income and the rate of growth of output, assuming capitalists and workers have different saving propensities. Robinson (1962, cited in Basu and Das, 2016) conceived an investment function, which illustrates the relationship between investment and profit rate. In our study, we propose a

framework that uses some of these established relationships to model the rural organised industrial sector⁷⁵.

The output of the rural industrial sector is described using the fixed-coefficient Leontief production function. At equilibrium, the short-run output (Y^*) is equal to the aggregate demand for goods of this sector. Aggregate demand is the sum of consumption demands of rural industrial capitalists, rural industrial workers and from the rest of the economy. The demand from the rest of the economy is assumed to be constant *ceteris paribus*. The consumption demand of rural industrial capitalists and rural industrial workers is a function of their respective incomes, as mentioned earlier.

The capitalists' income and the labourers' income are expressed in terms of the industrial wage rate (w_n), labour per unit of output (a), unit material cost (c) and raw material per unit of output (b). In this framework, the industrial wage rate is a function of the agricultural wage rate (w_a), as elaborated in a later section. Assuming constancy of b and c , this results in establishing connections between Y^* , w_n and a . With this the model provides us with handles that allow us to analyse how the short-run equilibrium output (Y^*) changes with changes in the rural industrial wage rate⁷⁶ (w_n) and labour per unit of output (a), which is the reciprocal of labour productivity⁷⁷.

To decipher how the medium-run growth in output (g) changes with change in w_n and a , we have used the dependence of investment on profit rate, provided by Robinson (1962, cited in Basu and Das, 2016).

⁷⁵ Subsequently, the rural organised, industrial sector is referred to as the rural industrial sector

⁷⁶ Similar results are obtained when we use real and nominal values of industrial wage rate.

⁷⁷ In this model a is labour per unit of output. Hence $\frac{1}{a} = \frac{Y}{L}$

The purpose of defining macroeconomic relations in terms of w_n and a is twofold. First, is to understand how changes in the rural industrial wage rate (w_n) and rural industrial labour productivity ($\frac{1}{a}$) impact change in the short-run equilibrium output (Y^*) and the medium-run growth in output (g). Secondly, given the challenges of underemployment and working poverty in rural India, we want to explore the significance of w_n and $\frac{1}{a}$ per se in augmenting growth of a sector. Needless to say that the growth of this sector will have a positive bearing on the rural economy as a whole.

It is obvious from the above that w_n and $\frac{1}{a}$ are two pivotal variables in our model. The reason for attaching primacy to w_n in our model is its two-fold dissimilar impact on rural industrial output. On one hand, w_n is a part of the input cost, so a change in w_n , impacts input cost, profits, levels of investment, and in turn industrial output. A rise in w_n is likely to bring down Y^* , unless the rise in wage rate is compensated by a rising labour productivity ($\frac{1}{a}$). On the other hand, w_n decides the purchasing power of the rural industrial labourer and his demand for goods and services which, again has a bearing on industrial output. A rise in w_n is likely to boost rural industrial output by this route. Another reason for attaching importance to w_n is the fact that the primary source of income for the poor in the developing world is their own labour: “the poor’s most abundant asset [is their] labour” (Fields, 2005; 1990 World Development Report, cited in Fields, 2005). So a change in the wage rate impacts the living conditions of many. This makes it a variable of import to policy makers, especially in developing economies.

The other variable of interest is the labour productivity ($\frac{1}{a}$) of rural industrial labourers, as its variation impacts both output and growth of this segment. Rise in labour productivity implies fall in labour per unit of output and input cost. Decline in a has a

dual differing impact on Y^* . Y^* tends to rise as demand increases due to fall in input cost and thus price of rural industrial goods (p). On the other hand, Y^* tends to fall due to decline in consumption demand of rural industrial workers' with decrease in the number of workers per unit of output. Hence, change in Y^* with change in a is analysed to understand, which of the aforementioned effects prevail. In the medium-run growth framework, with a decline in a wage bill falls and profits rise. This is likely to improve investment and lead to the growth of the rural industrial segment.

The existing dual sector models (Lewis, 1954; Fei and Ranis, 1961; Harris and Todaro, 1970; Bose, 1989; Dasgupta and Sinha, 1989; Hymer and Resnick, 1969; Rakshit, 1982; Ranis and Stewart; 1993) explore the linkages between the agricultural sector and the industrial sector and explain the process underlying phenomenon observed in one or both the sectors. Strictly speaking our model only explores the rural industrial sector. However, it captures the agricultural sector implicitly through the agricultural sector's nuanced influence on some of the key variables of the rural industrial sector. This is the rationale for studying the aforementioned dual sector models in the next section.

6.2 Dual Sector Models

Traditionally, models of the less developed economy have one sector represented as 'modern', 'formal', 'industrial' and 'urban' and the other sector as 'subsistence', 'informal', 'agricultural' and 'rural'. Usually the backward sector is associated with the rural economy and the modern sector is associated with the urban economy (Lewis, 1954; Fei and Ranis, 1961; Harris and Todaro, 1970; Bose, 1989; Dasgupta and Sinha, 1989). However, there have been departures from this construct: Hymer and Resnick (1969), Rakshit (1982) and Ranis and Stewart (1993), do not connect the rural economy

solely with agricultural activities; they have constructed dual sector models of the rural economy comprising of an agricultural sector and a non-agricultural sector.

Lewis's (ibid) model is essentially a study on how a poor economy is getting industrialised in the long-run through the process of labour reallocation from the agricultural sector to the industrial sector. This continues until the turning point is reached by when surplus labour has been totally transferred out of the agricultural sector at no additional cost. Then the marginal product of labour starts exceeding the prevailing agricultural wage rate. This leads to a rise in agricultural wages. The lasting legacy of Lewis's model is thinking of development as a process of structural transformation (Ranis, 2004; Basu, 1998; Kirkpatrick and Barrientos, 2004).

Ranis and Fei (ibid) extended and formalized the Lewis model, thereby adding rigour to the analysis of the transition of an underdeveloped economy. In the Lewis-Ranis-Fei model there is neither any constraint on capitalists' surplus nor of surplus labour in the agricultural sector, so the cycle of reinvestment, the creation of new capital, further expansion of the industrial sector and absorption of surplus labour from the subsistence sector proceeds smoothly over a protracted period of time. This smooth progression is not evidenced in the real world as pointed out by Dasgupta and Sinha (ibid). There are fluctuations in the rate of growth of industrial output in most developing economies.

Harris and Todaro's (ibid) model is also in the genre of a labour reallocation model in a developing economy. Workers decide to be in the rural or in the urban on the basis of their expectations to maximize their earnings.

Bose's (ibid) dual sector model addresses issues pertaining to an economy like India. He examines short-run determinants of demand of mass consumption good. He formalizes the inter-sectoral relationship between the agricultural sector and the mass consumption

good production sector. He shows how the price of food plays a significant role in determining the demand for, the output of and employment of the mass consumption good sector. His analysis also includes the impact of the change in agricultural output on food equilibrium and clothing equilibrium.

Dasgupta and Sinha (1989) argue that the effect of deteriorating terms of trade against industry with the transfer of surplus labour is significant even in the short run and results in fluctuation of output growth rate.

Rakshit's (ibid) model has a rural non-agricultural sector and an agricultural sector and none of the sectors follow the capitalist mode of production. The rural non-agricultural sector produces traditional goods for local consumption. Agriculture is the dominant sector of the rural economy in terms of employment and output. His model identifies factors determining the growth of output of the agricultural sector. It argues that growth in agricultural output favourably impacts employment in both the sectors of the rural economy.

The next two models analyse production possibilities in a rural open economy and the effect of colonial rule on it. Hymer and Resnick's (ibid) dual sector model looks at the impact of colonial rule on rural non-agricultural activities. The rural non-agricultural sector (termed z sector) produces traditional goods for local consumption (termed z goods). The model goes on to explain how linking of the rural market with the world market in the colonial period led to rise in demand for cash crops and consumption of imported manufactured goods. This led to the agricultural sector producing crops for the world and a resultant fall in rural non-agricultural activity. This is in line with the neoclassical model of trade (Heckscher Ohlin model) where poor labour surplus countries specialise in agricultural goods, which are labour intensive.

Ranis and Stewart's (ibid) model is a digression from Hymer and Resnick's model. In their model the z -sector has two sub-sectors, one produces z goods and the other produces non-traditional modern goods, termed z_m goods. Unlike Hymer and Resnick, they argue that z_m goods had a presence even in the colonial era. The agricultural sector has two sub-sectors, one produces crops (A_d) for domestic consumption and the other produces cash crops for export (A_e). Technological advancement in A_d sector releases resources to the z -goods sector and raises demand for the goods of the z -goods sector. They show how a dynamic agricultural sector and modernization of the z -goods sector led to equitable development, both under colonial and post-colonial favourable archetype. They validate their claim empirically using data from the Philippines and Taiwan. They also bring forth the fact that historical reasons and government policy decide whether an economy qualifies as a favourable or an unfavourable post-colonial archetype.

Our model addresses issues pertaining to an economy like India. Most existing models that capture trends and relationships in such economies do not associate (Rakshit, 1982; Bose, 1985; Dasgupta and Sinha, 1989) the capitalist mode of production with the rural sector. This is also true for models in the genre of labour reallocation (Lewis, 1954; Harris and Todaro, 1970). This implies that the capitalists' savings (that is, private capital) are available for investment only in the urban realm. The exception is Ranis and Stewart's (1993) model, but its focus is on inter-sectoral dynamics between the agricultural sector and the z – sector and its impact on production possibilities and consumption possibilities, during the process of development of a rural economy. It is true that the spatial coverage of our model is limited in comparison to Ranis and Stewart's (ibid) model, which captures the agricultural sector, the rural traditional industrial sector and the rural modern industrial sector.

Our model focuses on getting a detailed understanding of the workings of the rural industries segment with an objective to underscore its potential. It models a rural economy that has two sectors: agriculture and the rural industrial sector (which can be alternately termed as the rural modern sector). The framework examines the change in short-run equilibrium output (Y^*) of the rural industrial sector with change in rural industrial wage rate (w_n) and labour per unit of output (a). that is, reciprocal of labour productivity. Ours is different from Bose's (1985) model, which examined the short-run determinants of the urban modern mass consumption goods segment under constancy of nominal wages and varying food prices. Moreover, our model also determines the factors driving growth (g) of output of the rural industrial sector in the medium-run.

The first result obtained from our model is that a rise in w_n leads to an increase in Y^* . The logic underlying our result is that an increase in rural industrial wage rate (w_n) increases demand (D_{iw}) for rural industrial goods (demand-side effect) as well as price (p) of rural industrial goods (the supply-side effect). The demand-side effect prevails over the supply-side effect, hence Y^* rises with rise in w_n . The second result obtained from our model is that in the short-run Y^* increases with fall in labour productivity ($\frac{1}{a}$) and vice versa. This is so as the demand side effect (increase in demand for industrial goods (D_{iw}) with rise in number of industrial workers per unit of output (a)) prevails over the supply side effect (rise in price of industrial goods, p with increase in input cost due to rise in a). The third result from our model is that in the medium-run growth rate (g) of rural industrial output increases with i) increase in labour productivity ($\frac{1}{a}$), ii) decrease in w_n and iii) increase in capital productivity ($\frac{1}{v}$). This is so as profit share (θ) increases with increase in $\frac{1}{a}$ and decline in w_n . This, coupled with the increase

in capital productivity ($\frac{1}{p}$) increases profit rate (R) of the rural industrial segment. An increased value of profit rate (R) gives an increased value of g .

6.3 A Model of the Rural Industrial Sector

The agricultural sector in our model economy produces food. The rural industrial sector comprises of industries that produce non-traditional, modern goods like consumption goods, intermediaries (termed subsequently as input goods) and investment goods. It is a closed economy. Both rural and urban consumers consume food and the produce of the rural industries sector. Underlying the rural economy is a rural labour market that is marked by the following characteristics: *i)* It is fragmented along sectoral lines (agriculture and industrial); but the segments are interconnected. *ii)* Rural labour tends to move to the labour market that offers higher wage rates. *iii)* There is an absence of institutional mechanisms for enforcement of minimum wage in both the rural agricultural labour market and rural industrial labour market. *iv)* The rural industrial labour market attracts skilled labour due to higher wage rates and better working conditions compared to the rural agricultural market. *v)* The biggest share of rural labourers is employed in agriculture. *vi)* The rural agricultural labour market is characterized by low wage rates, seasonal demand for labour and poor working conditions. Hence, rural labour tends to move to other available labour markets (both rural and urban). The forces of demand and supply decide the rural agricultural wage rate like in the Harris-Todaro model. *vii)* The rural agricultural wage rate sets the floor for wages in the rural economy, in the absence of institutional mechanisms to define/enforce the minimum wage.

6.3.1 Determinants of Rural Wage Rates

The rural industrial capitalist wants to maximise his profit. At the same time, he requires an adequate supply of labour as surplus value production is not possible without labour. A high wage rate will eat into his profits and a low wage rate will fail to attract labour: this is his dilemma. He sets the industrial wage rate above the agricultural wage rate. In other words, he sets the wage high enough to attract skilled labour to meet his labour demand. In terms of the model, the nominal rural industrial wage rate w_n is indexed to the prevailing agricultural wage rate, w_a . Thus, in our model w_n is a function of w_a the agricultural wage, P_f the price of food and i interventions that may be done by the state or by non-state actors (we assume there are no state or non-state interventions, for the time being, i is mentioned here as the general case). w_n is a function of P_f as the rural industrial worker demands a hike in his wage to sustain his real income with rise in P_f . For the short-run and medium-run analysis, [6 – 1a] given below will be considered, where we ignore i .

$$[6-1] \quad w_n = f(w_a, P_f, i^{78})$$

$$[6-1a] \quad w_n = f(w_a, P_f), \quad \frac{\partial w_n}{\partial w_a} > 0, \quad \frac{\partial w_n}{\partial P_f} > 0$$

In our model the equilibrium w_a is determined by demand and supply conditions for labour in the agricultural labour market. To capture this, w_a is a function of the agricultural employment rate E_{ra} in our model.

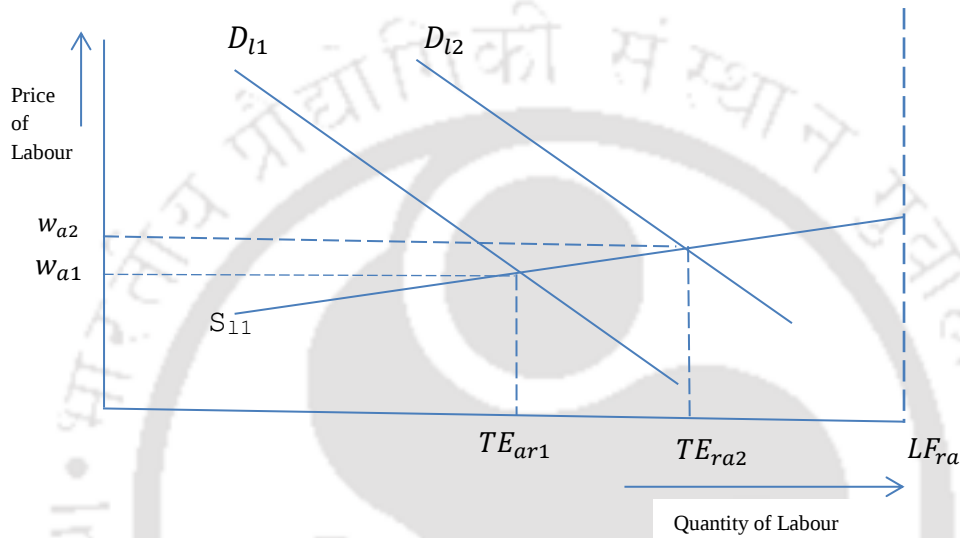
$$[6-2] \quad w_a = g(E_{ra}), \quad \frac{\partial w_a}{\partial E_{ra}} > 0$$

We adopt the definition of employment rate as follows,

⁷⁸ Refer Chapter 2 for evidence on increase in rural wage rate with implementation of MGNREGA.

$E_{ra} = \frac{TE_{ra}}{LF_{ra}}$, where TE_{ra} is the total employed workers in the rural agricultural sector and LF_{ra} is the total labour force in the rural agricultural sector under the most favourable conditions. TE_{ra} increases from TE_{ra1} to TE_{ra2} when demand for labour increases from D_{l1} to D_{l2} (refer Figure 6 – 1) and E_{ra} increases.

Figure 6-1 Determination of Agricultural Wage Rate (w_a)



As the labour market tightens (as the number of labourers available in the rural agricultural market declines from $(LF_{ra} - TE_{ra1})$ to $(LF_{ra} - TE_{ra2})$), the price of agricultural labour makes a mild jump from w_{a1} to w_{a2} . As w_n is a function of w_a , any change in w_a will result in a change in w_n .

6.3.2 Output, Price and Distribution of Output

6.3.2.1 Output

Let Y denote the real output (net value added) of the rural industries sector. Output-input relation of this sector is described using the Leontief Production Function or the fixed-coefficient production function. Rural industries have a certain number of installed machinery that require a certain number of labour hours for obtaining a certain level of

output. To increase the full capacity output both machinery and labour have to be increased in a certain proportion.

$$[6-3] Y = \min\left(\frac{L}{a}, \frac{K}{v}\right)$$

In equilibrium in the medium run, when both L and K vary we get,

$$[6-3a] \frac{L}{a} = \frac{K}{v}$$

$$[6-3b] Y = \frac{K}{v}$$

where L and K are labour and capital inputs respectively to the production process, a the labour required to produce one unit of output, that is, a is labour to output ratio, reciprocal of labour productivity. v is the capital required to produce one unit of output, that is v is capital to output ratio, reciprocal of capital productivity.

6.3.2.2 Price Determination

Price of industrial goods is determined using mark-up pricing. Price (p) of such goods is a mark-up⁷⁹ (λ) over short run unit cost that is, the price is cost-determined [6-4a]. We assume that marginal cost equals average cost. Short-run unit cost or marginal cost (μ) is the sum of marginal costs of material⁸⁰ ($b.c$) and labour ($a.w_n$) .

$$[6-4a] p = a.w_n + b.c + \lambda(a.w_n + b.c)$$

$$[6-4b] p = (1 + \lambda)(a.w_n + b.c)$$

$$[6-4c] p = \mu(1 + \lambda)$$

⁷⁹Given Lee's(1984) exhaustive work on pricing procedures, when talking about λ , a mention of Lee's(1984) views may not be out of place,. Lee had reservations about the widespread use of mark-up pricing in macroeconomic models. His argument was that most industries were large corporations, where mark-up method of pricing was not prevalent; it was a method of pricing adopted in smaller firms (Lavoie, 2016). As rural organised sector manufacturing industries in India certainly qualify in the genre of smaller industries than mega corps, we are possibly exempted from Lee's criticism.

⁸⁰Material Cost comprises total cost of fuels and materials consumed

where w_n is the money value of the rural industrial wage rate that is, price of rural industrial labour, c is the unit cost of material. w_n and c are determined by factors external to the industrial sector. As mentioned earlier, w_n is decided by w_a and P_f , c is decided by technological requirements of inputs per unit of output in the production process. The capitalist determines the mark-up keeping in mind the competitor's price and the quantum of returns he expects⁸¹. In order to stay competitive firms may reduce mark-up when there is a significant rise in the industrial wage rate and vice-versa, thereby restricting variation in p . Thus, λ could be thought of as a function of wage rate.

$$[6 - 5] \lambda = \lambda(w_n),$$

In our model, $\frac{\partial \lambda(w_n)}{\partial w_n} < 0$ ⁸². For $\lambda = \lambda(w_n)$, price of industrial goods depends on the

capitalist's tweaking of λ with change in w_n . Accordingly⁸³, $\frac{\frac{\Delta p}{p}}{\frac{\Delta w_n}{w_n}}$, the elasticity of

industrial price with respect to wage rate, can be positive, negative or equal to zero.

⁸¹This is in line with Eichner's theory on determinants of mark-up. There are different views on determinants of mark-up. Sawyer (1998) neatly sums up the Kaleckian view on mark-up. He states that in Kalecki's early work (1954, cited in Sawyer 1998) degree of monopoly determined the extent of mark-up; however, in a later paper (1971b, cited in Sawyer, 1998), Kalecki presented a different view: trade unions influenced mark-up of prices over costs and mark-up decided the real wage for a given ratio between material costs and costs. Thus, Kalecki moved from mark-up being decided by product market considerations to it being decided by both labour and product market considerations. Eichner (1976, cited in Lavoie, 2016) also advocated that mark-up over unit costs set prices; but he had a different take than Kalecki on what determines the degree of mark-up. For Eichner, mark-up was determined by the firm's requirement to finance its output expansion and research and development. Lavoie (2016) points out that this view of deciding costing margin is popular as it links micro-economic pricing behaviour of the firm with macroeconomic growth model, where profit share rises with increase in growth rate of output due to increase in capital stock. Increase in mark-up augments profit share, whereas an increase in wage rate augments wage share. In Eichner's framework, income required by capitalists drives mark-up. Thus, the latter Kaleckian view that extent of mark-up is influenced by trade unions appears to be contrary to Eichner's view.

⁸² Rotemberg and Woodward (1999) in their empirical analysis of data of American industries found that during a boom, variation in mark-up is counter-cyclical whereas variation of marginal cost, which is proportional to the average labour cost in their analysis, is pro-cyclical viz. mark-up and wage rate share a negative correlation.

⁸³ Refer Appendix 4, A4-1

6.3.2.3 Distribution of Output

Let y_n denote the money value of net value added per unit of output viz. (the money value of unit output – material cost per unit of output).

$$[6 - 6] \quad y_n = p - b.c$$

For every unit of output produced, y_n gets shared between capitalists (second R.H.S. term of [6-6b]) and labourers (first R.H.S. term of [6-6b]).

$$[6 - 6a] \quad y_n = \text{Wagebill} + \text{Profits, per unit of output}$$

$$[6 - 6b] \quad y_n = a.w_n + \lambda(a.w_n + b.c), \text{ from } [6 - 4a]$$

$$[6 - 6c] \quad y_n = a.w_n + \lambda.\mu, \text{ from } [6 - 4c]$$

The distribution of output between capitalists and labourers determines demand patterns for various goods and services. Put simply, rise in capitalists income will increase demand for goods and services required by capitalists. This in turn will lead to growth in output of industries manufacturing such goods and services. A closer examination of [6 - 6b] indicates that change in capitalists income depends on quantum of change in a and w_n . We obtain capitalist's income as a share of total income viz. profit share (θ) in terms of λ and unit cost as,

$$[6 - 7] \quad \theta = \frac{\lambda(a.w_n + b.c)}{a.w_n + \lambda(a.w_n + b.c)},$$

$$\theta = \frac{\lambda}{\lambda + \frac{a.w_n}{a.w_n + b.c}}$$

$$\theta = \frac{\lambda}{\lambda + \frac{a.w_n}{\mu}}$$

$$[6 - 7a] \quad \theta = \theta(w_n, a), \text{ follows from } [6 - 6b]$$

And labourers share $(1 - \theta)$ as,

$$[6 - 8] \quad (1 - \theta) = 1 - \frac{\lambda}{\lambda + \frac{aw_n}{a.w_n + b.c}},$$

$$(1 - \theta) = \frac{\frac{a.w_n}{a.w_n + b.c}}{\lambda + \frac{a.w_n}{a.w_n + b.c}}$$

$$(1 - \theta) = \frac{\frac{a.w_n}{\mu}}{\lambda + \frac{\mu}{\mu}}$$

$$[6 - 8a] \quad (1 - \theta) = (1 - \theta)(w_n, a), \text{ follows from } [6 - 6b]$$

6.3.3 Output in the Short-Run

The short-run output of the rural industrial sector gets determined by the demand in the short-run (Weisskopf, 1979). In such a state, the installed capacity of capital stock may remain unutilised. Let the initial equilibrium output be Y^* . The capitalists' stock (K_{sr}), which corresponds to short-run full capacity output (Y_{sr}) may exceed the capital stock that actually gets utilized in the short-run due to lack of demand. Capitalists' deploy labour (L^*) proportional to the demand determined output. The assumptions in the short run are: *i*) K_{sr} is constant. *ii*) Capital per unit of output (v) is constant. *iii*) c the unit cost of material is constant. *iv*) Initial equilibrium output (Y^*) is lower than or equal to the full capacity output (Y_{sr}).

6.3.3.1 Demand

Given the spectrum of goods produced by the rural industrial sector, demand for its output comes from various groups as given in [6 - 9].

$$[6 - 9] \quad D = \sum D_i,$$

Where $i = \{\text{rural industrial workers, rural industrial capitalists and others}\}$

To keep things simple in this model, consumption demand is a linear function of the form $D = x + k.z$, where x is the autonomous demand, z the consumer's real income

and k , the marginal propensity of consumption of goods of this sector. This form of demand function links the consumer's real income or in other words purchasing power to demand. It underscores the primacy of income in regulating demand at the macro level. This is admittedly a very simple form of demand function, which we are using for the sake of exposition. The demand functions of different classes of consumers of the rural industrial sector are outlined below.

6.3.3.1.1 Demand by Industrial Workers (D_{iw})

$D_{iw} = a_{iw} + k_{iw} \cdot W$, where a_{iw} is the autonomous (real) demand of industrial workers, k_{iw} is the marginal propensity of consumption of industrial workers for industrial goods, W is the real wage bill and is expressed as product of real wage rate ($\frac{w_n}{p}$) and number of workers ($Y \cdot a$), since $\frac{L}{a} = Y$. k_{iw} is assumed to be constant.

Thus, we obtain

$$[6 - 10a] D_{iw} = a_{iw} + k_{iw} \cdot Y \cdot a \cdot \frac{w_n}{p}, \quad \text{where } \frac{w_n}{p} \text{ is the real industrial wage rate, } Y \cdot a \text{ represents } L, \text{ as } \frac{L}{a} = Y.$$

6.3.3.1.2 Demand by Capitalists (D_c)

$$D_c = a_c + k_c \cdot \pi,$$

$$[6 - 10b] D_c = a_c + k_c \cdot \left\{ \frac{Y}{p} \cdot \lambda \cdot (a \cdot w_n + b \cdot c) \right\},$$

where $\lambda \cdot (a \cdot w_n + b \cdot c)$ is profit per unit of output, k_c is the marginal propensity of consumption of industrial capitalists for industrial goods. k_c is assumed to be a constant.

6.3.3.1.3 Demand by Agricultural Workers (D_a)

$D_{aw} = a_{aw} + k_{aw} \cdot W_a$, where a_{aw} is the autonomous (real) demand of industrial workers, k_{aw} is the marginal propensity of consumption of agricultural workers for

industrial goods, W_a is the real wage bill of agricultural workers. k_{aw} is assumed to be constant for simplicity, like other consumption propensities.

[6 – 10c] $D_{aw} = a_{aw} + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}}$, where L_a is the agricultural workforce and P_{aw} is price index of agricultural labourers.

6.3.3.1.4 Demand by the Rest of the Economy

Demand from the rest of the economy is lumped together as D_o and is assumed to be constant ceteris paribus. We consider two possibilities of short-run demand.

6.3.3.1.5 Economy's Aggregate Demand

Case 1: In the first case, the demand of agricultural workers is lumped together with the rest of the economy. This case examines the demand of rural industrial capitalists and rural industrial workers for rural industrial sector's produce. In subsequent exercises this is considered as the aggregate demand for produce of this sector.

The short-run total demand D for output of the rural industrial sector is given as

$$D = D_o + D_{iw} + D_c$$

$$D = D_o + a_{iw} + a_c + k_{iw} \cdot W + k_c \cdot \pi$$

$$D = D_o' + k_{iw} \cdot Y \cdot a \cdot \frac{w_n}{P} + k_c \cdot \frac{Y \cdot \lambda}{P} \cdot (a \cdot w_n + b \cdot c)$$

$$\text{where } D_o' = D_o + a_{iw} + a_c$$

$$[6 – 10d] D = D_o' + \{ k_{iw} \cdot a \cdot \frac{w_n}{P} + k_c \cdot \frac{\lambda}{P} \cdot (a \cdot w_n + b \cdot c) \} \cdot Y$$

Case 2: In the second case, the demand of agricultural workers is specified explicitly and not lumped with the demand from the rest of the economy. As the bulk of the rural workforce is engaged in agriculture, it is worth stating demand of agricultural workers

separately. It provides us a handle to examine, how a change in income of this class impacts output of this segment⁸⁴. It could possibly be explored further in the future. The short-run total demand D for the output of the rural industrial sector is given as,

$$D = D_o + D_{aw} + D_{iw} + D_c$$

$$D = D_o + a_{aw} + a_{iw} + a_c + k_{aw} \cdot W_a + k_{iw} \cdot W + k_c \cdot \pi$$

$$D = D_o' + k_{iw} \cdot Y \cdot a \cdot \frac{w_n}{p} + k_{aw} \cdot L_a \cdot \frac{w_a}{p_{aw}} + k_c \cdot \frac{Y \cdot \lambda}{p} \cdot (a \cdot w_n + b \cdot c)$$

$$\text{where } D_o' = D_o + a_{iw} + a_c + a_{aw}$$

$$[6-10e] D = D_o' + \{ k_{iw} \cdot a \cdot \frac{w_n}{p} + k_c \cdot \frac{\lambda}{p} \cdot (a \cdot w_n + b \cdot c) \} \cdot Y + k_{aw} \cdot L_a \cdot \frac{w_a}{p_{aw}}$$

6.3.3.2 Equilibrium Condition

Here the demand of industrial workers and industrial capitalists explicitly stated; demand of others lumped together and constant. In other words we pursue [6-10d].

In this case, at equilibrium we must satisfy the following condition (intersection of D_1 and S_1 in Figure 6-2)

$$[6-11] Y^* = D_o' + \{ k_{iw} \cdot a \cdot \frac{w_n}{p} + k_c \cdot \frac{\lambda}{p} \cdot (a \cdot w_n + b \cdot c) \} \cdot Y^*$$

$$Y^* \{ 1 - k_{iw} \cdot a \cdot \frac{w_n}{p} - k_c \cdot \frac{\lambda}{p} \cdot (a \cdot w_n + b \cdot c) \} = D_o'$$

$$[6-11a] Y^* = \frac{D_o'}{\alpha}, \text{ where } \alpha = \{ 1 - \frac{1}{(\lambda+1)(a \cdot w_n + b \cdot c)} (k_{iw} \cdot a \cdot w_n + k_c \cdot \lambda(a \cdot w_n + b \cdot c)) \}$$

It follows from [6-11a] that w_n and a impact Y^* . We have identified four cases as discussed below, to analyse how Y^* changes in the short-run when either or both w_n and a change.

⁸⁴ This case has been detailed out in Appendix 4, A4-8

Case 1: Change in Y^* with w_n , for $\lambda = \text{constant}$, $a = \text{constant}$

We partially differentiate [6 – 11a] with respect to w_n to get the comparative static result,

$$[6 - 12] \quad \frac{\partial Y^{*85}}{\partial w_n} = - \frac{D_0' \cdot \frac{\partial \alpha}{\partial w_n}}{\alpha^2} ,$$

$$\text{where } \alpha = \left\{ 1 - \frac{1}{(\lambda+1)(a \cdot w_n + b \cdot c)} (k_{iw} \cdot a \cdot w_n + k_c \cdot \lambda (a \cdot w_n + b \cdot c)) \right\}$$

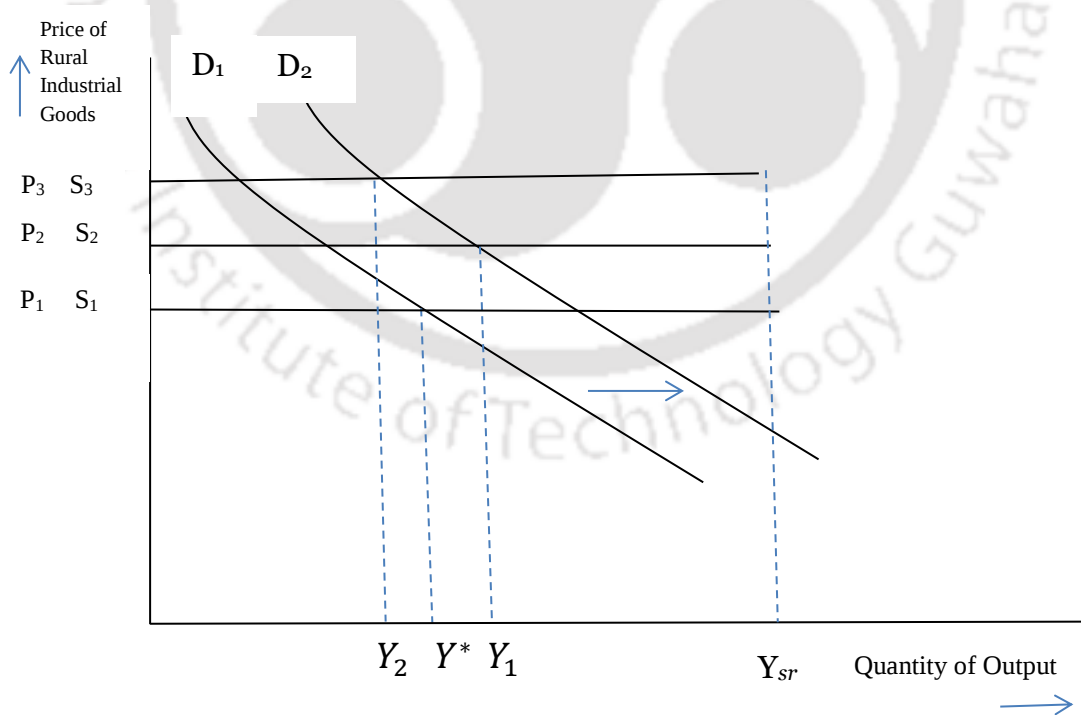
We obtain,

$$[6 - 12a] \quad \frac{\partial Y^*}{\partial w_n} = \frac{D_0'}{\alpha^2 \cdot (\lambda + 1)} \cdot \left\{ \frac{k_{iw} \cdot abc}{(a \cdot w_n + b \cdot c)^2} \right\}$$

Thus, $\frac{\partial Y^*}{\partial w_n} > 0$ for $\lambda = \text{constant}$.

The result implies that an increase in w_n brings about an increase in Y^* . Increase in w_n

Figure 6-2 Change in Output in the Short-Run with Change in w_n



⁸⁵ Refer Appendix 4, A4-2

increases both the demand for industrial goods (D_{iw} i.e. demand-side effect) and the price of output (P i.e. supply-side effect).

The demand curve moves from D_1 to D_2 and price moves from P_1 to P_2 . The new equilibrium point is Y_1 and it satisfies the condition $\frac{\partial Y^*}{\partial w_n} > 0$. However, if the price moves to P_3 the new equilibrium point is Y_2 . This is not a valid equilibrium point in our model as the condition $\frac{\partial Y^*}{\partial w_n} > 0$ is violated. The intuition underlying the finding $\frac{\partial Y^*}{\partial w_n} > 0$ is that a rise in w_n increases the industrial worker's purchasing power. This results in a substantial increase in the industrial workers' consumption demand (D_{iw}). A rise in w_n also increases the input cost and hence the price p of the industrial produce, which is likely to pull down the demand. Its impact on D_{iw} overshadows the impact on p viz. $\Delta D_{iw} \gg \Delta p$. Hence, Y^* increases with increase in w and vice-versa.

Goodwin (1983) had also observed that the impact of a rise in money wage rate on rise in price is small, which would imply that the dampening effect on demand of a wage rise is likely to be low.

Case 2: Change in Y^ with w_n , for $\lambda = \lambda(w_n)$, $a = \text{constant}$*

We partially differentiate [6 – 11a] with respect to w_n for $\lambda = \lambda(w_n)$, to get the comparative static result,

$$\frac{\partial Y^{*86}}{\partial w_n} = - \frac{D_0' \cdot \frac{\partial \alpha}{\partial w_n}}{\alpha^2}$$

Differentiating [6 – 11a] we obtain

$$[6-12b] \frac{\partial Y^*}{\partial w_n} = \frac{D_0'}{\alpha^2} \cdot \left[\frac{(1+\lambda)a.b.c.k_{iw} - a.w_n.k_{iw} \cdot (a.w_n + b.c) \cdot \lambda'(w_n)}{\{(\lambda+1)(a.w_n + b.c)\}^2} + \frac{k_c \cdot \lambda'(w_n)}{(\lambda+1)^2} \right]$$

⁸⁶ Refer Appendix 4, A4-3.

Since, $\frac{\partial \lambda}{\partial w_n} < 0$, $\lambda'(w_n)$ has a negative bearing on the second and third R.H.S terms of [6-12b].

$\frac{\partial Y^*}{\partial w_n} > 0$, for $\lambda = \lambda(w_n)$, if the following condition is satisfied:

$$\frac{(1+\lambda)a.b.c.k_{iw}}{(\lambda+1)^2(aw_n+b.c)^2} - \frac{a.w.k_{iw}.(a.w_n+b.c).-|\lambda'(w_n)|}{(\lambda+1)^2(aw_n+b.c)^2} + \frac{k_c.-|\lambda'(w_n)|}{(\lambda+1)^2} > 0$$

$$\frac{1}{(\lambda+1)^2} \left[\frac{(1+\lambda)a.b.c.k_{iw}}{(aw_n+b.c)^2} + \frac{a.w.k_{iw}.(a.w_n+b.c).|\lambda'(w_n)|}{(aw_n+b.c)^2} \right] > \frac{k_c.|\lambda'(w_n)|}{(\lambda+1)^2}$$

The above condition is satisfied when i) the marginal propensity of consumption of the capitalist (k_c) = 0 and the marginal propensity of consumption of the industrial worker (k_{iw}) = 1. This is an extreme case. It guarantees that there is at least one case where this condition is satisfied. On the other hand, if ii) $1 > k_c > 0$ and $1 > k_{iw} > 0$ and the marginal propensity of the industrial workers (k_{iw}) is sufficiently greater than 0 then also the effect of wage rate on output is positive. This is a likely case since workers being more poor would have a high marginal propensity of consumption for industrial goods, many of which are mass production goods.

Given the aforementioned assumptions two different cases follow from [6 – 11]. They are,

$$[6 - 13a] Y = h(w_n, a) \text{ for } \lambda = \text{constant}$$

$$[6 - 13b] Y = k(w_n, a, \lambda) \text{ for } \lambda = \lambda(w_n)$$

$$[6 - 14] \Delta Y = \frac{\partial Y}{\partial w_n} . \Delta w_n + \frac{\partial Y}{\partial a} . \Delta a$$

Case 3: Change in Y^* with a and w_n , for $\lambda = \text{constant}$

$\frac{\partial Y}{\partial w_n}$ has been calculated for $\lambda = \text{constant}$ above.

We partially differentiate [6 – 11a] with respect to a to get the comparative static result

$$[6 - 12c] \frac{\partial Y^{87}}{\partial a} = \frac{D_o'}{\alpha^2 \cdot (\lambda + 1)} \cdot \left\{ \frac{k_{iw} \cdot bcw_n}{(a \cdot w + b \cdot c)^2} \right\}$$

Thus, $\frac{\partial Y}{\partial a} > 0$. This implies that when a declines, that is when labour per unit of output falls or in other words labour productivity rises Y declines. The underlying intuition is that when a declines, it impacts both D_{iw} (demand side condition) and P (supply side condition). D_{iw} falls (demand curve moves from D_1 to D_2) as the size of the industrial workforce declines with declining a since less labour is required per unit of output. P (the supply curve shifts from S_1 to S_2) falls due to rising labour productivity $\left(\frac{1}{a}\right)$ and the resultant declining wage cost per unit of output. A fall in price boosts real demand but that gets eclipsed with fall in D_{iw} due to fall in size of the industrial workforce. The equilibrium output therefore falls from Y^* to Y_1 , where $Y_1 < Y^*$. As the impact of change in real demand due to change in size of the industrial workforce prevails over that that due to change in price with change in labour productivity we obtain $\frac{\partial Y}{\partial a} > 0$.

For $\lambda = \text{constant}$, substituting $[6 - 12a]$ and $[6 - 12c]$ in $[6 - 14]$ we get $\Delta Y > 0$,

$$[6 - 14a] \Delta Y = \frac{D_o'}{\alpha^2 \cdot (\lambda + 1)} \cdot \left\{ \frac{k_{iw} \cdot abc}{(a \cdot w + b \cdot c)^2} \right\} \cdot \Delta w + \frac{D_o'}{\alpha^2 \cdot (\lambda + 1)} \cdot \left\{ \frac{k_{iw} \cdot bcw}{(a \cdot w + b \cdot c)^2} \right\} \cdot \Delta a$$

as it follows from $[6 - 12a]$ and $[6 - 12c]$ respectively that the coefficients of Δw and Δa are positive. In other words, the short-run equilibrium output of the rural industrial sector increases with increase in the rural industrial wage rate and increase in labour per unit of output.

Case 4: Change in Y^ with a and w_n , for $\lambda = \lambda(w)$*

$\frac{\partial Y}{\partial w_n}$ has been calculated for $\lambda = \lambda(w_n)$ above.

For $\lambda = \lambda(w)$, substituting $[6 - 12b]$ and $[6 - 12c]$ in $[6 - 14]$ we get,

⁸⁷ Refer Appendix 4, A4-4

$$[6 - 14b]\Delta Y = \frac{D_o'}{\alpha^2} \cdot \left\{ \frac{(1+\lambda)a.b.c.k_{iw} - a.w.k_{iw} \cdot (a.w+b.c).\lambda'(w)}{\{(\lambda+1)(aw+b.c)\}^2} + \frac{k_c.\lambda'(w)}{(\lambda+1)^2} \right\} \cdot \Delta w$$

$$+ \frac{D_o'}{\alpha^2.(\lambda+1)} \cdot \left\{ \frac{k_{iw}.bcw}{(a.w+b.c)^2} \right\} \cdot \Delta a$$

The coefficient of Δa is positive refer $([6 - 12c])$ and the coefficient of Δw is positive for the scenarios stated in case 2. Hence, it follows that $\Delta Y > 0$ i) when both the coefficients of Δw and Δa are positive. ii) when the coefficient of Δa overshadows a negative coefficient of Δw ⁸⁸. A summary of the results obtained so far are given in the Table 6-1 below.

A summary of the results obtained so far are given in Table 6-1 below.

Table 6-1 Results of Comparative Static Analysis: Short-Run Equilibrium Output

Case No.	Case Description	Result
1 Case 1:	Change in Y^* with the change in w_n for $\lambda=\text{constant}$, $a=\text{constant}$	The short-run equilibrium output (Y^*) increases with an increase in the wage rate of rural industrial workers(w_n) . Thus, $\frac{\partial Y^*}{\partial w_n} > 0$ $\lambda = \text{constant}$, $a = \text{constant}$
1 Case 2:	Change in Y^* with change in w_n for $\lambda = \lambda(w)$, $a = \text{constant}$	The short-run equilibrium output (Y^*) increases with an increase in the wage rate of rural industrial workers (w_n) for $\lambda = \lambda(w)$, if marginal propensity of the industrial worker (k_{iw}) is sufficiently greater than 0.
2 Case 1:	Change in Y^* with change in a and change in w_n for $\lambda=\text{constant}$	The short-run equilibrium output increases with increases in labour per unit of output (a) and wage rate of rural industrial workers(w_n) , for $\lambda = \text{constant}$.
2 Case 2:	Change in Y^* with change in a and change in w_n for $\lambda = \lambda(w)$	The short-run equilibrium output increases with increases in labour per unit of output (a) and wage rate of rural industrial workers(w_n) , for $\lambda = \lambda(w)$ for two conditions. i) when both $\frac{\partial Y}{\partial w_n}$ and $\frac{\partial Y}{\partial a}$ are positive ii) when $\frac{\partial Y}{\partial w_n} < 0$ but the positive effect of $\frac{\partial Y}{\partial a}$ overshadows the negative effect of $\frac{\partial Y}{\partial w_n}$.

Empirically speaking we have found that short-run equilibrium output (Y^*) of the rural industrial sector increased with a simultaneous i) increase in wage rate and ii) increase in labour productivity of rural industrial workers that is a decrease in labour per unit of

⁸⁸ The coefficient of Δw maybe negative when k_{iw} is not sufficiently greater than zero.

output. The empirical observations can be expressed as $\Delta Y > 0$ when $\Delta w > 0$ and $\Delta\left(\frac{1}{a}\right) > 0$. To reconcile the empirical observations with the theoretical results we take a relook at [6 – 14a]. The second empirical finding that the labour productivity is rising implies that the second term in the equation [6 – 14a] has a negative bearing. We observe rising rural industrial output (Y^*) with rising rural industrial wage rate (w_n) and falling labour per unit of output (a), as the positive bearing of w_n (first term on R.H.S. of [6 – 14a]) surpasses the impact of a (second term on R.H.S. of [6 – 14a])

6.3.4 Growth in Output: Demand-Side and Supply-Side Conditions

In the medium-run, the demand for rural industrial output may change and in tandem the capital installed by the capitalists. Thus, the idle capacity, which occurs in the short-run due to lack of effective demand may vanish in the medium-run since capacity adjusts with short-run production over a longer planning horizon. For expansion of output, both installed capacity of capital and workforce size need to be augmented. Level of investment determines the new value of capital stock, which in turn decides the new value of full capacity output. Higher the investment higher is the growth rate of output in the medium-run. The growth rate of output in equilibrium is given as

$$[6-16] \quad g = \frac{1}{Y} \frac{dY}{dt} = \frac{1}{K} \frac{dK}{dt} = \frac{1}{K} \cdot I,$$

where I is an independent investment function in the tradition of heterodox economics.

The Marxist and post-Keynesian traditions emphasise the centrality of profit rate in investment decisions (Weisskopf, 1979; Shaikh, 1987; Foley and Michl, 1999, cited in Basu and Das, 2016). The underlying thinking is that a profit-making industry/sector that posts high profit rate (R) attracts investment from capitalists in expectation of higher profit rates in the future (Bhaduri, 2010; Basu and Das, 2016). This implies that quantum

of savings that is invested is determined by R , and this was the essence of the investment function conceived by Robinson (1962, cited in Basu and Das, 2016). We consider an independent investment function on the lines of the Foley-Michl investment function discussed in Basu and Das (2016), but from a medium-run perspective (given below in [6 – 17a]). The Foley-Michl investment function is a generalised function that captures influences of the three decomposed components of profit rate on investment. In the case of medium run, that is in our case the decomposed components of the profit rate, are profit share(θ) and capital per unit of output(v). Thus, the investment function is a function of profit share and capital-output ratio. We further recall that profit share itself is a function of wage rate and labour productivity, as given in [6-7a]. We are suppressing the third component of the profit rate, which is the effective demand component as we are not referring to the short-run. Each of the decomposed components has a distinct influence on investment. Investment increases with an increase in profit share and falls when capital is less productive, that is capital-output ratio is high. We have taken a simplified linear representation of [6 – 17a] in [6 – 17b], where the parameters have the property $\gamma_2 > 0$ and $\gamma_3 > 0$.

$$[6-17a] \frac{I}{K} = l(R) = l(\theta(w_n, a), v), \text{ [it follows from [6 – 7a],}$$

$$\text{that } \theta = \text{share of profit in value added} = \theta(w_n, a)]; \frac{\partial l}{\partial \theta} > 0, \frac{\partial l}{\partial v} < 0$$

[6-17a] is a general form. We use a simplified linear form as below.

$$[6-17b] \frac{I}{K} = \gamma_1 + \gamma_2 \cdot \theta(w_n, a) - \gamma_3 \cdot v$$

Rewriting [6-16] in terms of [6-17b] we get

$$[6-18a] g = \gamma_1 + \gamma_2 \cdot \theta(w_n, a) - \gamma_3 \cdot v$$

It is evident from [6 – 18b], that v and the variables w_n and a through their impact on θ determine the medium-run growth in output. These relationships and ramifications of changes in these variables are further explored below.

To understand the mechanism underlying growth in output in the medium-run, we take the total differentiation of [6 – 18a].

$$[6 - 18b]\Delta g = \gamma_2 \cdot \Delta\theta(w_n, a) - \gamma_3 \cdot \Delta v$$

A. Change in θ with change in w_n

Case 1: Change in θ with w_n , for $\lambda = \text{constant}$,

$$\frac{\partial \theta^{89}}{\partial w_n} = -\left\{ \frac{\frac{\lambda \cdot abc}{(aw_n + bc)^2}}{\left(\lambda + \frac{a \cdot w_n}{aw_n + bc} \right)^2} \right\},$$

Thus, $\frac{\partial \theta}{\partial w_n} < 0$, as the wage rate rises, profit share falls. This is obvious as, $Y = W + \pi$, where W is wage bill and π profits.

Dividing both sides by Y , we get,

$$1 = \frac{W}{Y} + \frac{\pi}{Y}, \text{ where } \frac{W}{Y} \text{ is the wage share and } \frac{\pi}{Y} \text{ is the profit share}$$

Rise in w_n inflates the wage share and deflates the profit share, hence $\frac{\partial \theta}{\partial w_n} < 0$.

Case 2: Change in θ with w_n , for $\lambda = \lambda(w_n)$,

$$\frac{\partial \theta^{90}}{\partial w_n} = \lambda \cdot \frac{a}{aw_n + bc} \left[e - \frac{bc}{(aw_n + bc)} \right], \text{ where } e = \frac{\frac{\partial \lambda}{\lambda}}{\frac{\partial w_n}{w_n}} \text{ is the elasticity of } \lambda \text{ with respect to}$$

w_n .

⁸⁹ Refer Appendix 4, A4-5.

⁹⁰ Refer Appendix 4, A4-6.

As $e < 0$, it follows that $\frac{\partial \theta}{\partial w_n} < 0$, for $\lambda = \lambda(w_n)$.

Hence, for both $\lambda = \text{constant}$ and $\lambda = \lambda(w_n)$ $\frac{\partial \theta}{\partial w_n} < 0$. This implies that w_n and θ move counter to each other. A change in the profit share affects investment and growth. Thus, both investment and rate of growth of output increase with decline in w_n and vice-versa.

B. Change in θ with change in a

$$\frac{\partial \theta^{91}}{\partial a} = -\lambda \cdot \frac{b \cdot c \cdot w_n}{a \cdot w_n + \lambda(a w_n + b c)}$$

The result is on expected lines. As labour productivity increases that is labour to output ratio declines, profit share increases and vice versa. This is so as increased labour productivity decreases labour per unit of output, which leads to lower labour cost per unit of output. Thus, the capitalist's share of output rises.

For $\lambda = \text{constant}$, $[6 - 18b]$ can be rewritten as

$$[6 - 18c] \Delta g = \gamma_2 \cdot \left[-\frac{\frac{\lambda \cdot a b c}{(a w_n + b c)^2}}{\left(\lambda + \frac{a \cdot w_n}{a \cdot w_n + b c} \right)^2} \cdot \Delta w_n - \lambda \cdot \frac{b \cdot c \cdot w_n}{a \cdot w_n + \lambda(a w_n + b c)} \cdot \Delta a \right] \\ - \gamma_3 \cdot \Delta v,$$

For $\lambda = \lambda(w_n)$, $[6 - 18b]$ can be rewritten as

$$[6 - 18d] \Delta g = \gamma_2 \cdot \left[\lambda \cdot \frac{a}{a w_n + b c} \left[e - \frac{b c}{(a w_n + b c)} \right] \cdot \Delta w_n \right. \\ \left. - \lambda \cdot \frac{b \cdot c \cdot w_n}{a \cdot w_n + \lambda(a w_n + b c)} \cdot \Delta a \right]$$

As $e < 0$, it follows that $\frac{\partial \theta}{\partial w_n} < 0$, for $\lambda = \lambda(w_n)$.

⁹¹ Refer Appendix 4, A4-7.

We tabulate the obtained results in Table 6-2.

Table 6-2 Results: Change in Medium-Run Growth in Output

Case No.	Case Description	Result
1 Case 1	Change in profit share (θ) with change in the rural industrial wage rate (w_n), for $\lambda = \text{constant}$	Profit share increases with decrease in wage rate of rural industrial workers(w_n). Thus, $\frac{\partial \theta}{\partial w_n} < 0$ for $\lambda = \text{constant}$
1 Case 2	Change in profit share (θ) with change in the rural industrial wage rate (w_n), for $\lambda = \lambda(w)$	Profit share increases with decrease in wage rate of rural industrial workers(w_n). Thus, $\frac{\partial \theta}{\partial w_n} < 0$ for $\lambda = \lambda(w)$
2	Change in profit share (θ) with change in labour per unit of output (a).	Profit share increases with a decline in labour per unit of output. Thus, $\frac{\partial \theta}{\partial a} < 0$
3 Case 1	Change in output growth rate (g) with change in capital productivity and profit share for $\lambda = \text{constant}$	Output growth rate increases with increase in profit share for $\lambda = \text{constant}$ and increase in capital productivity. Profit share increases with decline in rural industrial wage rate and decline in labour per unit of output.
3 Case 2	Change in output growth rate (g) with change in capital productivity and profit share for $\lambda = \lambda(w)$.	Output growth rate increases with increase in profit share for $\lambda = \lambda(w)$ and increase in capital productivity. Profit share increases with decline in rural industrial wage rate and decline in labour per unit of output.

Empirically we found that output growth increased ($\Delta g > 0$), rural industrial wage rate increased ($\Delta w_n > 0$), the labour productivity of rural industrial labour increased ($\Delta \left(\frac{1}{a}\right) > 0$), i.e, a declined and rural industrial capital productivity increased ($\Delta \left(\frac{1}{v}\right) > 0$).

To understand the mechanism underlying this empirical observation, a relook at [6 – 18c].

$$[6 - 18c] \Delta g = \gamma_2 \cdot \left[-\frac{\frac{\lambda \cdot abc}{(aw_n + bc)^2}}{\left(\lambda + \frac{a \cdot w_n}{a \cdot w_n + bc}\right)^2} \cdot \Delta w_n - \lambda \cdot \frac{b \cdot c \cdot w_n}{a \cdot w_n + \lambda(aw_n + bc)} \cdot \Delta a \right] \\ - \gamma_3 \cdot \Delta v,$$

By our behavioural assumptions, the rate of growth in output (g) increases with an increase in profit share and capital productivity; whereas profit share increases with decreases in wage rate ($\frac{\partial \theta}{\partial w_n} < 0$) and increase in labour productivity ($\frac{\partial \theta}{\partial a} < 0$). Empirically we have observed that profit share as well as wage rate are increasing. To reconcile this with the result obtained from the model, the inference is that the decline in θ consequent to the rise in w_n is offset by rise in θ associated with the decline in a . Added to this is the positive impact of the last term ($\frac{\partial j}{\partial v} \cdot \Delta v$) on the R.H.S. This accounts for the rise in capital productivity, which is bound to have a positive impact of profit rate and hence investment. The combined impact results in higher growth rate of output, i.e. $\Delta g > 0$.

6.4 Chapter Summary

In this chapter we proposed an analytical model to understand the relation between key aggregate variables pertaining to the rural industrial sector. The framework connects *i*) short-run equilibrium output of the rural industrial sector with the rural industrial wage rate and labour per unit of output, *ii*) medium-run growth of output of the rural industrial sector with the rural industrial wage rate and labour per unit of output. The underlying motive is to decipher how wage rate and labour productivity of the rural industrial organised sector influence the short-run output and growth in output of this segment. The output of this segment is described in terms of the fixed-coefficient Leontief production function.

Empirically we observed that labour productivity, output, profit share and wage rate of the rural industries segment increased in the period 1998-99 to 2007-08. We obtained from our model that the short-run equilibrium output increases with increase in rural

industrial wage. Short-run output also increases with increase in labour per unit of output (that is output moves counter to labour productivity). The first part of the model's result is in sync with the empirical observation as well as that part of our first proposition. that states: the output of the rural organised manufacturing segment increases with increase in wage rate of rural industrial workers. Empirically both output and labour productivity increased. We reconciled the rise of both output and labour productivity with our model result with the inference that the effect of rising wage rate has dominated over the effect of rising labour productivity on short-run output.

In our model, the medium-run growth in output increases with an increase in profit share and capital productivity. Profit share in turn increases with decrease in industrial wage rate and an increase in labour productivity. It therefore follows that medium-run growth in output decreases with increase in wage rate and increase in labour productivity.

Empirically we observe that both wage rate and profit share of the rural industrial sector are increasing. We reconcile these observations with the inference that the effect of rising labour productivity may have dominated the effect of wage rise in impacting the profit share.

Based on our findings and results, in the next chapter we present the conclusions drawn, policy implications, caveats and possibilities for future research.

Chapter 7

Conclusions and Policy Implications

7.1 Conclusions

Decades of planning and policy making did not lead to adequate growth of output and employment of the labour-intensive manufacturing segment in India. This deficiency led to the bulk of the workforce getting bound to agriculture. This coupled with declining agricultural growth rates has resulted in low land to man ratio, low income from land and poor agricultural wage rates (that are lower than most other rural occupations). All this implies that the bulk of the working poor continues to be in agriculture and in rural India. Rural employment rates improved during 1999-00 to 2004-05 after years (1983 to 1999-2000) of low rural employment growth rate (Sundaram, 2007; Unni and Raveendran, 2007; Abraham, 2009). This was due to emergence of employment alternatives with the growth of the rural non-agricultural sector. This provided employment to many in a labour force that was desperate for jobs, as the agricultural sector was going through a bad patch.

This research was an attempt to understand the nature of growth of the rural non-agricultural sector in India. Our observations follow.

Over the last few decades the rural non-agricultural sector grew at a rapid pace in India, as evident from a 13.08 per cent point increase in its share in the rural National Domestic Product during the period 1999-00 to 2004-05. This was not matched by a commensurable change in its share in the workforce indicating a high labour productivity of the rural non-agricultural workforce. Over the last decade or so, the boom in rural non-agricultural employment has been primarily driven by a surge in public construction

activities with increased public expenditure on the rural economy. These kind of jobs led to the increased casualisation of the workforce. It appears that distress-induced expansion of the rural non-agricultural sector also increased workforce casualisation. The spurt in short-term rural employment as indicated by the rise in rural subsidiary status employment across all employment categories, is possibly due to rise in low skill, seasonal work like assembling, packaging, etc.. Perhaps growth induced expansion of the rural non-agricultural sector generates employment that are more permanent in nature. We infer that rural regions that have a history of generating surplus or are able to attract private investment due to the presence of certain skills or better rural infrastructure etc., are likely to see rise in self-employment and regular wage jobs. The observed spatial variation in the growth of this sector in India could be partly attributed to inter-regional disparities existing since colonial times. The rest may be attributed to the policies of the concerned state government.

In the course of this work, we focused on constructing an empirical sketch of the rural organised manufacturing segment in India, analyse its data trends and understand the phenomenon underlying these empirical observations, for the period 1998-99 and 2007-08. Our inferences follow.

Rural organised manufacturing industries (IC 15 to IC 37) as well as urban industries had robust returns to capital during the study period, as evidenced by two-digit profit rates. Profits got further inflated in the rural industries segment as wage rates of rural workers were lower than their urban counterparts. High capital accumulation may have somewhat dampened the average profit rate of rural industries. The higher growth in profit rate of rural industries is attributed to falling wage share, rising output to capital ratio underpinned by steep rise in labour productivity. Extensive use of capital as indicated by

higher levels of capital per capita in rural industries has possibly driven up labour productivity of this segment. It appears that capital usage is being promoted over labour usage in the rural industries segment. The observed burgeoning profit share and increasing wage rate in the rural industrial segment also points to a high rise in labour productivity. Rural industries also reported higher rate of growth of output⁹² with rising profit rate levels. The rural industries segment outperformed their urban counterparts as evidenced by higher growth in both profit rate and output and sharper rise in labour productivity. But labour did not get commensurable compensation as evidenced by falling wage share and low wage rates. We infer that distribution of income across classes was far more skewed in the rural industries segment compared to the urban industries segment.

We have attempted to capture the empirical observations in terms of an analytical model. The model generates the following results. The short-run equilibrium output of the rural industrial sector increases with increases in rural industrial wage rate and labour per unit of output. This is because increases in purchasing power of workers as well as workforce size (demand-side effect) overshadows the effect of price rise (supply-side effect). This is under the assumption that the price mark-up is constant. In the case, where the price mark-up varies with the industrial wage rate the demand-side effect prevails, only if the marginal propensity of consumption of industrial workers is sufficiently greater than zero. We infer that in reality the output increased with a decline in labour per unit of output and increase in wage rate because the impact of the rise in wage rate prevailed over the impact of decline in labour per unit of output.

Next, we examine the growth of output in our model. Growth increases with a decline in the industrial wage rate and it increases with a decline in labour per unit of output in our

⁹² Growth rate of output in the rural and urban sectors were 13.55 per cent and 7.52 per cent.

model. In both cases the profit share increases that pushes up the profit rate. Investment improves and results in a higher growth rate of output. Empirically the output growth rate, profit share and wage rate of the rural industrial segment were all rising, during the study period. We ascribe this to the steep increase in labour productivity. The sharp rise in labour productivity pushed up profit share and overshadowed the negative impact of rising wage rate. Rising profit rate resulted in an increase in investment. This in turn improved the growth rate of output. Empirically the rise in capital productivity made an additional contribution to growth.

Our results contribute to the existing body of literature in three ways. First, we extended the profit rate analysis of the heterodox economics tradition for assessing the growth of the rural organised manufacturing industries segment in India as well as to its urban counterpart. The existing studies on the growth of the rural non-agricultural sector in India have not examined profit rates to assess the growth of the rural economy as a whole or any part of it. The few existing studies on profitability analysis of India's organised manufacturing sector have not provided the rural-urban break-up. Second, by providing an elaborate empirical analysis of the rural organised manufacturing segment in India we added to the scant literature of this particular industrial segment. Third, we provided an analytical model of the rural industrial (modern) sector and examined its macroeconomic behaviour. The framework integrates the impact of industrial worker's wage rate and labour productivity on the output of this sector. It brings to focus the significance of the worker's wage rate as well as his productivity in the performance of the rural sector in a developing economy. To our knowledge, Ranis and Stewart's (1993) dual sector model is one existing dual sector model that associates the modern, industrial sector with the rural; but with a focus on inter-sectoral linkages.

7.2 Policy Implications

The challenges that continue to stalk India's rural economy are its large pool of rural working poor and inadequate generation of productive employment. This resolves into two broad requirements. One, a need to improve wage rates. Two, a need to improve the generation of productive employment. Policy prescription discussed below are guided by these two objectives.

Typically wage rates improve with a rise in labour productivity that is, output-labour ratio. However, high levels of output-labour ratio reduce total employment for a given output. It is a paradoxical scenario that warrants one of two available choices. Either push for high output-labour ratio and high wage rates or push for improved levels of productive employment (that implies relatively lower levels of output-labour ratio) with wage rate commensurable to the relatively low output-labour ratio. In developing economies that are typified by capital constraints, generation of productive employment in big numbers is onerous.

The then Indian government in 2005, undertook a massive policy initiative (MGNREGS) for generation of low-skill employment⁹³ for the rural poor. Although this scheme has had a fair share of critics, studies show that MGNREGS essentially a demand-driven employment generation framework has coincided with an increase in low-skill, low-wage rural employment. The resultant tightening of rural labour markets led to an approximate increase in real wages by 4 per cent to 8 per cent (Nagaraj *et al.*, 2014; Wiggins and Keats, 2014). Although the thrust of this scheme was ensuring livelihood security, it also helped in improving income levels of poor households. This addresses

⁹³ Sampath and Rukmini (2015) point out that this scheme has generated more rural employment than any other public scheme or private measure, in independent India.

the concern of poor income levels of the rural workers directly. Indirectly, it adds to the rural demand for rural produce. Studies show that in some regions improved purchasing power with an increase in income had a multiplier effect on the rural economy (Sampath and Rohini, 2015). They point out that criticism of MGNREGA largely stems from the alteration of power balance in rural India between landless labourers and their employers. In regions where the scheme has been successful, the latter have been disadvantaged as they had to raise agricultural wages⁹⁴. There have been criticisms, however, that higher wages are leading to declining profits of farmers (FICCI Report, undated), which possibly could adversely affect labour absorption.

Our policy suggestion is to push-up real wage rates of rural activities. Rise in the wage of any rural occupation impacts wage rates of other rural occupations as evidenced by research on MGNREGA. The rationale underlying this policy suggestion is given by our model. Our model shows that a rise in the industrial wage rate boosts demand. This in turn expands output, as the demand-side effect prevails over the supply-side effect (increase in price and consequent suppression of demand). An expanding output eventually improves employment levels. Thus, though the initial emphasis is on improving the real wage rate, this will eventually lead to increases in the size of the workforce. The expansion of domestic consumer demand will boost the rural output. Moreover, with an increase in the wage rate a fairer distribution of income across classes in the rural economy also cannot be ruled out. A policy of a rise in wage rate can also be pursued through raising the minimum wage rates, which are government mandated. In our model, rural industrial wage rate also rises with increase in rural agricultural wage as the wage rate of rural industrial workers is a function of the wage rate of agricultural labourers.

⁹⁴ This is to ensure that labour is available for growing labour-intensive agricultural crops.

On the flip side, rising wage rate reduces the profit share as explained in our model. The declining profit share will have a negative bearing on medium-run growth in output. However, in our model rising capital productivity improves medium-run growth in output. In other words, in order to keep the growth momentum going a policy of rise in wage rate has to be supplemented with a rise in productivity of capital. This would not only ensure that the output level rises (due to the rise in wage rate) but that the growth of output over a longer time horizon keep humming (through a rise in capital productivity). This would ensure that the profit rate stays healthy in the rural industrial sector. Application of improved technology and new productive investments (which embody the new technology) would ensure that the capital productivity rises over time. The role of research institutions, many run by the government, comes to the fore in this context. Rise in capital productivity has the advantage that it helps in pushing profit rate without further distorting the already skewed distribution of income.

In other words, a scenario where a public scheme like MGNREGS increases the workforce participation of unskilled workers and hikes the rural wage rate; and private investment creates high wage, skilled work opportunities, there is bound to be an increase in local demand that will benefit the local economy. However, there are regions where impact of MGNREGS is negligible or absent as it has been able to create a low volume of activities. In such regions, our suggestion is that there needs to be adequate emphasis on the creation of high wage, skilled work opportunities.

In a nutshell, we propose that policies should focus on the following:

- i) Wage rates of rural activities including those in agriculture need to be raised;

- ii) Rural employment generation schemes need to be encouraged as they raise wage rates, thus helping (i), and also in creating a dent on the pool of the unemployed and underemployed
- iii. Capital productivity of rural industrial sector needs to be improved. Given that the rural industrial sector produces a varied range of goods that qualify as raw materials, consumer goods, intermediaries and investment goods a uniform technique of production cannot be applied. On one hand, there is a need for capital-intensive industries that are characterized by rising labour productivity, output, and profits as they generate the much needed investible surplus to maintain growth. But such well-performing industries will have higher wage rates that will eat into the investible surplus and stymie growth. So there is also a need for industries that are marked by rising capital productivity, to maintain the growth momentum. We propose that the choice of techniques across different industries should be such that at the aggregate level capital productivity increases so that the rate of growth in output of the rural industrial sector is maintained, with rise in the wage rate. We are not trying to give an industry-wise or industry category wise choice of a technique of production. Borrowing from Rudra (1956) we propose that there should be a set of technologies apt for the various industries in the rural industrial sector. The basis of choice is the available investible surplus and the desired level of output. It needs to be noted that improvement in capital productivity not only aids growth in output but also leads to a need for lower levels of investment in the next production cycle. A strategy to increase capital productivity can be extended to industries where substitutability between labour and capital is feasible. This way employment opportunity can be created for the labour force in such industries.

Capital productivity can also be maintained/improved through better maintenance practices that keep a check on the depreciation rate.

7.3 Caveats and Possibilities for Future Research

Below we take a relook at our four research questions to identify the caveats and possible directions for future research.

- i) What do literature and evidence say about the nature of growth of the rural non-agricultural sector in India?
- ii) What has been the variation in output, profit rate, labour force size, wage rate, labour productivity, capital productivity, etc. of rural organised manufacturing industries between 1998-99 and 2007-08? How does it fare vis-à-vis urban organised manufacturing industries?
- iii) What are the factors driving change in profit rate of both rural and urban organised manufacturing industries in India?
- iv) What are the determinants of short-run output and the medium-run growth in output of rural, organised manufacturing industries in India?

We addressed questions *i)* and *ii)* in totality. To address question *iii)*, we did profit rate decomposition analysis from a medium-run perspective, as data is available for a period of ten years. We did not divide the period into shorter spans, so we were unable to study the impact of demand deficiency on change in profit rate. This gap could be possibly addressed later. Our analytical model addresses question *iv)*. We tried to explain the phenomena underlying empirical observations, using our model. The empirical analysis could be furthered, if additional data are available, in the future.

In this research, improvement of employment levels with expansion of output, is implicit. During 1998-99 to 2007-08, the rural organised manufacturing segment's workforce increased by 0.137 million per year. Given that the projected labour force size for 2019 is 535 million (ILO Report, 2018), and India roughly needs 17 million jobs a year, the workforce size increase in this segment is inadequate. Understanding how more jobs could be created in high value-added segments, need to be looked into. Segregation of industries on the basis of capital-labour ratio value, examination of performance of capital intensive industries vis-à-vis labour intensive industries and their employment elasticity could be taken up, in the future. To address the issue of improving productive employment generation, the measures required to augment labour intensive industry could also be explored.

Our research suggests that a concerted effort to expand the rural organised manufacturing segment, is a way ahead to generate productive, remunerative employment in the rural economy. This is realisable and sustainable only if there is both private and public initiative and investment in the rural industrial segment. In this context, an examination of the existing industrial policy and the kind of incentives provided to encourage growth of the rural industrial sector may be relevant. This we propose to take up in future.

Appendix 1

Table A1-1: Definitions of Variables for Chapter 4, Chapter 5 and Chapter 6

Item No.	Term	Variable Name	Definition
1.	Capital Stock	K_n	The depreciated value of fixed assets owned by the factory as on the closing day of the accounting year.
2.	Output (Net Value Added)	Y_n	Is the difference between the total output and material cost.
3.	Total number of Workers	L	Total number of employees (includes production workers employed directly or through contractors and all other employees) in an industry.
4.	Total Emoluments	TE_n	The sum of wages, salaries and employer's contribution as provident fund and other funds to all industrial employees.
5.	Wage	W_n	Is defined to include all remuneration in monetary terms and also payable more or less regularly in each pay period to workers as compensation for work done during the accounting year.
6.	Salary	S_n	Is remuneration in monetary terms in an accounting period to employees other than workers. It is given as $(TE - W_n - B_n)$.
7.	Benefits to Employees	B_n	Is defined to include old age benefits like provident fund pension, gratuity etc. and employers contribution towards other social security charges such as employees state insurance, compensation for work injuries and occupational diseases, provident fund- linked insurance, retrenchment and lay off benefits to all employees in an industry.
8.	Benefits to Workers	b_n	Is defined as the benefits given to industrial workers. It is given as $b_n = B_n \cdot \left(\frac{W}{W + S} \right).$
9.	Profit	π_n	Is pre-tax profit as tax data not collected by ASI. It is given as $(Y_n - W_n - S_n - B_n - R - I)$ where R is rents and I is interest
10.	Profit (Marxist)	π_m	Is the difference between the net value added and the employer's monetary remuneration and benefits to workers. It is given as $(Y_n - W_n - b_n)$
11.	Price Index for Manufactured Products	P_{mfg}	Wholesale price index for manufactured products (2004-05=100)
12.	Price Index for Manufactured Products	P_{lw}	Consumer price index for industrial workers (2004-05=100)
13.	Price Index for Machinery	P_{mch}	Wholesale price index for machinery and equipment (2004-05=100)
14.	Real Capital Stock	K	K_n/P_{mch} , deflated value of capital stock

15	Real Output	Y	Y_n/P_{mfg} , deflated value of output
16	Real Wages	W	W_n/P_{iw} , deflated value of wage
Item No.	Term	Variable Name	Definition
17	Real Profit	π	π_n/P_{mfg} , deflated value of profit
18	Profit Share	P_s	π/Y , real profit by real output
19	Real Profit Rate	R	π/K , real profit by real capital stock
20	Profit Rate (Marxist)	R_n	π_m/K_n , Marxist profit by capital stock
21	Capital Productivity	k_r	Y/K , real output per unit of real capital stock
22	Labour Productivity	y_r	Y/L , real output per unit of labour

Source: Obtained from *Time Series Data on Annual Survey of Industries*(1998-99 to 2007-08)

Table A1-2: Price Indices (Base Year: 2004-05) for Chapter 2, Chapter 4 and Chapter 5

Period	P_{iw} (Industrial Workers)	P_{mfg} (Manufactured Products)	P_{mch} (Machinery and Equipment)
1998-99	79.62	80.34	82.74
1999-00	82.31	82.50	82.81
2000-01	85.38	85.21	87.73
2001-02	89.04	86.77	92.08
2002-03	92.69	89.06	92.94
2003-04	96.15	94.11	94.65
2004-05	100	100	100
2005-06	104.23	102.4	105.14
2006-07	111.35	108.2	110.98
2007-08	118.47	113.4	118.83

Source: <https://www.rbi.org.in>

Appendix 2

A2-1 Translation of Marxist Labour Value Concepts into Price Equivalent Form

Weisskopf's (1979) framework provides the price equivalent forms of the ROC variant, RSL variant

α is the price equivalent of ROC variant, β is the price equivalent of the RSL variant i.e. rate of exploitation and R is the price equivalent form of the rate of profit in Weisskopf's translated price framework, that derives from Marx's framework based on labour value concepts,

$$\alpha = \frac{K_n}{W_n}, \text{ where } W_n \text{ is the total wage bill}$$

$$\alpha = \frac{K_n}{Z_n} \cdot \frac{Z_n}{Y_n} \cdot \frac{Y_n}{W_n}$$

$$\alpha = \frac{1}{C_c} \cdot \frac{1}{C_u} \cdot \frac{1}{P_s}, P_s \text{ is profit share, } C_u \text{ is capacity utilization rate and } C_c \text{ is capacity capital ratio.}$$

$$\beta = \frac{\pi_m}{W_n}$$

$$\beta = \frac{\pi_m}{Y_n} \cdot \frac{Y_n}{W_n}$$

$$R_n = \frac{\pi_m}{K_n}$$

Weisskopf (1979) decomposes profit rate (R) as

$$[1] R_n = \frac{\pi_m}{Y_n} \cdot \frac{Y_n}{Z_n} \cdot \frac{Z_n}{K_n}$$

The price form of the ROC variant hypothesises that “competition of capitals” results in rise of the capitalist's stock (K_n) with time, i.e. α rises, while β remains constant (this implies $\frac{\pi_m}{Y_n}$ and $\frac{Y_n}{W_n}$ are both constant) leading to a decline in R_n . Rate of capacity utilization, $\frac{Y_n}{Z_n}$ is also assumed to be constant as ROC variant does not depend on excess capacity build-up. Thus, growth in organic composition of capital ($\frac{K_n}{W_n}$) brings down capacity to capital ratio ($\frac{Z_n}{K_n}$), the third term in equation [1]. This in turn brings down profit rate.

Glynn and Sutcliffe (1972 cited in Weisskopf, 1979) finds growth in the power of trade unions eventually influences government policy in favour of the working class. This leads to rise in the labour wage bill (W_n), which in turn results in decline in profit share.

$$[6] \frac{\pi_m}{Y_n} = \frac{(Y_n - W_n)}{Y_n} = (1 - \frac{W_n}{Y_n})$$

The capitalist process of production brings about an imbalance in the distribution of wealth across classes. This gives rise to a gap in demand for commodities and the capacity to produce commodities, i.e. rise in the RF variant. As a result the capitalist fails to realize the full value of commodities produced. To tide over this situation the capitalist either lowers his production levels (the average rate of capacity utilization in the economy as a whole declines) or he reduces the output price. This implies the second term in [1] declines resulting in a decline in profit rate.

A2-2 Steps in Differentiation of Profit Share

$$\left(\frac{\widehat{\pi_m}}{Y_n}\right) = \frac{d\left(\frac{\pi_m}{Y_n}\right)}{\left(\frac{\pi_m}{Y_n}\right)}$$

$$d\left(\frac{\pi_m}{Y_n}\right) = d\left(1 - \frac{W_n}{Y_n}\right) = -d\left(\frac{W_n}{Y_n}\right)$$

Hence,

$$\frac{d\left(\frac{\pi_m}{Y_n}\right)}{\left(\frac{\pi_m}{Y_n}\right)} = -\frac{d\left(\frac{W_n}{Y_n}\right)}{\left(\frac{\pi_m}{Y_n}\right)} = -\frac{\frac{W_n}{Y_n}}{\frac{\pi_m}{Y_n}} \cdot \frac{d\left(\frac{W_n}{Y_n}\right)}{\left(\frac{W_n}{Y_n}\right)} = -\frac{W_n}{\pi} \cdot \frac{d\left(\frac{W_n}{Y_n}\right)}{\left(\frac{W_n}{Y_n}\right)}$$

Since,

$$\frac{W_n}{Y_n} = \frac{w_r}{y_r} \cdot \lambda_{iw.mfg}$$

$$\frac{d\left(\frac{W_n}{Y_n}\right)}{\left(\frac{W_n}{Y_n}\right)} = (\widehat{W}_r + \lambda_{iw.mfg} - \widehat{y}_r)$$

Hence,

$$\frac{d\left(\frac{\pi_m}{Y_n}\right)}{\left(\frac{\pi_m}{Y_n}\right)} = -\frac{W_n}{\pi_m} (\widehat{W}_r + \lambda_{iw.mfg} - \widehat{y}_r) = \frac{W_n}{\pi_m} (\widehat{y}_r - \widehat{W}_r - \lambda_{iw.mfg})$$

A2-3 Steps followed to arrive at Estimates of Factors Driving Change in Profit Rate

Values of variables mentioned in Table A2-3a was obtained from *Time Series Data on ASI (1998-99 to 2007-08)*.

Table A2-3a: List of Variable Values Obtained from the ASI Report

Variables	1998-99		2007-08	
	Rural	Urban	Rural	Urban
Y_n (1)	5297516	9199195	24574147	23453182
L (2)	2430789	3832258	3662652	4429220
W_n (3)	788677	1681939	1986316	3094721
TE_n (4)	1431347	3015171	3970402	6542121
B_n (5)	270193	703423	643350	1313487
K_n (6)	22528007	16547401	50616437	33792004

Table A2-3b: List of Computed Variables and Ratios for Profit Rate Decomposition Analysis

Variables	1998-99		2007-08	
	Rural	Urban	Rural	Urban
Y (7) [(1)/ P_{mfg}]= (7)	6593817	11450330	21670324	20681818
K (8) [(6)/ P_{mch}]= (8)	27227817	19999532	42595672	28437267
S_n (9) [(4)-(3)-(5)]= (9)	372477	629809	1340736	3447400
b_n (10) (5)*[(3)/(3)+(9)]= (10)	183520	511783.5	384092.7	621339.1
W (12) [(3)/ P_{iw}]= (12)	990608.85	2112580.51	1676640.5	2612240.23

Variables	1998-99		2007-08	
	Rural	Urban	Rural	Urban
y_r (13) [(7)/(2)]=(13)	2.713	2.988	5.917	4.669
w_r (15) [(12)/(2)]=(15)	0.408	0.551	0.458	0.590
$\frac{W_n}{\pi_m}$ (16) [(3)/(11)]=(16)	0.182	0.240	0.089	0.157
$\frac{\pi_m}{K_n}$ (17) [(11)/(6)]=(17)	0.192	0.423	0.439	0.584
$\frac{\pi_m}{Y_n}$ (18) [(11)/(1)]=(18)	0.816	0.762	0.904	0.842
$\frac{Y_n}{K_n}$ (19) [(1)/(6)]=(19)	0.235	0.556	0.485	0.694

The profit rate decomposition analysis equation is

$$\widehat{R}_n = \frac{w}{\pi_m} (\widehat{y}_r - \widehat{\lambda}_{iw.mfg} - \widehat{w}_r) + (\widehat{y}_r - \widehat{\lambda}_{mch.mfg} - \widehat{k}_r)$$

To identify the drivers of change in profit rate we calculate the change in the values of R_n (L.H.S. term) and y_r , $\lambda_{iw.mfg}$, w_r , k_r , $\lambda_{mch.mfg}$ (the R.H.S. terms) in the period 1998-99 to 2007-08. The change is calculated using the formula,

$$\text{Change in variable value} = \frac{[Variable_{(New Value)} - Variable_{(Old Value)}]}{Variable_{(Old Value)}}$$

Here $Variable_{(New Value)}$ is the variable value in 2007-08 and $Variable_{(Old Value)}$ is the variable value in 1998-99.

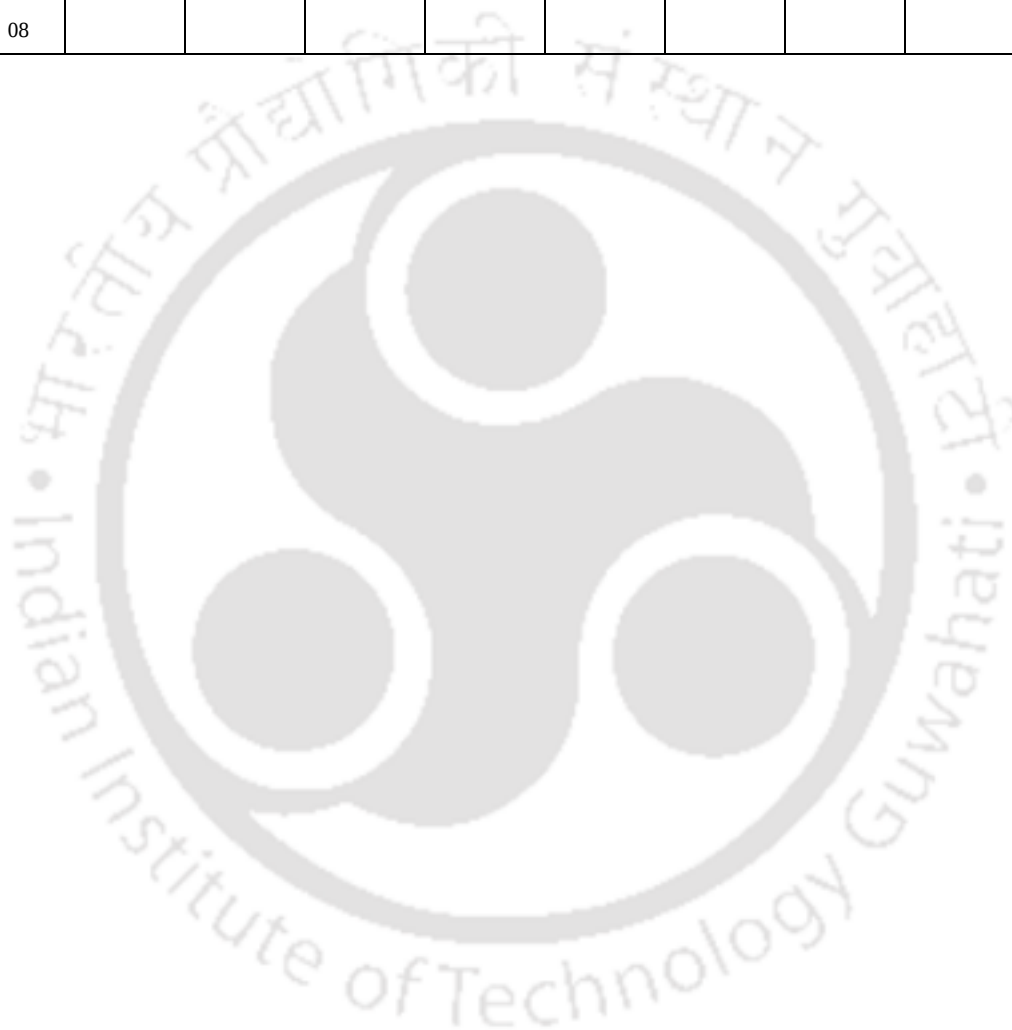
The estimates are given in Table 4a and Table 4 b.

Table A2-3c: Profit Rate Decomposition Analysis of Rural Industries: Values of Variables in 1998-99 and 2007-08 Corresponding to Table 4-4a

Year	R_n	$\frac{\pi_m}{Y_n}$	$\frac{Y_n}{K_n}$	(y_r)	(w_r)	$(\lambda_{iw.mfg})$	(k_r)	$(\lambda_{mch.mfg})$	$\frac{W_n}{\pi_m}$
1998-99	0.192	0.816	0.235	2.713	0.408	0.991	11.201	1.03	0.182
2007-08	0.439	0.904	0.485	5.917	0.458	1.045	11.630	1.048	0.089

Table A2-3d: Profit Rate Decomposition Analysis of Urban Industries: Values of Variables in 1998-99 and 2007-08 Corresponding to Table 4-4b

Year	R_n	$\frac{\pi}{Y}$	$\frac{Y}{K}$	(y_r)	(w_r)	$(\lambda_{iw.mfg})$	(k_r)	$(\lambda_{mch.mfg})$	$\frac{W}{\pi_m}$
1998-99	0.423	0.761	0.556	2.988	0.551	0.991	5.219	1.030	0.240
2007-08	0.584	0.842	0.694	4.670	0.590	1.045	6.420	1.048	0.157



Appendix 3

Table A3-1: Industry Codes and Industry Descriptions for Chapter 4 and Chapter 5

IC	Industry Description
15	Manufacture of Food Products and Beverages
16	Manufacture of Tobacco Products
17	Manufacture of Textiles
18	Manufacture of Wearing Apparel
19	Tanning of Leather
20	Manufacture of Wood, Cork, Straw, Plating Material Products
21	Manufacture of Paper and Paper Products
22	Publishing, Printing and Reproduction of Recorded Media
23	Manufacture of Cork, Refined Petroleum Products and Nuclear Fuel
24	Manufacture of Chemicals and Chemical Products
25	Manufacture of Rubber and Plastic Products
26	Manufacture of other Non-Metallic Mineral Products
27	Manufacture of Basic Metals
28	Manufacture of fabricated metal products except machinery and equipment
29	Manufacture of Machinery and Equipment N.E.C.
30	Manufacture of office, accounting and computer machinery
31	Manufacture of Electrical Machinery and Apparatus N.E.C.
32	Manufacture of Radio, Television, Communication Equipment and Apparatus
33	Manufacture of Medical, Precision and Optical Instruments
34	Manufacture of Motor Vehicles, Trailers, Semi-Trailers
35	Manufacture of Other Transport Equipment
36	Manufacture of Furniture, Mfg. N.E.C.
37	Recycling

Source: Obtained from *Time Series Data on Annual Survey of Industries(1998-99 to 2007-08)*

Table A3-2.: Real Profits of Rural and Urban Industries (IC 15 to IC 37) in 1998-99 and 2007-08 for Chapter 4

IC	Rural Profit Real Value		Urban Profit Real Value	
	1998-99	2007-08	1998-99	2007-08
15	395204.1	924601.4	437668.7	452447.10
16	23014.69	161332.5	207155.8	250895.10
17	-36609.4	266448.9	-84897.9	151948.0
18	12771.97	8000.882	184188.4	159861.60

IC	Rural Profit Real Value		Urban Profit Real Value	
	1998-99	2007-08	1998-99	2007-08
19	16629.33	25152.56	31748.82	36332.45
20	6919.343	17045.86	160.5676	10791.89
21	-39598	105950.6	16528.5	101492.9
22	14665.17	57355.38	58059.5	182344.8
23	-39598	4768015	190197.9	616881.8
24	993583.5	2233951	1284364	1172698
25	91253.42	245250.4	-26879.5	242642
26	-29675.1	1480863	44504.61	536831.6
27	-160965	1939920	592399.8	3519922
28	17174.51	289874.8	81883.25	506029.1
29	83185.21	337063.5	147895.2	1034125
30	11655.46	70292.77	8862.335	10365.96
31	55881.25	516773.4	295051	599755.7
32	86921.83	192817.5	104146.1	78201.94
33	51294.5	100938.3	2489.42	114547.6
34	-16072.9	306567.9	126563.4	894804.2
35	46336.82	380209	57008.96	163712.5
36	11087.88	65389.77	84475.98	190851
37		1684.30		485.89

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08)

Table A3-3a: Real Profit Rate (in %) of Rural Industries (IC 15-37) from 1998-99 to 2007-08 for Chapter 4

IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
15	18.42	15.0643	4.67	7.82274	2.02008	2.07613	6.34416	14.99	26.97	21.6423
16	12.6	182.46	113	174.08	178.8	148.48	90.35	47.82	161.51	160.21
17	-1.28	-4.64	1.6	-1.33	3.09	1.8	4.29	97.47	7.57	5.99
18	32.01	27.87	10.33	22.5	37.58	23.42	35.16	14	43.23	4.03
19	24.8	33.48	17.43	24.24	10.77	18.85	18.16	14.44	22.28	22.67
20	10.54	3.12	-3.57	3.39	11.77	12.33	6.28	31.35	12.43	18.37

IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
21	-5.26	-7.77	1.55	-0.14	-0.16	3.48	3	9.51	10.94	9.34
22	13.06	10.41	17.46	5.46	34.89	12.41	13.36	22.84	53.94	61.53
23	-5.26	21.33	20.3	11.91	38.04	45.69	56.03	86.5	100.6	120.05
24	21.32	19.28	17.72	21.07	29.64	29.61	37.45	29.04	30.06	35.51
25	10.09	18.41	15.55	13.28	19.42	19.04	16.66	22.66	24	21.09
26	-1.05	2.34	7.98	6.13	6.14	6.36	18.6	20.31	35.72	42.34
27	-2.48	0.33	-6.66	-11.91	0.52	8.54	20.58	9.62	20.39	24.85
28	6.11	10.23	-0.04	3.39	10.11	12.27	29.34	40.02	39.15	30.83
29	16.93	16.55	24.97	20.54	17.9	25.6	38.08	36.44	63.86	41.91
30	137.88	76.01	234.52	238.16	177.11	228.32	205.06	36.58	213.82	94.09
31	15.55	9.52	12.7	32.27	16.03	21.33	36.28	61.35	77.32	68.83
32	23.97	15.04	15.86	17.06	20.15	9.86	9.82	18.69	25.22	29.66
33	62.73	12.06	35.34	33.67	36.59	35.27	27.9	108.82	130.3	155.4
34	-2.32	3.23	7.04	-0.47	14.63	30.85	31.14	33.81	36.12	17
35	27.44	37.21	23.15	39.05	59.21	75.66	85.29	92.81	126.02	78.16
36	27.42	41.72	38.02	26.86	18.22	21.3	28.25	43.56	43.16	60.27
37	-	48.51	-10.2	-12.8	-41.14	55.69	-1.29	-36.75	-3.67	7.62

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08)

Table A3-3b Real Profit Rate (in %) of Urban Industries (IC 15-37) from 1998-99 to 2007-08 for Chapter 4

IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
15	40.2	17.54	21.87	20.77	19.04	22.13	38.82	36.62	50.92	30.6
16	193.56	200.59	198.56	209.37	259.18	240.21	300.04	281.16	248.36	266.07
17	-4.94	-7.48	-7.57	-8.35	-4.88	-2.12	9.02	8.2	5.22	6.69
18	87.31	58.98	43.47	35.91	39.54	24.21	30.35	22.89	25.2	33.7
19	23.11	30.68	9.93	17.13	15.88	19.44	40.46	32.27	30.55	15.97
20	0.96	38.89	16.05	3.31	1.35	1.07	34.56	24.25	-13.77	18.82
21	3.4	-0.54	24.62	4.55	10.33	12.77	20.42	15.54	13.95	14.35
22	16.46	35.42	18.93	14.58	26.13	33.4	47.59	31.73	23.94	25.69
23	25.43	3.1	6.69	6.15	20.74	32.96	34.68	32.68	27.47	29.53
24	34.31	22.42	11.85	6.87	11.77	16.29	31.85	29.27	24.74	28.19
25	-3.23	18.24	5.91	10.58	8.24	14.56	11.39	11.84	3.74	29.91
26	5.6	6.69	6.59	10.43	7.39	13.76	14.54	12.91	28.6	36.12
27	13.77	12.94	2.61	2.6	8.38	19.15	38.25	34.18	43.7	56.84
28	18.74	6.6	21.42	16.12	19.13	32.93	59.31	48.6	58.05	53.79
29	12.44	14.85	14.64	15.64	10.04	25.78	62.51	48.71	52.08	66.45
30	26.64	-9.4	11.32	17.18	27.47	19.83	13.56	14.4	22	5.49
31	50.15	0.63	8.45	1.31	15.2	25.51	92.44	73.03	119.68	94.66
32	16.6	19.3	8.21	18.42	13.34	6.73	30.68	18.28	9.42	17.79
33	2.05	23.93	15.78	39.29	19.58	40.12	62.28	62.33	51.97	49.27
34	7.09	8.37	-3.18	4.01	9.73	32.07	87	84.3	55.64	43.74
35	19.28	26.48	8.33	35.16	30.16	28.06	53.01	47.64	23.41	30.32
36	48.07	124.42	41.89	25.69	31.81	41.41	45.81	35.39	51.77	62.59

IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
37	-	57.76	-9.74	-0.82	-21.28	52.84	116.86	14.35	-14.23	14.36

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08).



Table A3-4.: Sector-wise, Year-wise Comparison of Number of Industries with Higher Profit Rate (1997-98 to 2007-08) for Chapter 4

	1998-99		1999-00		2000-01		2001-02		2002-03		2003-04		2004-05		2005-06		2006-07		2007-08	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Higher	9	13	9	14	13	10	11	12	13	10	9	14	9	14	9	14	14	9	9	14

Source: Computed using data in Table A3-3a and Table A3-3b.

Table A3-5a: Real Output of Rural Industries in the Organised Manufacturing Sector for Chapter 4

IC.	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
15	1138645.75	1165093.3	1026066.2	1098067.3	966054.3	929635.53	988254	1267327.14	1925289.28	2044359.78
16	51428.93	59940.61	52776.669	166132.30	195910.6	170969.08	65236	44493.16	196262.48	191037.92
17	612366.19	596281.21	716738.65	508410.74	620835.4	589244.50	660484	876492.19	1050299.45	1048165.79
18	27336.32	28084.85	39534.092	32536.59	38207.95	38467.75	73229	65320.31	113484.28	70624.34
19	51034.35	44436.36	41995.071	55738.16	29633.95	44033.58	36026	42247.07	83530.5	81301.59
20	21926.81	18928.49	14534.679	24490.03	28368.52	29072.36	22585	44214.84	39115.54	44599.65
22	27997.26	28329.7	36725.736	20338.83	30599.6	24907.02	29718	50700.2	65631.24	89684.30
23	461143.88	497663.03	554980.64	591513.2	1196108	1420671.6	1728978	3104687.5	3883301.29	4965085.54
24	1696107.79	1934312.7	1755632	1556042.41	1931245	2044767.8	2210849	2475703.13	2814933.46	3157395.94
25	274951.45	345876.36	288123.46	335125.04	351196.9	341398.36	390721	396183.6	440678.37	525805.11
26	321160.06	575163.64	599054.1	600168.26	545961.1	555839.97	808938	862508.79	1392439.93	1992294.53
27	555875.03	456614.55	279539.96	243861.93	446006.1	762941.24	1361794	1129170.9	2039601.66	2739418.87
28	101600.69	118790.3	105176.62	110192.46	131866.2	132865.8	168106	280230.47	414963.03	519806.88
29	278300.97	245292.12	310441.26	262317.62	287342.2	322841.36	410082	443750	719342.88	626283.07
30	17523.03	16572.121	34913.74	49655.41	37907.03	68054.40	44067	169797.85	72336.41	103418.87
31	193054.52	209294.55	149507.1	310485.19	218280.9	193235.58	265604	463814.45	531775.42	816148.15
32	174266.87	126310.3	148455.58	95817.68	224183.7	207161.83	163315	182750.98	217003.7	286669.31
33	102235.50	41501.818	60282.83	80420.65	66052.1	65921.79	50513	89508.79	114016.63	135581.13

IC	1998-99	1999-00	2000-2001	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
34	121807.32	175813.33	213436.22	148122.62	294384.7	433805.12	508369	577456.05	704353.97	634572.31
35	184398.81	154204.85	160197.16	244178.86	323254	400229.52	434734	508342.77	835072.09	529767.20
36	25438.14	34347.879	46962.8	49607.01	42499.44	52318.56	53627	73146.48	68230.13	114303.35
37		25.47	268.75	431.02	249.27	555.73	222	32.23	218.11	3705.47

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08).

Table A3-5b: Real Output of Urban Industries in the Organised Manufacturing Sector for Chapter 4

IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
15	936898.18	870278.79	805675.39	797439.21	864349.88	763483.16	817701	1023266.6	1299109.98	1042258
16	324240.73	397020.61	425532.22	283963.35	343340.44	340290.09	433425	483854.49	371755.08	346783.1
17	807616.38	775111.52	774839.81	712851.22	733571.75	755903.73	788190	921696.29	1029231.98	953700.2
18	340070.95	368698.18	338459.10	301501.67	351670.78	313286.58	373759	453466.80	531914.05	607846.6
19	93405.53	121020.61	93579.39	96935.58	107642.04	101810.65	98985	152002.93	132684.84	166925.9
20	10297.49	26675.15	20426.01	16007.84	15312.15	14937.84	16430	30359.38	9315.16	37216.93
21	148452.83	129264.24	20426.01	151137.49	192505.05	172000.85	172113	197374.02	196103.51	242637.6
22	206319.39	262075.15	230896.61	229540.16	277573.54	294801.83	267513	382203.13	382640.48	441654.3
23	302498.13	145528.48	270125.57	274539.59	807530.88	1164672.19	1291095	1095368.16	881954.71	812268.1
24	2528650.7	2360143.03	1812153.5	1803818.14	1787286.10	1760556.8	2062732	2270262.7	2114766.17	2280250
25	264844.41	353258.18	254141.53	292753.26	297964.29	335694.4	308677	298464.84	280145.10	499180.8
26	264671.4	304585.45	307737.36	312477.82	294119.69	301388.8	382313	390616.21	574551.76	797043.2
27	1591726.4	1778620.61	1306993.31	1146700.47	1688003.59	2223930.51	3563276	3028299.81	3768602.59	5042078
29	907274.09	950767.27	822967.96	851243.52	722480.35	831675.7	942279	1287802.73	1368243.07	907274.1
30	35501.62	40161.21	61929.35	63438.98	99719.29	103230.26	65022	72435.55	89254.16	45101.41
31	659467.26	479202.42	468278.37	355996.31	460938.69	501506.75	518389	754355.47	1181836.41	1040821
32	333751.56	258756.36	218743.11	284090.12	236237.37	182056.11	209090	309033.20	225811.46	312278.7
33	87976.10	258756.36	100572.70	123599.17	118888.39	155495.7	191453	187279.3	188373.38	280864.2

IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
34	611112.77	140120	421580.8	534005.99	563317.99	841474.87	1170629	1715086.91	1409569.32	1543494
35	220594.97	714345.45	226350.19	293308.75	284627.22	272878.55	355950	427161.13	361176.53	390924.2
36	208729.15	372695.76	183433.87	252103.26	206902.09	237016.26	328080	334279.3	456769.87	466033.5
37		94.55	199.51	251.24	434.54	1843.59	3534	1731.45	3218.11	2145.50

Source: Computed using *Time Series Data on ASI* (1998-99 to 2007-08).



Table A3-6: Real Output Growth Rate (both CAGR and EGR) of Urban and Rural Organised Manufacturing Industries (1997-98 to 2007-08)

IC	CAGR of Output in Organised Industries in the Rural Sector	Exponential Growth Rate of Output in Organised Industries in the Rural Sector	CAGR of Output in Organised Industries in the Urban Sector	Exponential Growth Rate of Output in Organised Industries in the Urban Sector
15	0.0672	0.0575	0.0119	0.0298
16	0.1570	0.0989	0.0075	-0.0513
17	0.0615	0.0638*	0.0186	0.0284*
18	0.1112	0.1410	0.0667	0.0593*
19	0.0531	0.0468	0.0666	0.0503*
20	0.0821	0.0378	0.0590	0.0378
21	0.1273	0.1149	0.0119	0.1149
22	0.1381	0.076*	0.0075	0.076*
23	0.3022	0.2031	0.0186	0.2031
24	0.0715	-0.0011	0.0667	-0.0011
25	0.0747	0.0313	0.0666	0.0313
26	0.2248	0.0981	0.1535	0.0981
27	0.1939	0.1425*	0.0561	0.1425*
28	0.1989	0.1093*	0.0882	0.1093*
29	0.0943	0.0317	0.1160	0.0317
30	0.2181	0.0523	-0.0114	0.0523
31	0.1737	0.085*	0.0730	0.085*
32	0.0569	-0.0061	0.1303	-0.0061
33	0.0319	0.0783	0.1367	0.0783
34	0.2013	0.2077*	0.1135	0.2077*
35	0.1244	0.0248	0.0857	0.0248
36	0.1817	0.0762*	0.0269	0.0762*
37	0.8636	0.2332	0.4773	0.4464***

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08).

Table A3-7 Comparison of Average Output in Rural and Urban Organised Manufacturing Industries (1997-98 to 2007-08)

IC	Average Rural Output	Average Urban Output	Gap in Output (Avg. Rural Output – Avg. Urban Output)
15	1254879.268	922046.056	332833.21
16	119418.7767	375020.507	-255601.7
17	727931.8103	825271.284	-97339.47
18	52682.54921	398067.367	-345384.8
19	50997.66361	116499.249	-65501.58
20	28783.59016	19697.7932	9085.797
21	186086.9244	162201.457	23885.468
22	40463.18784	297521.762	-257058.6
23	1840413.288	704558.08	1135855.2
24	2157698.948	2078061.96	79636.987
25	369005.9714	318512.38	50493.592

IC	Average Rural Output	Average Urban Output	Gap in Output (Avg. Rural Output – Avg. Urban Output)
26	825352.8441	392950.469	432402.37
27	1001482.421	2513823.09	-1512341
28	208359.8417	508896.927	-300537.1
29	390599.3526	959200.777	-568601.4
30	61424.58721	67579.3828	-6154.796
31	335119.9881	642079.168	-306959.2
32	182593.4942	256984.794	-74391.3
33	80603.42473	169325.83	-88722.41
34	381212.0637	895039.148	-513827.1
35	377437.924	354731.695	22706.229
36	56048.07883	304604.306	-248556.2
37	634.2280898	1494.7213	-860.4932

Source: Derived from Appendix 3, Table A3-6a and Table A3-6b.

Table A3-8a: Workforce Size in Rural Industries in the Organised Manufacturing Sector

IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
15	653142	654281	663205	643925	628218	667386	697781	737303	783190	814132
16	63079	51896	58862	66474	64287	79996	77138	91910	88531	82878
17	423405	425608	421602	374978	387384	417167	448597	483246	588090	570870
18	22696	20985	40870	28756	25514	39679	42502	59477	65347	73433
19	36776	32505	36022	40674	34203	41236	40458	42894	54993	66694
20	23232	21909	21314	24186	22608	22504	23266	23640	29931	29125
21	61530	69480	72250	69076	70388	71342	74441	75282	79621	135112
22	7318	6101	7954	7062	6394	8137	8534	10865	10890	11586
23	23819	30995	22035	26064	22565	27982	31569	35870	42214	63150
24	229880	251650	248233	235911	247003	249079	264055	281144	309532	333857
25	83846	88295	75977	90799	85099	95388	107680	121527	128918	143820
26	215683	222291	208835	234579	374248	238331	286171	326596	396484	402809
27	152303	110709	98275	111055	106234	107580	128020	175975	229798	262946
28	48566	47873	50661	43457	55105	55531	68275	79420	109976	125406
29	76154	61801	67522	61797	70459	69198	75734	84424	108916	112198
30	1231	2112	1664	2843	2029	3103	1788	2302	3223	4770
31	45753	41907	41157	49451	49789	40627	57993	71408	75488	94783
32	27459	18771	24134	14344	22618	27236	25259	25092	25061	32855
33	16101	13098	12359	13879	12530	12183	12454	13635	15808	15711
34	52408	52405	50680	48961	65225	71965	94750	104270	123414	144545
35	134351	33956	37903	34824	39551	43380	47701	52562	83458	59899
36	14966	19827	21556	28590	24065	26527	28671	33190	28223	41256
37		148	323	481	407	541	329	595	537	751

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08).

Table A3-8b: Workforce Size in Urban Industries in the Organised Manufacturing Sector

IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
15	370869	387072	356587	365108	380647	338152	358272	355179	359765	364469
16	368875	397362	395372	396340	399723	375034	372715	355124	332363	311992
17	709748	658768	673528	629870	613866	609906	627883	658126	729695	672394
18	218544	230342	241571	243768	260030	287830	345104	408655	427580	454621
19	64289	66613	78445	81850	85054	76917	86147	103810	93583	122860
20	13965	18350	16111	15280	15542	15620	14743	19127	16790	23260
21	70661	67879	67492	62675	65408	65465	63654	63403	71091	73620
22	71383	69457	66053	62202	70560	62497	62026	75025	79401	78649
23	25743	22199	24978	25431	29277	27007	28479	29601	26776	23123
24	291338	300796	295296	273901	265362	248506	271995	279719	283732	277165
25	112933	115353	111509	110385	111937	115145	121067	121634	135419	132051
26	134965	137655	138398	139388	130610	123146	136440	145246	150360	149694
27	315726	368858	322494	289819	293778	292700	303239	312176	360297	365278
29	293465	236694	210313	204134	198124	193843	222440	231747	253182	278024
30	6600	8633	10090	9551	7765	8950	13354	12066	15070	13086
31	131681	125442	118136	102196	107515	110115	110653	128388	140291	150844
32	74654	53111	48447	50144	45199	37603	43146	52891	48006	67000
33	33211	33886	29914	24110	29012	30556	29900	35064	38558	40943
34	152184	151366	136095	132534	133186	141001	160483	171743	192811	220183
35	89966	102514	99236	90577	91228	89804	94788	101993	110841	101360
36	75957	82721	66903	66295	78706	88169	109207	113570	144681	132046
37		132	280	421	561	666	1588	1079	2509	1686

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08).

Table A3-9 Labour Growth Rate (Both CAGR and EGR) in Urban and Rural Industries (1997-98 to 2007-08)

IC	CAGR of labour in Organised Industries in the Rural Sector	Exponential Growth Rate of Labour in Organised Industries in the Rural Sector	CAGR of Labour in Organised Industries in the Urban Sector	Exponential Growth Rate of Labour in Organised Industries in the Urban Sector
15	0.0248	0.0248	-0.0019	-0.005
16	0.0308	0.0515	-.0184	-.0218*
17	0.0338	0.0373*	-0.0060	0.0008
18	0.1394	0.1332*	0.0848	0.0897*
19	0.0684	0.0614*	0.0746	0.059*
20	0.0254	0.0283*	0.0583	0.0287
21	0.0913	0.0513*	0.0046	0.0022
22	0.0524	0.064*	0.0108	0.0136
23	0.1144	0.0857*	-0.0119	0.0093
24	0.0423	0.0347*	-0.0055	-0.0073
25	0.0618	0.0636*	0.0175	0.02*
26	0.0719	0.073*	0.0116	0.0104
27	0.0626	0.0812*	0.0163	0.0067
28	0.1112	0.1088*	0.0738	0.0613*
29	0.0440	0.0556*	-0.0060	0.0042

IC	CAGR of labour in Organised Industries in the Rural Sector	Exponential Growth Rate of Labour in Organised Industries in the Rural Sector	CAGR of Labour in Organised Industries in the Urban Sector	Exponential Growth Rate of Labour in Organised Industries in the Urban Sector
30	0.1624	0.0953*	0.0790	0.0739*
31	0.0843	0.0831*	0.0152	0.0158
32	0.0201	0.0348	-0.0119	-0.0114
33	-0.0027	0.0073	0.0235	0.0258
34	0.1193	0.1255	0.0419	0.0413*
35	-0.0858	0.0102	0.0133	0.0114
36	0.1193	0.0845*	0.0634	0.0796*
37	0.2251	0.1372**	0.3749	0.3281**

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08).

Table A3-9 Growth Rate of Labour Productivity in Rural and Urban Industries (1997-98 to 2007-08)

IC	Exponential Growth Rate of Labour Productivity in Organised Industries in the Rural Sector	Exponential Growth Rate of Labour Productivity in Organised Industries in the Urban Sector	CAGR of Labour Productivity in Organised Industries in the Rural Sector	CAGR of Labour Productivity in Organised Industries in the Urban Sector
15	0.0328	0.0350**	0.0416	0.0137
16	-	-	0.1220	0.0261
17	0.0260**	0.0278***	0.0268	0.0247
18	-	-0.0298**	-0.0245	-0.0167
19	-	-0.0083	-0.0144	-0.071
20	-	-	0.0556	0.0895
21	0.0449*	-	0.0332	0.0515
22	0.0506	0.062***	0.0813	0.0767
23	0.2037***	0.1942***	0.1685	0.1294
24	0.032***	0.0062	0.028	-0.59
25	-0.0056	0.0115	0.0123	0.0542
26	0.0806**	0.088***	0.1427	0.1173
27	0.1462***	0.1357***	0.1236	0.1184
28	0.0706***	0.0481***	0.0789	0.037
29	0.0540***	0.0274	0.0483	0.06
30	0.1129*	-0.0214	0.0479	-0.0482
31	0.0659**	0.0687**	0.0825	0.0362
32	0.032*	0.0053	0.0360	0.0046
33	0.0543*	0.0523	0.0347	0.1115
34	0.0777**	-	0.0734	0.0637

IC	Exponential Growth Rate of Labour Productivity in Organised Industries in the Rural Sector	Exponential Growth Rate of Labour Productivity in Organised Industries in the Urban Sector	CAGR of Labour Productivity in Organised Industries in the Rural Sector	CAGR of Labour Productivity in Organised Industries in the Urban Sector
35	0.1657***	0.0134	0.2302	0.0518
36	0.0481***	-0.0034	0.0557	0.0281
37	-	-	0.5234	0.0735

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08). Significance levels: *p<0.1; **p<0.05; ***p<0.01.

Table A3-10 Growth Rate of Capital Productivity in Rural and Urban Industries (1997-98 to 2007-08)

IC	Exponential Growth Rate of Capital Productivity in Organised Industries in the Rural Sector	Exponential Growth Rate of Capital Productivity in Organised Industries in the Urban Sector	CAGR of Capital Productivity in Organised Industries in the Rural Sector	CAGR of Capital Productivity in Organised Industries in the Urban Sector
15	-0.0073	0.0705	-0.0109	0.0705
16	-0.0471**	-0.0711	-0.0309	-0.0711
17	0.0217**	0.0406	0.0149	0.0406
18	-0.0168	-0.0356	-0.0697	-0.0356
19	-0.0143	0.0171	-0.0045	0.0171
20	0.0496*	-0.0639	0.0425	-0.0639
21	0.0707***	0.0953	0.0801	0.0953
22	0.1553***	-0.014	0.1612	-0.014
23	0.1545**	0.0731*	0.0830	0.0731
24	0.0400**	-0.0013	0.0372	-0.0013
25	0.0355**	0.0147	0.0461	0.0147
26	0.1532***	0.0373*	0.2006	0.0373
27	-0.1706***	0.1058***	0.1629	0.1058*
28	0.0777***	0.0268**	0.0482	0.0268*
29	0.0580***	0.0393**	0.0355	0.0393*
30	0.0484	-0.1552***	-0.0441	-0.155*
31	0.1099***	0.1045**	0.0812	0.1045*
32	-0.0124*	0.0021	-0.0096	0.0021
33	0.0877*	0.0166	0.0588	0.0166
34	0.1329**	0.2182***	0.0767	0.2182*
35	0.1306***	-0.026	-0.0010	-0.026
36	0.0317	0.0028	0.0584	0.0028
37	-	-	-0.0863	-0.0199

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08). Significance levels: *p<0.1; **p<0.05; ***p<0.01.

Table A3-11a Wage bill Size in Rural Industries in the Organised Manufacturing Sector

IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
15	190881.46	200164.01	213239.63	205817.61	201960.3	205894.96	213505	230078.67	247927.25	278900.98
16	10098.55	8512.93	9796.20	12410.15	12232.17	16626.10	14634	14959.22	15947.01	15929.77
17	161625.81	177567.73	176405.48	147944.74	152838.49	166020.80	178865	189361.03	226130.22	238399.59
18	5968.70	5933.67	11289.53	8408.58	7806.67	11709.82	15429	21413.22	22718.45	27734.45
19	11629.66	10348.68	10927.62	12658.36	10249.22	13073.32	12228	14328.89	20676.25	22250.36
20	5405.99	6634.67	5115.95	6398.25	5548.60	5891.84	6066	6808.02	8757.97	7999.49
21	29418.93	34825.66	37481.85	39429.47	38913.58	38735.31	40594	39858.01	38793.89	42763.57
22	3205.41	3830.64	4609.98	3627.58	3508.47	4262.09	4523	6950.01	5929.95	7413.69
23	27474.59	27866.60	28462.17	27467.43	20992.56	26189.29	27522	32629.76	39372.25	65872.37
24	111615.36	136149.92	132862.5	120592.99	132620.56	138757.15	154643	162941.57	181172.88	203358.66
25	34090.15	38426.68	35654.72	42635.89	43125.47	47394.7	52518	57684.93	62273.01	68067.87
26	73309.96	80665.78	80989.69	87615.68	116734.28	84522.10	92743	103034.63	127675.8	135483.24
27	102931.12	57090.27	56752.17	85787.29	61553.57	61275.09	72420	97800.06	122270.31	148149.74
28	19212.37	21213.70	23388.38	21201.71	27064.41	26275.61	30200	35765.13	53436.01	65164.18
29	45722.32	39035.35	45617.24	42056.38	48855.32	46982.84	51070	58696.15	80403.23	72923.10
30	546.38	1049.69	822.21	1692.50	1446.76	1838.79	1001	1553.30	2894.48	3473.45
31	27622.80	23955.78	21779.11	34186.88	31484.52	22230.89	32444	35264.32	67793.44	50368.87
32	10691.40	10188.31	15381.82	9869.72	18343.94	18096.72	17459	16492.37	22506.51	19261.42
33	10573.33	8410.89	7652.85	10453.73	9199.48	8310.97	6664	7458.51	8637.63	9285.90
IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
34	31775.27	36524.12	36440.62	36830.64	47932.89	53372.85	71546	79210.40	90199.37	106376.30
35	66055.08	24337.26	29563.13	30837.83	33817.02	38266.25	39403	39936.68	60303.55	50274.33
36	4956.33	6288.42	7846.10	10314.47	8130.33	9713.99	9987	11785.47	10335.88	15331.31
37		64.39	141.72	192.05	188.80	194.49	98	182.29	129.32	296.28

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08)

Table A3-11b: Wage bill Size in Urban Industries in the Organised Manufacturing Sector

IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
15	141235.27	162892.72	151074.02	155799.64	159736.76	140832.03	145760	152196.10	154237.99	156714.78
16	64176.042	69838.42	76312.95	68356.92	69272.84	63287.57	65880	61783.56	58443.65	54504.09
17	349544.27	339410.76	359169.59	326061.32	320582.59	296269.37	301592	318372.83	316533.45	307758.08
18	60451.89	73964.28	79722.42	82186.66	96025.46	101609.98	123596	151988.87	167910.19	177172.27
19	22499.42	24021.38	29142.66	28981.36	29723.81	27872.07	31912	38946.56	33709.92	47502.32
IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
20	3681.45	5758.72	5325.60	5326.82	5322.04	5470.62	4994	7192.75	5817.69	8651.98

21	40862.71	37415.87	40935.82	36738.54	35049.09	36556.42	36622	38554.16	40131.12	45220.73
22	41203.09	42309.56	42679.78	41911.50	45180.71	41802.39	39741	46120.12	49616.52	49127.20
23	32300.29	31432.39	54023.19	50856.92	52639.98	53045.24	56109	55379.45	58995.96	44994.51
24	226861.95	236819.34	225764.81	218347.93	209766.96	194917.31	194939	198838.15	200087.11	194509.15
25	53557.49	57374.56	55014.05	57366.35	57176.61	59918.88	61870	62726.66	71078.58	66443.82
26	59973.34	64423.52	68552.35	71641.96	67083.83	60549.14	67951	71725.03	73627.30	77197.61
27	264019.34	342360.59	341451.15	284722.60	332971.19	341270.93	317090	316478.94	345084.87	412734.87
28	79645.42	86560.56	93080.35	83691.6	88709.68	87445.66	96708	111613.74	121922.77	148399.6
29	222389.19	181705.74	166916.14	158374.89	153637.93	156476.34	166599	170757.94	183212.39	210307.25
30	5124.64	4185.40	6589.37	5521.11	4963.86	6486.74	8876	7986.18	13533.90	9166.88
31	105896.62	99232.17	108983.37	77936.88	89758.33	88471.14	87130	100673.51	125991.02	115252.81
32	47096.43	34947.15	33491.45	34839.4	33217.18	29472.70	29705	36646.84	43112.71	48071.24
33	22670.24	22943.75	19611.15	17306.83	19569.53	19993.76	22824	23229.4	27189.94	32687.60
34	143575.27	145875.35	137353.01	127329.29	130919.19	134852.83	154772	154582.17	171657.84	189657.30
35	58719.81	73597.38	65175.69	60988.32	64742.69	62897.56	68754	72906.07	80570.27	75365.92
36	41493.23	45725.91	40714.45	38527.63	50867.41	56954.76	70636	75876.43	93273.46	91114.21
37		15.79	100.73	92.09	368.97	420.18	808	483.56	864.84	699.76

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08).

Table A3-12 Wage Bill Growth Rate (Both EGR and CAGR) in Urban and Rural Industries (1997-98 to 2007-08)

IC	CAGR of wage bill in Organised Industries in the Rural Sector	Exponential Growth Rate of wage bill in Organised Industries in the Rural Sector	CAGR of wage bill in Organised Industries in the Urban Sector	Exponential Growth Rate of wage bill in Organised Industries in the Urban Sector
15	0.0430	0.0329*	0.0116	-0.0402
16	0.0519	0.0693*	-0.0180	0.0483
17	0.0441	0.0375*	-0.0140	-0.0416
18	0.1861	0.1736*	0.1269	0.0528
19	0.0748	0.0741*	0.0866	-0.0091
20	0.0445	0.0414*	0.0996	0.1374
21	0.0424	0.0272*	0.0113	0.0158
23	0.1020	0.0677*	0.0375	0.099
24	0.0689	0.0588*	-0.0170	0.066
25	0.0799	0.0769*	0.0242	-0.0547
26	0.0706	0.0597*	0.0284	0.0193*

IC	CAGR of wage bill in Organised Industries in the Rural Sector	Exponential Growth Rate of wage bill in Organised Industries in the Rural Sector	CAGR of wage bill in Organised Industries in the Urban Sector	Exponential Growth Rate of wage bill in Organised Industries in the Urban Sector
27	0.0413	0.0656	0.0509	0.0253*
28	0.1453	0.12518	0.0716	0.0564*
29	0.0532	0.0479	-0.0062	-0.0007
30	0.2282	0.1552*	0.0667	0.0975*
31	0.0690	0.0889*	0.0095	0.0138
32	0.0676	0.0781*	0.0023	0.0091
33	-0.0143	-0.0156	0.0415	0.0372
34	0.1437	0.1401*	0.0314	0.0295*
35	-0.0299	0.0379	0.0281	0.0231*
36	0.1337	0.0951*	0.0913	0.1041*
37	0.2102	0.0845	0.6063	0.4285***

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08).

Table A3-13: Comparison of Average Wage Rate and Average Workforce Size in Rural and Urban Industries (1997-98 to 2007-08)

IC	Rural Avg. Size of Workforce	Rural – Average size of Wage Bill	Rural -Avg. Wage Bill p.u. of labour in the accounting period	Urban -Avg. Size of Workforce	Urban Avg. Size of Wage Bill	Urban -Avg. Wage Bill p.u. of labour in the accounting period
15	694256.30	218836.99	0.32	363612.00	142468.50	0.39
16	72505.10	13114.61	0.18	370490.00	90994.58	0.25
17	454094.70	181515.89	0.40	658378.40	308667.10	0.47
18	41925.90	13841.21	0.33	311804.50	98042.78	0.31
19	42645.50	13837.04	0.32	85956.80	28641.93	0.33
20	24171.50	6462.68	0.27	16878.80	9185.51	0.54
21	77852.20	38081.43	0.49	67134.80	39757.19	0.59
22	8484.10	4786.08	0.56	69725.30	44907.13	0.64
23	32626.30	32384.90	0.99	26261.40	63086.81	2.40
24	265034.40	147471.46	0.56	278781.00	197184.32	0.71
25	102134.90	48187.14	0.47	118743.30	54202.50	0.46
26	290602.70	98277.42	0.34	138590.20	68272.51	0.49
27	148289.50	86602.96	0.58	322436.50	329818.45	1.02
28	68427.00	32292.15	0.47	184741.30	99777.74	0.54
29	78820.30	53136.19	0.67	232196.60	177037.68	0.76
30	2506.50	1631.85	0.65	10516.50	7243.41	0.69
31	56835.60	34713.06	0.61	122526.10	99932.59	0.82
32	24282.90	15829.12	0.65	52020.10	37060.01	0.71
33	13775.80	8664.73	0.63	32515.40	22802.62	0.70
34	80862.30	59020.85	0.73	159158.60	149057.43	0.94
35	56758.50	41279.41	0.73	97230.70	68371.77	0.70

36	26687.10	9468.93	0.35	95825.50	60518.35	0.63
IC	Rural Avg. Size of Workforce	Rural – Average size of Wage Bill	Rural -Avg. Wage Bill p.u. of labour in the accounting period	Urban -Avg. Size of Workforce	Urban Avg. Size of Wage Bill	Urban -Avg. Wage Bill p.u. of labour in the accounting period
37	456.89	165.26	0.36	991.33	428.21	0.43

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08). Significance levels: *p<0.1; **p<0.05; ***p<0.

Table A3-14a Capital Stock-Wage Bill Ratio in Rural Industries in the Organised Manufacturing Sector

IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
15	11.24	11.75	11.43	12.00	12.88	13.27	13.12	12.73	14.89	15.32
16	2.02	2.67	2.62	6.38	7.64	5.54	2.66	2.25	6.42	6.32
17	17.66	18.95	18.16	15.72	16.94	15.89	15.78	17.78	20.13	18.65
19	5.77	5.24	6.14	6.29	5.04	5.68	4.96	4.67	6.19	4.99
20	12.14	7.68	12.04	9.43	12.44	11.98	11.37	9.91	11.27	11.6
21	25.59	29.05	23.69	20.44	25.28	23.20	22.22	22.79	26.71	26.54
22	35.02	32.63	24.61	17.87	12.36	11.95	13.13	12.49	12.58	12.57
23	28.48	62.04	71.59	135.41	140.03	111.73	105.91	106.45	94.64	60.29
24	41.75	40.58	40.68	34.30	31.07	32.86	27.16	36.49	35.81	30.94
25	26.53	23.12	23.2	23.46	20.6	18.57	23.65	15.13	15.36	17.09
26	38.51	43.73	29.04	33.9	20.61	32.18	27.51	24.11	21.36	25.82
27	63.06	64.44	56.56	39.56	54.61	64.62	59.16	56.63	54.10	52.69
28	14.64	15.35	12.26	12.74	12.47	10.89	8.77	11.24	11.55	14.43
29	10.74	12.55	11.7	10.65	11.51	11.62	11.41	11.07	8.49	11.03
30	15.47	14.11	14.70	10.16	11.46	13.6	17.99	13.68	8.39	21.51
32	33.92	32.24	27.13	26.07	29.45	46.92	34.08	32.20	23.88	33.75
33	7.73	7.62	10.18	10.31	8.78	9.96	13.71	7.76	7.15	7.0
34	21.8	22.45	23.71	31.34	18.12	16.11	13.81	13.03	13.33	16.96
35	2.56	8.63	10.49	12.11	10.84	10.12	9.58	10.53	8.89	9.68
36	8.16	6.72	7.95	8.37	11.17	10.01	8.35	7.93	8.21	7.08
37	-	8.16	1.13	1.71	4.97	1.78	5.31	11.87	5.53	47.31

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08)

Table A3-14b: Capital Stock-Wage Bill Ratio in Urban Industries in the Organised Manufacturing Sector

IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
15	7.71	9.02	7.92	7.78	9.06	8.67	9.17	9.09	9.64	9.43
16	1.67	2.02	1.95	1.18	1.28	1.56	1.97	2.19	1.65	1.73
17	4.91	6.01	5.08	5.96	5.38	5.98	5.99	6.10	8.9	7.39

IC	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
18	3.49	4.32	4.02	3.46	3.35	3.33	3.04	3.20	3.22	2.68
19	6.11	6.35	6.02	4.87	5.54	5.08	4.99	5.00	4.66	4.79
20	4.55	4.73	6.22	5.97	5.53	5.7	5.91	5.71	9.3	6.63
21	11.89	14.14	11.34	12.45	16.97	11.87	10.85	13.23	13.41	15.64
22	8.56	7.80	7.05	7.27	8.16	8.95	9.47	11.96	13.37	14.45
23	23.16	31.53	21.74	27.73	49.71	54.31	46.63	48.96	40.04	46.42
24	16.50	17.91	18.98	24.71	21.50	21.96	20.86	21.73	21.03	21.39
25	15.55	12.33	11.34	10.73	13.04	13.13	12.52	11.60	12.27	12.21
26	13.24	13.9	13.88	11.54	13.83	12.84	17.32	18.04	16.14	19.25
27	16.30	15.09	14.01	14.81	14.66	15.98	16.88	18.48	17.14	15.00
28	5.47	4.70	4.22	5.11	4.67	5.21	4.96	5.12	6.23	6.34
29	5.35	5.99	5.17	6.08	6.53	6.16	5.97	7.29	6.95	7.40
30	6.49	11.42	18.21	23.56	46.21	45.18	32.98	33.71	19.34	20.59
31	5.56	8.68	6.11	6.99	7.38	5.9	5.08	5.44	5.12	5.5
32	13.32	11.53	12.96	13.13	10.29	10.57	12.47	16.57	10.64	9.14
33	5.36	5.55	6.27	6.14	6.76	7.53	7.06	6.77	5.99	7.11
34	12.43	14.55	13.65	9.6	9.23	9.29	9.43	9.52	9.02	10.79
35	5.03	6.94	5.15	4.53	38.87	5.21	6.15	6.31	6.39	7.16
36	4.24	3.69	3.86	9.61	25.63	3.92	3.55	4.17	3.57	3.35
37		8.10	1.67	3.07	5.96	4.26	2.17	7.92	5.34	4.83

Source: Computed using Time Series Data on ASI (1998-99 to 2007-08).

Table A3-15 Growth Rate (both CAGR and EGR) of K/W in Urban and Rural Industries (1997-98 to 2007-08)

IC	CAGR of K/W in Organised Industries in the Rural Sector	Exponential Growth Rate of K/W in Organised Industries in the Rural Sector	CAGR of K/W in Organised Industries in the Urban Sector	Exponential Growth Rate of K/W in Organised Industries in the Urban Sector
15	0.0350	0.0319*	0.0226	0.0210*
16	0.1351	0.077	0.0039	0.0056
17	0.0061	0.005	0.0465	0.0445*
18	0.0076	-0.0155	-0.0289	-0.0364*
19	-0.0160	-0.0127	-0.0265	-0.0319*
20	-0.0050	0.0105	0.0427	0.0330
21	0.0041	-.0015	0.0309	-0.0090
22	-0.1076	-0.1231*	0.0599	0.0837
23	0.0869	0.0650	0.0803%	0.0774*
24	-0.0327	0.0288	0.0293	0.0192

IC	CAGR of K/W in Organised Industries in the Rural Sector	Exponential Growth Rate of K/W in Organised Industries in the Rural Sector	CAGR of K/W in Organised Industries in the Urban Sector	Exponential Growth Rate of K/W in Organised Industries in the Urban Sector
25	-0.0477	-0.0463*	-0.0265	-0.0064
26	-0.0434	-0.0593*	0.0425	0.0417*
27	-0.0198	-0.0092	-0.0092	0.0125
28	-0.0016	-0.0748	0.0161	0.0259
29	0.0030	-0.0156	0.0367	0.0345*
30	0.0373	0.0052	0.1369	0.1096
31	0.0153	-0.0495	-0.0012	-0.0337
32	-0.0006	0.0001	-.0410	-0.0175
33	-0.0111	-0.0101	0.0319	0.024
34	-0.0275	-0.0693*	-0.0156	-0.0394
35	0.1593	0.0742	0.0400%	0.0152
36	-0.0157	0.0006	-0.0258	-0.0411
37	0.2457	0.481***	-0.0626	0.0383

Source: Computed using *Time Series Data on ASI (1998-99 to 2007-08)*.

Appendix 4

A4-1 Steps to obtain Elasticity of industrial wage rate with price for Chapter 6

Differentiating $p = [1 + \lambda(w_n)] \cdot (a \cdot w_n + b \cdot c)$

$$\Delta p = \frac{\partial p}{\partial \lambda} \cdot \Delta \lambda + \frac{\partial p}{\partial w_n} \cdot \Delta w_n = (a \cdot w_n + b \cdot c) \cdot \Delta \lambda + (1 + \lambda) a \cdot \Delta w_n$$

$$\text{Hence, } \frac{\Delta p}{p} = \frac{1}{(1+\lambda)(a \cdot w_n + b \cdot c)} \cdot [(a \cdot w_n + b \cdot c) \Delta \lambda + (1 + \lambda) \cdot a \cdot \Delta w_n]$$

$$\frac{\Delta p}{p} = \frac{\Delta \lambda}{\lambda} \cdot \frac{\lambda}{(1+\lambda)} + \frac{\Delta w_n}{w_n} \cdot \frac{w_n \cdot a}{(a \cdot w_n + b \cdot c)}$$

$$\frac{\frac{\Delta p}{p}}{\frac{\Delta w_n}{w_n}} = \frac{w_n \cdot a}{a \cdot w_n + b \cdot c} + \frac{\frac{\Delta \lambda}{\lambda}}{\frac{\Delta w_n}{w_n}} \cdot \frac{\lambda}{(1+\lambda)}, \text{ where } \frac{w_n \cdot a}{a \cdot w_n + b \cdot c} > 0, \frac{\frac{\Delta \lambda}{\lambda}}{\frac{\Delta w_n}{w_n}} \cdot \frac{\lambda}{(1+\lambda)} < 0, \text{ since } \frac{\Delta \lambda}{\lambda} <$$

0 ... [1]

For the price to be constant, with change in wage rate, elasticity of λ w.r.t w_n i.e.

$$\frac{\frac{\Delta \lambda}{\lambda}}{\frac{\Delta w_n}{w_n}} = - \frac{\frac{w_n \cdot a}{a \cdot w_n + b \cdot c}}{\frac{\lambda}{(1+\lambda)}},$$

$$\frac{\frac{\Delta p}{p}}{\frac{\Delta w_n}{w_n}} < 0, \text{ when the impact of the second term on the R.H.S of [1] prevails i.e.}$$

$$\left| \frac{w_n \cdot a}{a \cdot w_n + b \cdot c} \right| < \left| \frac{\frac{\Delta \lambda}{\lambda}}{\frac{\Delta w_n}{w_n}} \cdot \frac{\lambda}{(1+\lambda)} \right|$$

$$\frac{\frac{\Delta p}{p}}{\frac{\Delta w_n}{w_n}} > 0, \text{ when the impact of the first term on the R.H.S of [1] prevails i.e. } \left| \frac{w_n \cdot a}{a \cdot w_n + b \cdot c} \right| >$$

$$\left| \frac{\frac{\Delta \lambda}{\lambda}}{\frac{\Delta w_n}{w_n}} \cdot \frac{\lambda}{(1+\lambda)} \right|$$

A4-2 Steps to obtain change in Y^* with w_n , for $\lambda = \text{constant}$, $a = \text{constant}$ for Chapter 6

$$\frac{\partial Y^*}{\partial w_n} = \frac{\alpha \frac{\partial D_o'}{\partial w_n} - D_o' \frac{\partial \alpha}{\partial w_n}}{\alpha^2}, \text{ for } \lambda = \text{constant}$$

$$\frac{\partial Y^*}{\partial w_n} = \frac{0 - D_o' \frac{\partial \alpha}{\partial w_n}}{\alpha^2},$$

$$\text{where } \alpha = \left\{ 1 - \frac{k_{iw}}{(1+\lambda)(a \cdot w_n + b \cdot c)} \cdot a \cdot w_n - \frac{\lambda \cdot k_c}{(1+\lambda)(a \cdot w_n + b \cdot c)} (a \cdot w_n + b \cdot c) \right\}$$

$$\frac{\partial Y^*}{\partial w_n} = \frac{-D_o' \frac{\partial \alpha}{\partial w_n}}{\alpha^2}$$

$$\frac{\partial \alpha}{\partial w_n} = \left\{ 0 - \frac{\partial}{\partial w_n} \left(\frac{k_{iw}}{(1+\lambda)(a \cdot w_n + b \cdot c)} \cdot a \cdot w_n \right) - \frac{\partial}{\partial w_n} \frac{\lambda \cdot k_c}{(1+\lambda)} \right\}$$

$$\frac{\partial \alpha}{\partial w_n} = - \frac{.a.b.c.k_{iw.}}{(1+\lambda)(a.w_n+b.c)^2}$$

$$\frac{\partial Y^*}{\partial w_n} = \frac{D_o' . a.b.c.k_{iw.}}{(1+\lambda)(a.w_n+b.c)^2} \cdot \frac{1}{\left\{1 - \frac{k_{iw}}{(1+\lambda)(a.w_n+b.c)} . a.w_n - \frac{\lambda.k_c}{(1+\lambda)}\right\}^2} > 0$$

$$\text{Thus, } \frac{\partial Y^*}{\partial w_n} > 0$$

A4-3 Steps to obtain change in Y^* with w_n , for $\lambda = \lambda(w_n)$, $a = \text{constant}$ for Chapter 6

$$\frac{\partial Y^*}{\partial w_n} = \frac{\alpha \frac{\partial D_o'}{\partial w_n} - D_o' \frac{\partial \alpha}{\partial w_n}}{\alpha^2}, \quad \text{for } \lambda = \lambda(w_n)$$

$$\frac{\partial Y^*}{\partial w_n} = \frac{0 - D_o' \frac{\partial \alpha}{\partial w_n}}{\alpha^2},$$

$$\text{where } \alpha = \left\{1 - \frac{k_{iw}}{(1+\lambda)(a.w_n+b.c)} . a.w_n - \frac{\lambda.k_c}{(1+\lambda)(a.w_n+b.c)} (a.w_n + b.c)\right\}$$

$$\frac{\partial Y^*}{\partial w_n} = \frac{-D_o' \frac{\partial \alpha}{\partial w_n}}{\alpha^2}$$

$$\frac{\partial \alpha}{\partial w_n} = \left\{0 - \frac{\partial}{\partial w_n} \left(\frac{k_{iw}}{(1+\lambda)(a.w_n+b.c)} . a.w_n \right) - \frac{\partial}{\partial w_n} \frac{\lambda.k_c}{(1+\lambda)}\right\}$$

$$\begin{aligned} \frac{\partial \alpha}{\partial w_n} = & - \left[\frac{(1+\lambda)(a.w_n+b.c).k_{iw}.a - k_{iw}.a.w_n\{(1+\lambda).a + (a.w_n+b.c).\lambda'(w_n)\}}{\{(1+\lambda)(a.w_n+b.c)\}^2} \right. \\ & \left. + \frac{(1+\lambda).k_c.\lambda'(w_n) - k_c.\lambda.(w_n)}{(1+\lambda)^2} \right] \end{aligned}$$

$$\frac{\partial \alpha}{\partial w_n} = - \left[\frac{(1+\lambda)b.c.k_{iw}.a - k_{iw}.a.w_n(a.w_n+b.c).\lambda'(w_n)}{\{(1+\lambda)(a.w_n+b.c)\}^2} + \frac{k_c.\lambda'(w_n)}{(1+\lambda)^2} \right]$$

$$\frac{\partial Y^*}{\partial w_n} = \frac{D_o'}{\alpha^2} \left[\frac{(1+\lambda)b.c.k_{iw}.a - k_{iw}.a.w_n(a.w_n+b.c).\lambda'(w_n)}{\{(1+\lambda)(a.w_n+b.c)\}^2} + \frac{k_c.\lambda'(w_n)}{(1+\lambda)^2} \right]$$

$$\text{Thus, } \frac{\partial Y^*}{\partial w_n} > 0 \text{ for } \left[\frac{(1+\lambda)b.c.k_{iw}.a}{\{(1+\lambda)(a.w_n+b.c)\}^2} + \frac{k_c.\lambda'(w_n)}{(1+\lambda)^2} \right] > \frac{k_{iw}.a.w_n(a.w_n+b.c).\lambda'(w_n)}{\{(1+\lambda)(a.w_n+b.c)\}^2}$$

A4-4 Steps to obtain change in Y^* with a for Chapter 6

$$\frac{\partial Y^*}{\partial a} = \frac{\alpha \cdot \frac{\partial D_o'}{\partial a} - D_o' \frac{\partial \alpha}{\partial a}}{\alpha^2},$$

$$\text{where } \alpha = \left\{ 1 - \frac{k_{iw}}{(1+\lambda)(a.w_n+b.c)} \cdot a.w_n - \frac{\lambda.k_c}{(1+\lambda)(a.w_n+b.c)} (a.w_n + b.c) \right\}$$

$$\frac{\partial Y^*}{\partial a} = \frac{-D_o' \frac{\partial \alpha}{\partial a}}{\alpha^2}$$

$$\frac{\partial \alpha}{\partial a} = \left\{ 0 - \frac{\partial}{\partial a} \left(\frac{k_{iw}}{(1+\lambda)(a.w_n+b.c)} \cdot a.w_n \right) - \frac{\partial}{\partial a} \frac{\lambda.k_c}{(1+\lambda)} \right\}$$

$$\frac{\partial \alpha}{\partial a} = - \frac{w_n \cdot b.c.k_{iw.}}{(1+\lambda)(a.w_n+b.c)^2}$$

$$\frac{\partial Y^*}{\partial a} = \frac{D_o' \cdot w_n \cdot b.c.k_{iw.}}{(1+\lambda)(a.w_n+b.c)^2} \cdot \frac{1}{\left\{ 1 - \frac{k_{iw}}{(1+\lambda)(a.w_n+b.c)} \cdot a.w_n - \frac{\lambda.k_c}{(1+\lambda)} \right\}^2} > 0$$

$$\text{Thus, } \frac{\partial Y^*}{\partial w_n} > 0$$

A1-5 Steps to obtain change in θ with w_n for $\lambda = \text{constant}$ for Chapter 6

$$\frac{\partial \theta}{\partial w_n} = \frac{\partial \left(\frac{\lambda}{\lambda + \frac{a.w_n}{a.w_n+b.c}} \right)}{\partial w_n} \text{ for } \lambda = \text{constant}$$

$$\frac{\partial \theta}{\partial w_n} = \frac{\frac{\lambda}{\lambda + \frac{a.w_n}{a.w_n+b.c}} \cdot 0 - \lambda \cdot \frac{\partial \left(\lambda + \frac{a.w_n}{a.w_n+b.c} \right)}{\partial w_n}}{\left(\lambda + \frac{a.w_n}{a.w_n+b.c} \right)^2}$$

$$\frac{\partial \theta}{\partial w_n} = \left(\frac{0 - \lambda \cdot \left(0 + \frac{(a.w_n+b.c) \cdot a - a.w_n \cdot a}{(a.w_n+b.c)^2} \right)}{\left(\lambda + \frac{a.w_n}{a.w_n+b.c} \right)^2} \right)$$

$$\frac{\partial \theta}{\partial w_n} = \frac{\frac{-\lambda.a.b.c}{(a.w_n+b.c)^2}}{\left(\lambda + \frac{a.w_n}{a.w_n+b.c} \right)^2}$$

$$\text{Thus, } \frac{\partial \theta}{\partial w_n} < 0$$

A1-6 Steps to obtain change in θ with w_n for $\lambda = \lambda(w_n)$ for Chapter 6

$$\begin{aligned}\frac{\partial \theta}{\partial w_n} &= \frac{\partial \left(\frac{\lambda}{\lambda + \frac{a.w_n}{a.w_n + b.c}} \right)}{\partial w_n} \text{ for } \lambda = \lambda(w_n) \\ \frac{\partial \theta}{\partial w_n} &= \frac{\left(\lambda(w_n) + \frac{a.w_n}{a.w_n + b.c} \right) \cdot \lambda'(w_n) - \lambda(w_n) \cdot \frac{\partial \left(\lambda(w_n) + \frac{a.w_n}{a.w_n + b.c} \right)}{\partial w_n}}{\left(\lambda(w_n) + \frac{a.w_n}{a.w_n + b.c} \right)^2} \\ \frac{\partial \theta}{\partial w_n} &= \frac{\left(\lambda(w_n) + \frac{a.w_n}{a.w_n + b.c} \right) \cdot \lambda'(w_n) - \lambda(w_n) \cdot \lambda'(w_n) - \lambda(w_n) \cdot \frac{a.b.c}{(a.w_n + b.c)^2}}{\left(\lambda(w_n) + \frac{a.w_n}{a.w_n + b.c} \right)^2} \\ \frac{\partial \theta}{\partial w_n} &= \frac{\lambda'(w_n) \cdot \left(\frac{a.w_n}{a.w_n + b.c} \right) - \lambda(w_n) \cdot \frac{a.b.c}{(a.w_n + b.c)^2}}{\left(\lambda(w_n) + \frac{a.w_n}{a.w_n + b.c} \right)^2} \\ \frac{\partial \theta}{\partial w_n} &= \frac{\lambda'(w_n) \cdot w_n \cdot x - \lambda(w_n) \cdot y}{\left(\lambda(w_n) + \frac{a.w_n}{a.w_n + b.c} \right)^2} \\ \frac{\partial \theta}{\partial w_n} &= \frac{\frac{\partial \lambda(w_n)}{\partial w_n} \cdot w_n \cdot x - \lambda(w_n) \cdot y}{\left(\lambda(w_n) + \frac{a.w_n}{a.w_n + b.c} \right)^2} \\ \frac{\partial \theta}{\partial w_n} &= \frac{\lambda(w_n) \cdot \left[\frac{\partial \lambda(w_n)}{\partial w_n} \cdot w_n \cdot x - y \right]}{\left(\lambda(w_n) + \frac{a.w_n}{a.w_n + b.c} \right)^2} \\ \frac{\partial \theta}{\partial w_n} &= \frac{\lambda(w_n) \cdot \left[e \cdot \frac{a.w_n}{a.w_n + b.c} - \frac{a.b.c}{(a.w_n + b.c)^2} \right]}{\left(\lambda(w_n) + \frac{a.w_n}{a.w_n + b.c} \right)^2} \\ \frac{\partial \theta}{\partial w_n} &= \frac{\lambda(w_n) \cdot \frac{a.w_n}{a.w_n + b.c} \cdot \left[e - \frac{b.c}{a.w_n + b.c} \right]}{\left(\lambda(w_n) + \frac{a.w_n}{a.w_n + b.c} \right)^2}\end{aligned}$$

A1-7 Steps to obtain change in θ with a for Chapter 6

$$\begin{aligned}\frac{\partial \theta}{\partial a} &= \frac{\partial \left\{ \frac{\lambda(a.w_n + b.c)}{a.w_n + \lambda(a.w_n + b.c)} \right\}}{\partial a} \\ \frac{\partial \theta}{\partial a} &= \frac{[a.w_n + \lambda(a.w_n + b.c)] \cdot \lambda \cdot w_n - \lambda(a.w_n + b.c)(w_n + \lambda \cdot w_n)}{a.w_n + \lambda(a.w_n + b.c)} \\ \frac{\partial \theta}{\partial a} &= -\lambda \cdot \frac{b.c.w_n}{a.w_n + \lambda(a.w_n + b.c)}\end{aligned}$$

A4-8 Steps to obtain change in Y^* with w_a for Chapter 6

$$\frac{\partial Y^*}{\partial w_a} = \frac{\beta \frac{\partial (D_o' + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}})}{\partial w_a}}{\beta^2} - \frac{(D_o' + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}}) \frac{\partial \beta}{\partial w_a}}{\beta^2}$$

$$\text{where } \beta = \left\{ 1 - \frac{1}{(\lambda+1)(a \cdot m \cdot w_a + b \cdot c)} (k_{iw} \cdot a \cdot m \cdot w_a + k_c \cdot \lambda (a \cdot m \cdot w_a + b \cdot c)) \right\}$$

Differentiation of the first R.H.S. term yields,

$$\frac{\beta \frac{\partial (D_o' + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}})}{\partial w_a}}{\beta^2} = \frac{1}{\beta} \cdot k_{aw} \cdot L_a \cdot \frac{1}{P_{aw}}$$

Differentiation of the second R.H.S. term yields,

$$\begin{aligned} - \frac{(D_o' + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}}) \frac{\partial \beta}{\partial w_a}}{\beta^2} &= - \frac{(D_o' + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}})}{\beta^2} \{ -(\lambda+1)(a \cdot m \cdot w_a + b \cdot c) \cdot (k_{iw} \cdot a \cdot m + k_c \cdot \lambda \cdot a \cdot m) + (k_{iw} \cdot a \cdot m \cdot w_a + \\ &k_c \cdot \lambda (a \cdot m \cdot w_a + b \cdot c))(\lambda+1) a \cdot m \} \\ &= \frac{(D_o' + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}})}{\beta^2} \cdot (\lambda+1) b \cdot c \cdot a \cdot m \cdot k_{iw} \end{aligned}$$

$$\frac{\partial Y^*}{\partial w_a} = \frac{1}{\beta} \cdot k_{aw} \cdot L_a \cdot \frac{1}{P_{aw}} + \frac{(D_o' + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}})}{\beta^2} \cdot (\lambda+1) b \cdot c \cdot a \cdot m \cdot k_{iw}$$

Demand of industrial workers, industrial capitalists and agricultural workers explicitly stated; demand of others lumped together and constant

In this case, at equilibrium

$$[1] Y^* = D_o' + \left\{ k_{iw} \cdot a \cdot \frac{w}{P_{iw}} + k_c \cdot \frac{\lambda}{P_{iw}} \cdot (a \cdot w + b \cdot c) \right\} \cdot Y^* + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}}$$

It follows from [6-1a], Chapter 6 that $w = f(w_a, P_f)$

Assuming $P_f = \text{constant}$ let $w = m \cdot w_a$ Hence, [1] can be rewritten as,

$$Y^* \left\{ 1 - k_{iw} \cdot a \cdot \frac{m \cdot w_a}{P_{iw}} - k_c \cdot \frac{\lambda}{P_{iw}} \cdot (a \cdot m \cdot w_a + b \cdot c) \right\} = D_o' + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}}$$

$$[2] Y^* = \frac{D_o' + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}}}{\beta},$$

$$\text{where } \beta = \left\{ 1 - \frac{1}{(\lambda+1)(a \cdot m \cdot w_a + b \cdot c)} (k_{iw} \cdot a \cdot m \cdot w_a + k_c \cdot \lambda (a \cdot m \cdot w_a + b \cdot c)) \right\}$$

We examine change in Y^* with w_a , for $\lambda = \text{constant}$, $a = \text{constant}$

We differentiate [2],

$$[3] \frac{\partial Y^*}{\partial w_a} = \frac{\beta \frac{\partial (D_o' + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}})}{\partial w_a}}{\beta^2} - \frac{(D_o' + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}}) \frac{\partial \beta}{\partial w_a}}{\beta^2}$$

On differentiation we obtain,

$$[4] \frac{\partial Y^*}{\partial w_a} = \frac{1}{\beta} \cdot \frac{k_{aw} \cdot L_a}{P_{aw}} + \frac{(D_o' + k_{aw} \cdot L_a \cdot \frac{w_a}{P_{aw}}) \cdot k_{iw} \cdot a.m.bc(\lambda+1)}{\beta^2}$$

$$\frac{\partial Y^*}{\partial w_a} > 0$$

The result implies that an increase in w_a brings about an increase in Y^* .

A4-9 Regression Analysis Output

a. Fixed-effects (within) regression Number of obs = 199

Group variable (i): Industry Number of groups = 22

R-sq: within = 0.1146 Obs per group: min. = 9

between = 0.1923 avg. = 9.0

overall = 0.0772 max. = 10

realoutputgrowthrate	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
realprofitrate	.7570535	.1585867	4.77	0.000	.4440771	1.07003
_cons	-2.552971	5.737698	-0.44	0.657	-13.87652	8.770574

b. Random-effects GLS regression Number of obs = 199

Group variable (i): Industry Number of groups = 22

R-sq: within = 0.1146 Obs per group: min = 9

between = 0.1923 avg = 9.0

overall = 0.0772 max = 10

realoutputgrowthrate	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
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realprofitrate	.3652523	.0899873	4.06	0.000	.1888804 .5416243
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_cons	9.105637	4.215543	2.16	0.031	.8433238 17.36795
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