IMPACT OF TRADE ON LABOUR MARKET IN ORGANISED INDIAN FOOD INDUSTRY IN THE POST LIBERALISATION PERIOD

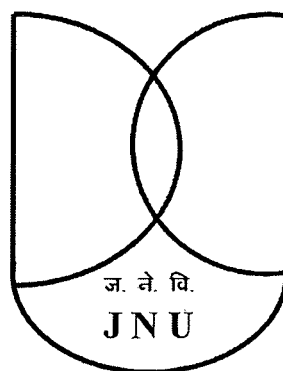*Dissertation submitted to Jawaharlal Nehru University*

in partial fulfilment of the requirements

for award of the degree of

MASTER OF PHILOSOPHY

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INDIA

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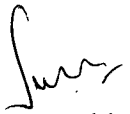### School of Social Sciences
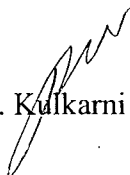### New Delhi-110067

Date:29th July 2013

CERTIFICATE

I declare that the dissertation entitle " IMPACT OF TRADE ON LABOUR MARKET IN ORGANISED INDIAN FOOD INDUSTRY IN THE POST LIBERALISATION PERIOD " submitted by me in partial fulfilment of the requirements for the award of the degree of Master of Philosophy of this University is my own work and has not been previously submitted for any other degree of this or any other University.

Sunil Kumar

We recommend that this dissertation be placed before the examiners for evaluation.

Dr. Seema Bathla

Supervisor

Dr. P.M. Kulkarni

Chairperson

This dissertation is dedicated to my supportive and loving wife Sweety.S.Nair, our exuberant, sweet, and loveable son Arihaan, and to my always encouraging parents, Mohan and Laxmi.

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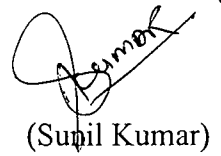
There are people in everyone's lives who make success both possible and rewarding. My wife and my son has scarified a lot by spending most of time with my in-laws to allow me to focus. I am deeply sorry for the time we spent apart. I express my love for my wife and my son . I am grateful to my in-laws for taking care of my wife and son.

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I own responsibility for errors and omissions that might have crept in the work.

Place: New Delhi

Date: 29th July 2013

(Sunil Kumar)

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ABBREVATIONS

ASI	Annual Survey of India
APEDA	Agricultural and Processed food products export development authority
CAGR or CGR	Compound Growth rate (Annual)
CSO	Central Statistical Organisation
CV	Coefficient of Variation
EII	Export Intensity Index
FDI	Foreign Direct Investment
FPI	Food Processing Industry
GDP	Gross Domestic Product
G-L Index	Grubel-Lloyd Index
GNP	Gross National Product
GOI	Government of India
GVA	Gross Value Added
HS	Harmonised System
III	Import Intensity Index
MNE	Multi National Enterprises
MOFPI	Ministry of Food Processing Industry
MOSPI	Ministry of Statistics and Programme Implementation
NAS	National Account Statistics
NIC	National Industrial Classification
NIFTEM	National Institute of Food Technology, Entrepreneurship and Management
NSS or NSSO	National Sample Survey
PPP	Public Private Partnership
PPRC	Paddy Processing Research Centre
TFP	Total Factor Productivity
TII	Total Trade Intensity Index
ADF	Augmented Dickey -Fuller
EG	Engle-Granger

ABSTRACT

In India studies done earlier on trade and manufacturing industries has shown the impact of trade liberalisation by only comparing the trends and growth performance during pre and post liberalisation periods. In order to see the impact of liberalisation , it is essential to take into account the changing context in terms of opening of the economy and trade flows. This study has analysed the trade performance of the entire organised Indian food processing industry as well as for the 3 digit organised food industrial groups (151-155) in the post liberalised period 1991-2010. In order to perform this task concordance table has been prepared for each of the industrial groups based on the harmonised system of coding to identifying the products. Results of the study shows that export in this sector has grown at a good pace while imports has reduced after liberalisation. According to the export intensity index and import intensity index, UAE for export and Indonesia for import was reported as the most preferred destinations for India to trade with. Using the Grubel-Lloyd index it was figured out that liberalisation has lead to intra industrial trade in the food processing industry.

This study has also examined the performance of the key indicators of the organised Indian food processing industry as well as for the 3 digit organised food industrial groups (151-155) in the period 1991-2010. In order to sever this objective concordance table has been prepared between NIC87,NIC98,NIC2004 and NIC2008 for each food processing industrial group. Results show that this industry has a high labour absorbing capacity, with high demand and competition pressure this industry is employing more per factory capital to enhance its technical knowhow. Labour productivity , wage and wage rate of the worker in the entire organised Indian food industry has increased in the liberalised period 1991-2010.

Whether the Increase in these indicators is a result from the trade in the liberalised period ? This study tries to answer this question by empirically analysing the impact of trade on the employment, labour productivity and wages of the workers in the organised Indian food processing industry at 3 digit level as well as in the entire organised Indian food industry during the liberalised period 1991-2010. Log-Linear regression models with time series data has been used to test the relationship between

trade and labour market in the organised food industry in period 1991-2010. Results of the regression models suggest that export intensity and import intensity both plays a significant role in influencing the labour demand in this sector. Increasing export and decreasing imports in the organised Indian food processing industry in liberalised period 1991-2010 has lead to an increase in the labour demand in the food industry. It is reported that trade has insignificant impact on the labour productivity of the workers for the entire organised Indian food industry. Export intensity has reported a positive and significant impact on the wage of the labours in organised food industry as a whole.

Analysing through the performance of organised Indian food processing industries as a part of organised manufacturing sector in the post liberalisation period 1991-2010 ,this study can help the policy makers and planners in a way to analyse the effect of liberalisation on the performance of food processing industries. Present study is also relevant because it makes an attempt to analyse the trade pattern and tried to empirically examine the impact of trade on employment, labour productivity and wages of food processing industry in the post liberalisation period. This will further give support to understand the impact of 1991 liberal trade policies on the labour market.

Key words: Trade, liberalisation, food industry, regression, labour productivity, capital intensity, wage rate, labour demand, export intensity, import intensity.

Chapter 1

Introduction

Supporters of international trade suggest that trade can lead to a redistribution of employment from import sector towards the export sector. So increase in imports will reduce the employment whereas increase in export can creates more job opportunities in a country. According to them trade should be liberalised as it can play a significant role in labour market by directly affecting the production of an industry. Contrary to this view, infant industry argument suggest that new manufacturing industries (infant industries) of developing countries cannot initially compete with well-established manufacturing industries in developed countries. Proponents who support this thought advise that trade norms should not be relaxed to safeguard the domestic industries from the foreign competition.

There are two set of arguments, one which says that it is not good to try to move today into the industries that will have a comparative advantage in the future, protecting manufacturing does no good unless the protection itself helps makes industry competitive, there is no justification for government intervention unless there is a market failure that prevents the private sector from investing in the infant industry. Advocates of the infant industry argument has identified two market failures as reasons, firstly, imperfect capital market justification which means that if creating better functioning laws and markets is not feasible, then high tariffs would be a second-best policy to increase profits for new industries, leading to more rapid growth. Secondly, appropriability argument favoring infant industry argument says that if establishing a system of property rights is not feasible, then high tariffs would be a second-best policy to encourage growth in new industries. It should be kept in mind that a tariff that reduces imports also necessarily reduce exports. By protecting import substituting industries, countries draw resources away from actual or potential

export sectors. So a country's choice to seek to substitute for imports is also a choice to discourage export growth[1].

The theorem of Stolper and Samuelson (SS) was the first theoretical formulation to explain the effects of free trade on income distribution among productive factors. The basic SS result is that protectionism increases the relative return to the scarce factor - labour in developed countries and capital in developing countries. Hence, developing countries which introduce programmes of trade liberalisation should experience a rise in the relative return to labour, since they are relatively abundant in labour (and scarce in capital), and a narrowing of the distribution of income. The opposite should happen in developed countries, since they are relatively abundant in capital[2]. Following this theory returns to unskilled labour should increase when trade liberalisation take place. Trade openness is closely associated with technological changes. Countries tends to import new technologies rather than producing themselves. This can bring in a differential effect on the labour market of the home country. Demand of the skilled labour can increase and this will lead to an increase in the relative wages of the workers.

India instigated trade liberalisation in 1991 with a view to open the trade gates for other countries of the world. There is no doubt that India has grown immensely during trade liberalisation period, but how much does trade liberalisation has contributed to this is still a question. To find an answer to this question this study has tried to analysing the impact of trade on labour market of organised food industry of India in post liberlisation period.

Food industry is part of agro industry and it is considered that development of agro industries which are labour intensive and call for less capital investment has, therefore, rightly assumed crucial importance in the economic progress of the country.[3] It is increasingly being realized that agro-industries can provide the true

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[1] International Economics, Theory and Polity, 8th ed, by Paul R. Krugman and Murice, Obstfeld published by Pearson Education.

[2] Arbache j.S. et. al(2004), " Trade Liberalisation and Wages in Developing Countries", The Economic Journal, Vol. 114, No. 493, pp. F73-F96.

[3] K.L.Nanjappa, "Development of Food Industries in India", All India Seminar of Food Industry, 1969, P.1

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basis for the social and economic development of our country.[4] Ajit Prasad Jain(1995) has defined agro-industry as one which carry out the processing of farm produce and which provides inputs for the developments of agriculture.[5] According to S.K Gupta (1993), the concept of agro-industries is confined only to those industries that are engaged in the processing of agricultural produce either for consumption or for the use of industry and those industries which produce inputs for agriculture such as fertilizers and farm implements.[6] So agro-industries can defined as industries which make direct use of the agricultural produce as raw materials on the one hand and supply inputs to agriculture on the other. Thus they are directly related to inputs and outputs of agriculture. Based on the type of link the industry has with input and output of agriculture, ago-industries can be of two types-(1) processing industries and (2) supply industries. Processing industries process agricultural produce for their further use while supply industries are those which produce inputs for agriculture. These agro industries builds a bridge between two dominant sectors of the economy, specifically agriculture and industry.

Agro-processing industries are further classified into food processing and non-food processing industries. The food processing industries are much more homogeneous and are easier to classify since their products all have the same end use while non food processing industries have a wide variety of end uses. Food processing industries as a part of agro processing industries plays a significant role in India's development as it sets a vital linkage and synergy between the two pillars of the economy i.e. industry and agriculture.

Food processing sector is recognised as a sunrise sector of the Indian economy, as it facilitates value addition to agricultural products by increasing shelf-life as well as by fortifying the nutritive capacity of the food products; ensure remunerative prices to farmers as well as affordable prices to consumers. The food industry has emerged as one of the fastest-growing sectors in the Indian economy. Its rate of growth has escalated from 6.7 percent during 2004-05 to 13.7 percent during

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[4] R.Sahaya, "Agro-Industries: Catalytic Agents for Rural Development'", Khadi Gramt odyog, fill. XXXXIV, No.7, April 1998, P.27 1.
[5] Ajit Prasad Jain, "Agro Industries in India", Khadi gram odyog, June-July, 1995, P.461
[6] S.K.Gupta, Development of Agro-Industries: problems and Prospects, Deep and Deep Publications, New Delhi, 1993, P.5.

2008-09, which is much higher than the growth in agricultural and manufacturing sectors together.[7] As per National Account Statistics (NAS) data, Gross Domestic Product (GDP) at 2004-05 prices in India has gone up to Rs.44,93,743 crore in 2009-10 from Rs 32,54,216 crore in 2005-06, with Compound Annual Growth Rate (CAGR) of 8.40%. Contribution of FPI sector has increased to Rs. 66,078 crore in 2009-10 from Rs. 47,689 crore in 2005-06 with CAGR of 8.49%.

Food processing industries are strongly supported on the ground that these industries has an ability to create substantial employment in a country. However, even if this industry itself is capital intensive, considerable employment may be generated in providing raw material base. At present the food processing sector employs about 13 million people directly and about 35 million people indirectly[8]. It is observed that capital labour ratio is less in the agro based industries as compared in non agro-based industries indicating the labour intensive character of the agro-based industries[9].This shows that food industry is growing and has potential to absorb more people compared to non-food industries mainly from rural areas[10]. On the other hand it is believed that this sector have an important role in achieving increased agricultural production by ensuring better remuneration for farmers who are considered as the first source of supply chain. This sector makes it possible by not only ensuring better market access to farmers but also by reducing high level of wastages.

With the emergence of a market economy, demand for food items has undergone intense changes during the last two decades due to increase in population, per-capita income, urbanization, change in family composition, change in food habits and awareness about health and nutrition [11]. This shows that increasing urbanization, hectic lifestyles, rising number of nuclear families and increasing proportion of working women is leading to an increased demand for convenience. Simultaneously,

[7] R. K. Sharma. and Seema Bathla (2010), 'Economic and social viability of agro-processing industries in India", research for African-Asian Rural Development Organisation (AARDO).
[8] Ministry of food processing industries, GOI, annual report 2010-11.
[9] Srivastava (1989), "Agro-Processing Industries: Potential, Constraints, and Task Ahead", Indian Journal of Agriculture Economics, Vol.44, No.3, July-September 1989. P 242.
[10]R. K. Sharma. and Seema Bathla (2010), "Economic and social viability of agro-processing industries in India", research for African-Asian Rural Development Organisation (AARDO).
[11]G.S Bhalla. and Peter Hazell (1998), "Food grains Demand in India to 2020: A Preliminary Exercise", Economic and Political Weekly, Vol. 32, No. 52 (Dec. 27, 1997 - Jan. 2, 1998), pp. A150-A154.

growing brand consciousness, exposure to western products, introduction of food categories that are new to the Indian palate and new product variants catering to diversified tastes are ensuring higher acceptability of processed food products. All these factors create a strong case for the accelerated growth of processed foods [12]. Indian consumers in larger numbers are opting for greater brought-into-home food consumption. The consumption pattern in both rural and urban households have diversified over time towards high value and packaged food products. All this signifies that food processing industries are facing immense demand side pressure to increase their output not only for domestic market but also for international markets.

It is true that Indian food processing industries has immense potential for growth and development, still India's processing level is very low in comparison with other countries. Around 2.2% of fruits and vegetables are processed in India, while in the case of USA it is 65%, in Philippines it is 78% and in China it is 23%. In comparison to developed countries whose processing percentage is in between 60 to 70 percent, India process 26% of marine ,6% of the poultry and 20% of the buffalo meat. The constraints faced by Indian food processing industries are non- availability of adequate critical infrastructural facilities, like, cold chain, packing and grading centre, lack of adequate quality control and testing infrastructure, inefficient supply chain, shortage of processable varieties of farm produce, seasonality of raw material, high inventory carrying cost, high taxation, high packaging cost, affordability and cultural preferences for fresh food. [13]

Considering food processing sector as a priority sector , MOFPI (GOI) time to time has announced several policy incentives to promote growth of the food sector in the country. Some of the policy incentives given by MOFPI are, under the industries (Development & Regulation) ACT 1951, most of the processed food items have been exempted from the purview of licensing, exempted items are reserved for small scale sector and alcoholic beverages, food processing industries were included in the list of priority sector of bank lending in 1999, NABARD has created a refinancing window with a corpus of rupees one thousand crore for agro processing infrastructure and

[12] Processed Food Industry In India: A Mega Growth Opportunity, Published in the F&B News Magazine, Nov 2009
[13] Ministry of food processing industries, GOI, annual report 2010-11.

market development, automatic approval for foreign equity up to 100% is available on most of the processed food items except alcohol, beer and those reserved for small scale sector subject to certain conditions, excise duty on processed fruits and vegetables has been brought down from 16% to zero level in budget 2001-02. In 2004-05 budget income tax holiday and other concessions were announced for certain categories of food processing industries following this in budget 2006-07 excise duty has been waived on condensed milk, ice-cream, preparations of meat, fish and poultry, pectin's, pasta and yeast. Excise duty on ready to eat packaged foods and instant food mixes, like dosa , idli mixes have been reduced from 16% to 8% and on aerated drinks it has been reduced from 24% to 16%. While in budget 2007-08 excise duty has been waived on all kinds of food mixes including instant mixes, soya bari and ready to eat packaged foods and on biscuits . Excise duty on reefer van has been reduced from 16% to 8% and exception limit of excise duty for small scale industry has been raised from Rs. 1 crore to Rs. 1.5 crore. Custom duty on refrigerated motor vehicles has been waived and on food processing machinery it has reduced from 7.5% to 5%. In case of sunflower oil(crude) custom duty has reduced from 65% to 50% and in sunflower oil (refined) it has reduced from 75% to 60%. Special additional duty of 4% has been waived in case of refined edible oil. All services provided by technology business incubators and their incubates whose annual business turnover s do not exceed Rs. 50 lakhs have been exempted from service tax for the first three years[14]. Total plan outlay rose from Rs. 650 crore during the 10th Plan to Rs. 4,031 crore during the 11th Plan [15].

11th five year plan was considered as the driver to fulfil the dream vision 2015 which was prepared with three specific targets. Firstly, to enhance the processing level from 6% in 2005 to 20% in 2015, Secondly, to enhancing the value addition from 20% in 2005 to 35% in 2015 and lastly, to enhancing the share in foreign trade from 1.5% in 2005 to 3% in 2015. Regardless of this the most novel components of 11th plan was the adoption of Public-Private Partnership (PPP) and giving stress on appropriate backward linkages. The core elements of purposed strategy of 11th plan were, better project selection, development and implementation, decentralized cluster

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[14] Ministry of food processing industries, GOI, annual report 2010-11.
[15] Report of the Working Group on food processing industries for 12th Five Year Plan, Ministry of Food Processing Industries Government of India.

based development, particularly for creation of infrastructure and fostering linkages to retail outlets, industry led capacity building and up gradation of standards, an integrated food law and science based food standards. Priority areas of the plan were, infrastructure development, food park, modernization of abattoirs , cold chain, value addition and preservation infrastructure (cold storages, reefer vans),research and development, capacity building, food safety, establishment of NIFTEM(National Institute of Food Technology, Entrepreneurship and Management) , modernization of PPRC(Paddy Processing Research Centre) and wine Sector Development. Keeping in mind the performance of 11th five year plan, ministry of food processing industries has purposed that some of the schemes under 11th five year plan will continue in 12th five year plan(2012-2017) and others will be restructured by appropriate management arrangements with strong project implementation capabilities and enhancing financial assistance[16].

It is discreditable that India's presence in the export market for raw and processed food products is insignificant. Current scenarios shows that India's processed food exports constitutes only 1.5 per cent of the global food trade . But it is also true that food-processing industry as one of the leading industries in manufacturing industries, has a great potential to enhance India's position in world trade. India's food industries has a great prospects to change their situation and position to achieve the target share of 3% in global food trade by 2015. It worth noting that India has advantage of distinctive geographical location as he can easily connect to Europe, the Middle East, Japan, Singapore, Thailand, Malaysia and Korea. According to data provided by APEDA(Agricultural and Processed food products export development authority) export value of processed fruits and vegetables has increase from Rs. 155128.73 lakh in 2004-05 to Rs. 508454.32 lakh in 2012-13. In case of other processed food products export value has increased from Rs. 201432.17 lakh in 2004-05 to Rs. 3569699.23 lakh in 2012-13[17]. This clearly shows a boost in the growth of foreign demand for Indian food processing goods.

Trade liberalisation was initiated in India to achieve rapid economic growth. So the main question to ask is that, trade liberalization has really promoted growth or

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[16] Outcome budget of Ministry of Food Processing Industries(GOI) for 2012-13.
[17] www.apeda.gov.in

not. The evidence is mix, in case of India the 1991 liberalisation unleashed the potential of manufacturing industries, taking India to a new growth orbit, but it is unclear to what degree liberalized trade has contributed to growth. Analysing that Indian food processing sector is emerged as a fastest-growing sub-sector of the manufacturing sector and has immense potential to generate employment,this study has tried to capture the economic and social viability of organised Indian food processing industry in the trade liberalised era, and attempted to answer the question that how trade liberalisation has affected the performance, employment and wages in this sector. The main aim of trade liberalisation was to have more open Indian economy , indirectly saying to promote international trade. Increase in trade have an indirect effect on the labour intake and on their wages. Several studies has shown that trade has a positive impact on the productivity of a country. As trade liberalisation increases the demand of imports of goods and services as well as the volume of export increases. Imports increase competition in the domestic market and allow for the use of better quality and more technologically advanced imported inputs in the production of exports. Both have impact on productivity[18].According to Hechscher-Ohlin model international trade has strong income distribution effects, the owners of a country's abundant factors gain from trade, but the owners of scarce factors lose. Going by this concept some economists argue that trade liberalization has contributed to income inequality. While keeping in mind the importance of trade in growth of a country like India , this study has tried to examine the pattern of trade and its impact on labour demand, wages and labour productivity in organised Indian food processing sector.

1.1 Objectives of the study

The main objectives of the study are:

1.1.1 To examine the trade performance of India's food processing industry at 3 digit level in post liberalisation period 1991-2010 by analysing the growth, pattern, composition and nature of trade.

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[18] Faundez. S. et. al. (2011), Productivity growth in Latin American manufacturing: what role for international trade intensities? , MPRA paper No, 36507.

1.1.2   To examine the performance of India's organised food processing industry at 3 digit level in the post liberalisation period 1991-2010 by analysing the organisational characteristics, growth and trends of the key indicators .

1.1.3   To empirically study the impact of trade on employment, labour productivity and wage in organised Indian food processing industry at 3 digit level in post liberalisation period 1991-2010.

1.2   Significance of the study

Analysing the impact of trade liberalisation on the organised manufacturing sector shows a mix results, a clear cut consensus is absent. By analysing the performance of organised food processing industries as a part of organised manufacturing sector in the post liberalisation period ,this study can help the policy makers and planners in a way to analyse the effect of liberalisation on the performance of food processing industries.

Present study is also relevant because it makes an attempt to analyse the trade pattern and tried to empirically examine the impact of trade on employment, labour productivity and wages of food processing industry in the post liberalisation period. This will further give support to understand the impact of 1991 liberal trade policies on the labour market.

Practically saying findings and conclusions of this study can help planners and policy makers in framing suitable trade policies to insure better development of labour market in food industry and to endorse them extensively for the benefit of India.

1.3   Scope of the study

As we know trade liberalisation in India started in the year 1991. So the period of study chosen starts from 1991 to 2010. To better analyse the first two objectives of the study, the whole 20 years has been divided into two equal half's of 10 years each i.e. sub period 1 from 1991 to 2000 and sub period 2 from 2001 to 2010.

The present study is based on 3 digit organised food processing industries at all India level. According to NIC(National Industrial Classification)2004,CSO, organised food processing industry is classified under division 15(Manufacture of food products and beverages) of Section D (Manufacturing).Division 15 is further segregated into five 3 digit industries, which are as follows:

151:    Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats

152 :   Manufacture of dairy products

153:    Manufacture of grain mill products, starches and starch products, and prepared animal feeds

154:    Manufacture of other food products

155:    Manufacture of beverages

To accomplish the objectives of the study, secondary data has been collected from two reliable source. One is ASI(Annual survey of Industries) and another is Uncomtrade. ASI provides data on various characteristics of the chosen industrial groups up to 2010.In order to make the present study consistent concordance has been made for food processing industries at 3 digit level between the following assuming NIC 2004 as base[19]:

- between NIC 1987 and NIC 1998
- between NIC 1998 and NIC 2004
- between NIC 2004 and NIC 2008

Data on trade of Indian food processing industries has been taken from the website of Un Comtrade. As India follows HS(Harmonised System) code to classify their commodities in the international markets, concordance has been prepared

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[19] see Appendix A.

between the following different HS codes to make the study more reliable and authentic[20]:

- between HS 1988/92 and HS 1996
- between HS 1996 and HS 2002
- between HS 2002 and HS 2007

Data of the deflators used in the study has been extracted from RBI, Handbook of Statistics on Indian Economy, RBI.

1.4   Methodology

1.4.1   Methodology for objective 1 and 2

Researcher has used secondary data from Uncomtrade to study the direction ,composition and nature of trade in Indian food processing Industries at 3 digit level. Export Intensity, Import intensity and total trade intensity has been calculated for the chosen trading partners by using the following formulas[21]:

$$T_{ij} = \frac{\{(X_{ij} + M_{ij})/(X_i + M_i)\}}{\{[(X_{wj} + M_{wj}) - (X_{ij} + M_{ij})]/[(X_w + M_w) - (X_i + M_i)]\}}$$

$$X_{ij}^a = \frac{[X_{ij}/X_i]}{[(M_j - M_{ji})/(M_w - M_i)]}$$

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[20] see Appendix B

[21] see Asher et. al. (2005), India-East Asia Integration: A Win-Win for Asia, Economic and Political Weekly, Vol. 40, No. 36 (Sep. 3-9, 2005), pp. 3932-3940.

$$M_{ij}^a = \frac{[M_{ij}/M_i]}{[(X_j - X_{ji})/(X_w - X_i)]}$$

where

T_{ij}= Total trade intensity index of country i with country j

X_{ij}^a= Export intensity index of country i with country j

M_{ij}^a= Import intensity index of country i with country j

X_{ij}= Exports of country i to j

M_{ij}=Imports of country i from j

X_i= Total exports of country i

M_i= Total imports of country i

X_{wj}=Total world exports to country j

M_{wj}= Total world imports from country j

X_w=Total world exports

M_w= Total world imports

X_j= Total exports of country j

X_{ji}= Exports of country j to country i

M_j= Total imports of country j

M_{ji}= Imports of country j from country i

If value of total trade intensity is greater than 1 for some particular trading partner, then it implies that j[th] trading partner is a preferred destination in term of trade. Similar analysis applies for export and import intensity as well. Researcher has applied these formulas to all the 5 food processing industrial groups at three digit level, in order to know the preferred destinations for each industrial group. To know the nature(Intra/Inter-industrial) of trade of food processing industry, Grubel-Lloyd (G-L) has been used. The formula is as follows:

$$GL_i = 1 - \frac{|X_i - M_i|}{(X_i + M_i)}$$

12

where:

GL_i= Grubel-Lloyd index of industry i

X_i= Export of industry i

M_i= Import of industry i

GL_i takes the value between 0 and 1. The closer GL_i is to 1 (that is, $X_i = M_i$), the more trade in industry i is intra-industry trade. The closer GL_i is to zero (that is, either X_i= 0 or M_i= 0), the more trade in industry i is inter-industry trade.

Researcher has used secondary data from ASI to analyse position of India's food processing industries in total manufacturing, growth of fixed capital, workers, GVA, output and wages, growth of labour productivity, capital productivity, capital intensity and wage rate.

In order to analyze secondary data, researcher has used statistical techniques such as graphs, regression and coefficient of variation. Growth rates of different variables were estimated for the entire period as well as for the two sub periods of study by using log-lin model[22]:

$$Y_t = Y_0(1 + r)^t \qquad (1)$$

where r is the compound(i.e. over time) rate of growth of Y. Taking the natural logarithm both sided of equation (1) , we get

$$\ln Y_t = \ln Y_0 + t \ln (1 + r) \qquad (2)$$

let

$$\beta_1 = \ln Y_0$$
$$\beta_2 = \ln (1 + r)$$

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[22] see Basic Econometrics,4th ed, by D. N. Gujrati, Published by Tata McGraw-Hill publishing co. ltd.

So we can write equation (2) as:

$$\ln Y_t = \beta_1 + \beta_2 t \qquad (3)$$

Adding the disturbance term to equation (3) we obtain :

$$\ln Y_t = \beta_1 + \beta_2 t + \mu_t \qquad (4)$$

Here β_2 gives the instantaneous rate(at a point in time) of growth and not compound rate(over a period of time) growth.

so compound growth rate $= \{antilog\ (\beta_2) - 1\}$ \qquad (5)

In this study instantaneous rate of growth has been used

Appropriate deflators has been used to make nominal values of the variables into real values in order to calculate the growth rate.

1.4.2 Methodology for objective 3

After trying for various functional forms this study has used log-linear regression models. The method of ordinary least squares has been used to estimate the regression models. Due to the fact that we are using time series data in our study some of the variable may come out to be non stationary, it become important to check the co-integration of the regression models so as to verify that regression is spurious or not. In this study we have made use of Engle-Granger(EG) test to check the co-integration of the models. This test is performed into 2 steps:

Step1: Estimate the so called co-integrated regression

$$Y_t = \beta_1 + \beta_2 x_{1t} + \cdots + \beta_n x_{nt} + \mu_t \qquad (6)$$

Were n is the number of independent variables in the model. In this regression we assume that all variables are $I(1)$ and might co-integrate to form a stationary

relationship, and thus a stationary residual term $u_t = Y_t - \beta_1 - \beta_2 x_{1t} - \cdots - \beta_n x_{nt}$. If the variables are co-integrating, they will share a common trend and form a stationary relationship in the long run.

Step 2: Test for a unit root in the residual process of the co-integrating regression above. For   this purpose set up a ADF test like

$$\Delta \hat{\mu}_t = \delta \hat{\mu}_{t-1} \qquad (7)$$

The estimated t value of the coefficient of μ_{t-1} in equation (7) follows the t (tau) Statistics. A larger negative t value is generally an indication of stationarity. If equation (6) is co-integrating regression we can say that regression is not spurious even though individually the variables are non stationary.

1.5   Limitations of the study

The findings in this dissertation are subject to at least two limitations. These are

1. Sample size for the empirical excise is small, hence the study is not free from the consequences of small sample .

2. While preparing the concordance between NIC 1987, NIC 1998, NIC 2004 and NIC 2008 for food industry, it has been found that some of the products has either deleted or changed their position from one industrial group to another or within the industrial group. The products which are deleted is no more of importance, so it can be ignore from India's point of view, products which has changed their positions within the industrial group does not create any problem, while products which has changed their positions cross the industrial groups has a very minimal significance in the consumption bundle of India, hence they can also be ignored. To carry an empirical excise on whole food industry this limitation is not a hurdle.

3. The major assumption in this study is that trade is done only by the organised industries of the food processing sector.

1.6 Chapter scheme

The present study is divided into 6 chapters. The content of each chapter is as follows:

1.6.1 The first chapter contains introduction, objectives, significance, scope , methodology and limitations of the study.

1.6.2 Second chapter provides review of literature on impact of trade on productivity, employment, wages. As the literature on food processing industries are very rare, this chapter tries to summaries that studies done on food processing industries both domestic as well as international front.

1.6.3 Third chapter gives an analysis of trade done by Indian food processing industrial groups in liberalised period 1991-2010. This chapter analyses the growth of trade, direction and composition of trade, nature of trade . It also analysed which are the preferred destination for food processing trade.

1.6.4 Fourth chapter analyse the performance of organised food processing industry as a part of manufacturing sector. In this chapter analysis has been done on share of fixed capital, factories, workers and GVA of food processing industrial groups in total manufacturing sector, per factory capital , worker, GVA, output and wages with their growth rates in the study period as well as for both sub periods has been studied. This chapter has also examined growth rates labour productivity, capital productivity, capital intensity and wage rates in the study period as well as for both sub periods.

1.6.5 In fifth chapter empirical exercise has been done to know the impact of trade on employment, labour productivity and wages of the labours in India's organised food industry.

Chapter 2

REVIEW OF LITERATURE

This chapter is divide into four sections : Section 2.1, reviews the literature on impact of trade on productivity of manufacturing sector both. Section 2.2, provides the literature review on how trade has affected labour market. Section 2.3, as the literature on food processing industries is very scare, this section has briefly discussed studies conducted by taking food processing industries separately and their key findings. Lastly section 2.4, summaries the whole literature.

Section : 2.1. Review of literature based on impact of trade on productivity of manufacturing sector

Many studies have focused on the manufacturing sector and its performance to understanding the productivity dynamics of emerging economies like India in per and post reform period. In order to do so it is essential to take into account the changing context in terms of the opening of the economy and trade flows. As per Faudez et. al. (2011) there are three ways in which increased import and export flows in trade liberalisation era can raise the productivity of the firms and industry. firstly, as firms are exposed to competition both in their home market and abroad, they are forced to upgrade their products and productive processes to survive in the market. Secondly, inputs and capital goods coming from abroad which are used in the domestic production of final goods. Domestic firms adopt new processes or optimize the existing ones by integrating new technologies, impacting productivity at a firm level. Thirdly, technology transfers to local firms through foreign direct investment, which produce positive externalities in the domestic economy. Some of the economist oppose to this and believe that import substitution will put more pressure on the infant and weak firms to compete with the well established foreign firms. These infant or weak firms will face a major setback because they would not be able to adopt the new and advance technologies so fast due to inadequate investment and credit facilities. Evidence that trade liberalization has encouraged development is mixed.

Edwards S(1998) by taking a sample of 93 countries has suggested that more open the economy is faster will be his productivity growth. In support to this Ferreira and Rossi(2001) has found a significant evidence of positive effect of international trade on productivity growth for Brazil over the period preceding and following trade liberalisation in 1988-90.In Indian context mostly the studies based on cross section as well as panel data across a large number of organised manufacturing units has tried to empirically examine the impact of industrial deregulation, de-licensing, reduction in tariffs, non-tariff barriers, inflow of FDI and technology on productivity, profits and price cost margins, employment and wages in the post reform period.

In Indian perspective, Goldar (2000) has estimated TFP growth of Indian manufacturing sector in the periods 1981-82 to 1989-90 and 1990-91 to 1997-98 . By using double-deflated value added method and gross output function framework he revealed that estimated growth rates of TFP for the 1990s is relatively lower compared to the 1980s. In support to this Balakrishnan.P et. al. (2000) has analysed the TFP growth of 2300 organised manufacturing firms with 11009 observations for the period 1988-89 to 1997-98. They also showed that same results and pointed out that there is no evidence of acceleration in productivity growth since the onset of reforms in 1991-92.

In another study done by Goldar and Kumari (2003) reported that the trend growth rate in TFP in Indian manufacturing(based on the gross output function framework) came down from 1.89 per cent per annum during the period 1981-82 to 1990-91, to 0.69 per cent per annum during the period 1990-91 to 1997-98. They pointed out that with corrections made for changes in capacity utilisation, the estimated trend growth rate of TFP in organised manufacturing for the post-reform period (1.3 per cent per annum) is about the same as that for the pre-reform period (1.6 per cent per annum). Working on the related issue, Das (2004) estimated the productivity growth for 75 three-digit manufacturing industries as well as the use-based classification industrial groups for the period 1980-81 to 1999-2000 . He divided the study period into four phases i.e. first phase(1980-81) saw the emergence of thinking about the need for change in trade policies. The second phase(1985-86) starts with the long-term fiscal policy proposing the removal of import licensing and simplification of the tariff structure and, importantly, the first instance of a three-year

continuous trade policy, third phase(1990-91) starts with the comprehensive trade policy changes of 1991-92, final phase(1995-96) starts with the Exim Policy of 1997-2002, which aims at simplified procedures and rationalised tariff rates. Study revealed that TFP growth in the 1990s is lower than in the 1980s. In addition, for all three use-based sectors, TFP growth in the second half of the 1990s (1996-2000) is lower than in the first half (1991-95).

Analysing the other phase of trade liberalisation Topalova(2003) has tried to established a link between trade liberalisation and firm productivity during 1989-1996. Using a panel of firm level data , he point out that a tariff reduction by 10% can lead to a growth of firm productivity. In other words lesser protectionism will generate more productivity for a firm. Further, Goldar and Aggarwal (2004) examined the effect of tariffs and non tariffs barriers on manufacturing imports on price-cost margins in Indian Industries. The analysis, base on panel data for 137 three digit industries for the period 1980-81 to 1997-98, indicated that lowering of tariff and removal of quantitative restrictions on manufactured imports had a significant pro-competitive effect on domestic industries, tending to reduce mark ups or price cost margins. However, price-cost margins did not fall in the post-reform period in most industry groups. Rather, there has been a marked fall in growth, rate of real wages and a significant reduction in labour's income share in value added, reflecting perhaps a weakening of industrial labour's bargaining power. This seems to have neutralized, to a large extent, the depressing effect of trade liberalisation on price-cost margins.

Section: 2.2. Literature review on how trade has affected labour market.

The growing role of trade flows in the global economy has generated increasing interest among policy-makers in its impact on employment and wages across the world. Trade policies have a significant impact on the level and structure of employment, on wages and wage differentials, and on labour market institutions and policies. Study done by Ghose A K (2000) reveals that in developing countries which has emerged as an important exporters of manufactured goods to industrialised countries, trade has a larger positive effect on employment and wages in the manufacturing sector. Also trade has lead to a decline in wage inequality by

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increasing demand for unskilled workers. Contrary to this Feliciano Z.M (2001) has shown that reductions in tariffs by Mexico in period 1986 to 1990 has no statistically significant effect on relative wages or relative employment, rather it has lead to an increase in wage inequality. Another study by Rama (2003) explicitly looks at the effects of trade reform on wages and finds that wages grow faster in economies that integrate with the rest of the world. The author concedes that openness to trade can have a negative impact on wages in the short run, but finds that it only takes a few years for this effect to change sign. Robbins (1994) examines the changes in the structure of wages after trade liberalisation in Chile and finds that, although the content of skilled labour in imports exceeds the content in exports, the returns to skilled labour grew following liberalisation. Robbins and Gindling (1999) investigate the changes in relative wages and in the supply and demand for skilled labour in Costa Rica before and after trade liberalisation. They find that the skill premium rose after liberalisation as a result of changes in the structure of labour demand. Beyer et al. (1999) use a time series approach and find a long-term correlation between openness and wage inequality in Chile.

From India's point of view , Goldar(2002) found that employment elasticity for aggregate manufacturing increased from 0.26 in the pre reform period (1973-74 to 1989-90) to 0.33 in the post reform period (1991-91 to 1997-98). But a significant increase in employment elasticity is observed only in export-oriented industries group, as import competing industries reveals a fall in employment elasticity from 0.425 in the pre reform period to 0.264 in the post reform period. As regards trend in real wages, results showed that growth in real wages per worker declined appreciably from 3.29 per cent per annum during the pre reform period to 1.16 percent per annum in the post reform period. The author has credited this decline in wage growth to government interventions in determination of wages in the organised sector in India. Studying the same aspect , Tendulkar(2003) has done an analysis on organised industrial growth over three distinct policy regimes i.e. 1973-74 to 1980-81, 1980-81 to 1990-91 and 1990-91 to 1997-98. He found that 1973-74 to 1980-81 marked as the period of restrictive industrial and trade policies, the trend growth rate of output was 4.65 percent and employment grew by 3.83 percent, Product wage per worker increased at 3.2 percent and implicit growth of productivity per worker grew at a negligible 0.8 percent. The subsequent period from 1980-81 to 1990-91 was a period

of somewhat liberal trade and industrial policies combined with an aggregate demand push provided by rising fiscal deficits and good agricultural harvest. It experienced jobless growth in manufacturing indicting only output growth at 7.1 percent. Real product wage grew by 4.5 percent compared to implicit growth of 7.3 percent in productivity per worker. The last period from 1990-91 to 1997-98 i.e. the period when economic reforms were initiated, witnessed considerable improvement in both output and employment growth at 9.0 and 2.9 percent respectively with moderate product wage growth of 2.6 percent.

In another study, Goldar (2004) stated that trend growth rate in employment in period 1997-98 to 2001-2002 was significantly negative, at about -3.3 percent annum. Further trend growth rate in real value added during the same period was also very low at about 0.5 per cent per annum. which was much lower than trend growth rates in real value of output and index number of industrial manufacturing production in this period, both exceeding 5 percent per annum. By analysing more updated data in their empirical study Banga and sharma(2008) have tried to analyse the impact of trade on employment and wages of unskilled workers at state level in organised manufacturing and agricultural sector. This study was carried out at three digit level for 54 industries for the period 1998-99 to 2005-06. The results of this study shows a favourable impact of export on wages of unskilled worker in organised manufacturing. Import competition does not seem to have displaced labour or adversely affected wages, which is explained by strict labour laws and downward rigidity of wages in the country. By assuming wages of unskilled workers as an indicator of poverty to explain the trade-poverty nexus, it is concluded by the author that positive impact of trade on employment and wages depends on the extent to which the poor are able to gainfully participate in the expanding sectors.

Bathla et. al. (2008) provided a descriptive analysis of two digit industry for the years 2000-01 and 2005-06 based on 56th and 62the rounds of NSS. They found that enterprises and workers are unevenly distributed across three types of enterprise in both rural and urban unorganised manufacturing in the post reform period. Even though OAME has contributed significantly in number of enterprises, workers and value addition, it has low level of output, labour productivity and capital assets at both locations. Study has empirically analysed the impact of exports and import on employment, wage rate and labour productivity by taking 66 industries at 3 digit level

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and 35 states and union territories for the year 2005-06. They captured the labour market rigidity at all India level as well as for NDME and DME separately. They pointed out that both internal factors and external factor play their role in labour market and have differential effect on employment, wage and labour productivity. It is revealed that higher exports lead to higher employment, higher labour productivity and higher wages while reverse was true in the case of higher imports.

In another study, Banga et. al. (2012) has attempted to examine the impact of export and import on employment, wage and labour productivity in unorganised sector at the state level. The trend analysis which was undertaken by this study was based on two NSSO rounds viz. 56th (2000/01) and 62th (2005/06). The empirical estimations were done on NSSO 62th round for the year 2005-06 using data for altogether a total of 82,897 unorganised enterprises. The study results shows that export intensity of the industry in the organised sector increases employment in enterprises in the unorganised sector. Enterprises in the unorganised sector belonging to export-oriented industries pay higher wage rates. Labour productivity of enterprises in unorganised sector increases if the industry to which they belong is export-oriented. Location of enterprises plays a important role in determining the trade impact on unorganised sector. Indian states were exports has a favourable impact on employment were Punjab, Haryana, Gujarat, Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu. Imports competition has no significant impact on employment but rather reduced the labour productivity.

Section: 2.3. literature review on food processing industries

Many studies has been carried out so far in context to manufacturing sector as a whole, but very few has separately dealt with manufactured food processing industry. This sections gives a brief summary of the studies done on food processing industry. The review of literature made here has been presented as follows.

2.3.1: Studies related to food processing industries in other countries and

2.3.2: Studies related to food processing industries in India.

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2.3.1 : Studies related to food processing in other countries

Heien. D.M (1983) measured total factor productivity in the US food processing and distribution sector using Theil- TiOrnqvist (TAT) indexes of total outputs and total inputs for the period 1950-77. The ratio of these two indexes was marked as the total factor productivity index, He constructed a complete set of cost and revenue accounts for the food processing and distribution sector in order to compute TAT indexes. He observed that total factor productivity index can change over time due to improvement in production techniques and scale effects but total factor productivity index changed very little over' the 1950-77 period, while cyclical behaviour was evident. By studying for the 1950-72 and 1973-77 sub periods he exposed that from 1950-72, productivity grew at .074% per year and fell at .42% per year from 1973-77. Studying the period 1959-91, Gopinath et al,(1996) tried to assess the sources of growth in the U.S. food processing sector's real GDP and compare them with the results obtained for primary agriculture. The results suggest that major factor contributing to growth in food processing GDP (1.04% annually) is input effects .Total factor productivity growth in food processing is relatively low, at 0.41%. This estimate compares to a TFP growth rate of 0.47% for the economy as a whole and 2.31% per annum for primary agriculture. The filtered TFP growth suggests a declining trend in its contribution to growth in food processing GDP over the period . It was observed that both efficiency gains and real price declines have been coincidental in primary agriculture as well as processed food sectors, and these changes have benefitted consumers in the form of lower real food prices. They also commented that policies which tend to distort markets can adversely affect the competitiveness of the food processing sector. Policies and programs that tend to induce productivity growth can increase the competitiveness of both sectors depending upon the magnitude of the price and income elasticities of food demand.

In another study , Gopinath et al,(1998) tested the effects of the real exchange rate and its volatility on exports, outward FDI, and foreign affiliate sales by the U.S. food-processing industry i.e. the appreciation (depreciation) of the U.S. dollar and its volatility has contributed to the observed substitution relationship between FDI and trade. All three dependent variables, exports, outward FDI, and foreign affiliate sales, in a host country are normalized by its GNP. The main focus of the study was on ten

high income countries for the period 1982-95(Australia, Belgium, Canada, France, Germany, Japan, the Netherlands, Italy, Spain, and the United Kingdom). They found that real exchange rates have a positive effect on outward FDI and foreign sales by U.S. majority owned multinational food companies. So they observed that an appreciation of the U.S. dollar can lead to increase in outward FDI and the resulting foreign affiliate sales. On the other hand real exchange rate has a negative effect on U.S. processed food exports . This is accompanied by the rise in the foreign affiliate sales of U.S. majority owned MNCs.Only Canada has positive and significant effect of real exchange volatility on exports, three countries showed significant negative effect while this effect was insignificant for the other countries. They noted that eight out of ten countries, the effect of the real exchange rate on foreign affiliate sales was positive and significant.

Skripnitchenko.A et al,(2005) examined the determinants of U.S. foreign direct investment (FDI) in the food processing industries using panel data for the period 1983 to 2000 of nine Latin American countries(Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Panama, Peru, and Venezuela) using a dynamic cost minimization investment model. They showed that high speed of adjustment of FDI, indicating that U.S. food processing multinationals are quite flexible in terms of adjusting their production capacities. Higher interest rates and wages have a negative effect on the FDI position of U.S. multinationals. Increase in demand for output, FDI openness and the exchange rate has a positive effect on the FDI position of U.S. multinationals.

2.3.2 : Studies related to food processing industries in India

Srivastava (1989) analyzed the profile and trends in the growth of agro-processing industries and identified constrains of agro-processing industries. It is also observed in the study that substantial portion of net value added from the agro-industry is derived from unregistered and cottage scale units. Further it is observed that bulk of the ago- processing industries are very small and that fixed capital investment per factory *is* vary less as compared to fixed capital investment per factory in the non agro-based industries, and working capital employed is more as compared in non ago-industries and capital labour ratio is less in the ago based industries as

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compared in non agro-based industries indicating the labour intensive character of the agro-based industries. The study identifies following constraints-inadequacy and suitability of raw materials, under utilization of the exiting. while Gandhi et. al(1994) tried to analyze the magnitudes, variation and pattern in the value addition in the food processing industries using data from annual survey of industries. The study finds that net value addition from food processing industry over the total value of input is high and grown during the period of study. The extent of value addition as percentage of input differs substantially by the food industry group from over 25 percent for cashew, coffee and fine sugar to 5-6 percent in traditional industries like milling, edible oil and vanaspati. The study conclude that information on value addition of agro-processing industries in different sectors will be of immense help in designing investment portfolio for the development of ago- processing industries and for the promotion of ago-industries for domestic markets and exports.

In other study, Srivastava et. al.(1994) analysed the structure and the export performance of agro- processing industries in India, illustrate methods for financial and economic analysis, focuses on working capital and raw material management, examine specific problems in *the* marketing of processed food products, packaging and capacity utilization. In the same frame, Himanshu (2006) in his study dealt with the problems and prospects and other related operational aspects involved in setting up new agro-industrial projects in India. Suggestions and policy recommendations for the growth of agro-industries in India have also been made in this study.

Gulati et. al. (2006) used data set of food manufacturing industries for the period 1984-85 to 2002-03 to compare the pre and post reform performance of these industries .They studied the evolution of the Indian food processing industry in terms of the relative importance of organised vs. unorganised segments. Their findings suggested that the organised segment is raising its share in output and fixed capital while unorganised sector remained dominant in terms of number of manufacturing units and employment. The gap between organised and unorganised food processing industries are widening up in terms of structural ratios such as scale of operation and capital deepening. According to them there are unambiguous evidence for scaling up and capacity expansion suggestion consolidation is taking up at factory level. while

evidence regarding technical progress and returns to scale is mixed. For this industry food industry has witnessed the entry of new MNEs in the reform period. Study reveals that food industry has benefitted from liberal trade and industrial policies to some extent in terms of rise in the share in output and fixed capital .

Using data envelopment analysis approach Jabir, et al (2007) in their study has calculated TFP for organised food manufacturing units for the period 1980-81 to 2002-03 and resulted that food industry in India has experienced a positive change in TFP with varied magnitude across subsectors but the contribution of efficiency in TFP change is very small. The reasons for inefficiency and low TFP change suggested were input slacks at optimal level of production process. The empirical analysis of their study suggest that the food processing industry in the country is growing at a rate of about 10 percent per annum. The growth in output is largely driven by the incremental use of inputs. The average technical efficiency score is estimated to be 0.902 under VRS (Variable returns to scale) model with average scale efficiency score of 0.870. They pointed out that the average technical inefficiency could be reduced by 10 percent by improving scale efficiency and eliminating pure technical inefficiencies. They also made a note that technical efficiency scores for food processing industry have declined during 1990s as compared to 1980s. The analysis of returns to scale in food processing sector by them suggests that most of the sub-sectors have moved from increasing returns to scale towards constant and decreasing returns to scale during last two decades except meat & meat products, fish & fish products, fruits & vegetables and starch & starch products. This result clearly indicates that additional investment in the food processing segments with increasing return to scale will give encouraging and profitable output and whereas food segments with decreasing or constant returns to scale need reorientation and modernization in production process. Results indicate that the industry needs to modernize its production system to improve the capacity utilization of factor inputs mainly of raw material, capital and energy. As raw material constitutes about 85 percent of production cost, proper methods of sourcing quality raw material for food production should be adopted to shorten the supply chain in food processing industry. This initially requires reforms in domestic food and agriculture markets to strengthen backward linkage of food processors with the farmers and provision of direct procurement. Analysing the liberalised period , Danish et. al. (2009) showed that

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total factor productivity growth in food products and beverages (NIC 15) has registered a growth of 0.84 percent during 1992-93 to 1997-98, which fell to -0.24 percent during 1998-99 to 2001- 02 and then increased to 1.87 percent during 2002-03 to 2005-06, which is closer to the magnitude of productivity growth at the aggregate level.

Working on both organised as well as unorganised food processing sector , Sharma and Bathla(2010) has tried to examine the economic and social viability of food processing industry. The analysis is undertaken at a disaggregate NIC 3 digit level at all India and in one state viz. Punjab. While the analysis of organised food manufacturing is carried out from 1981-82 to 2003-04 based on ASI data, the same in the unorganised segment is based on NSS 56th and 62nd rounds relating to 2000-01 and 2005-06 respectively. Both descriptive analysis and econometric models have been employed to study the growth patterns in employment, wages and estimation of partial and total factor productivity in selected agro-processing industries. The empirical exercises are carried out to examine returns to scale and the factors that influence labour market in the organised and unorganised segments. The results shows that food industry is growing and has potential to absorb more people compared to non-food industries mainly from rural areas. The rate of growth in labour productivity is also high and is increasing. A rise in labour productivity is associated with an increase in the capital intensity. The latter has increased more compared to labour productivity, which indicates that labour, which is surplus, particularly in the unorganised food manufacturing, may not have an important role. Rate of employment growth which was positive in the pre-reform period has shown signs of deceleration in the post-reform period. An increase in capital intensity (assets per worker) without having any impact on labour productivity is also a matter of concern. A negative growth in capital productivity (GVA per fixed assets) indicates lower capacity utilization in the industry.

2.4 Summary of the literature

This brief survey of literature gives insight about the trend of total factor productivity of India's organised manufacturing sector in pre and post liberalised era. It is shown that TFP has declined in immediate post reform period in comparison with pre reform period. Das(2004) has given two reasons for this state, firstly according to him it may be due to recessionary trend created because of factors such as import compression, tight-money policy, inflationary pressures and fiscal contraction initiated by the government as part of the macroeconomic stabilisation programmes in the manufacturing sector. secondly, just before the end of 1995 mergers began to raise up and constraints operate in the functioning of the labour markets, particularly the exit policies that ought to supplement the trade liberalisation attempts. On the other hand there are studies which indicates that reduction in tariff as well as non tariff barriers can increase the productivity, but reduce the price-cost margins of an industry.

Literature on impact of trade on employment and wages shows a mixed results. Some of the researcher has shown a positive impact of trade on employment as well as wages while other has supported the view that trade openness has resulted in a reduction in the number of workers and their wages. These divergent views can be due the fact that different studies has used different time periods to analyse this hypothesis and also in the case of India not enough studies have been done on this subject, so it is difficult to reach to a strong conclusion.

The available literature on food processing sector has shown the impact of reforms only by comparing trends and growth performance during the pre and post reform periods. In doing so, the studies have not tried to capture the true essence of trade liberalisation. In order to see the impact of reforms truly it is essential to take into account the changing context in terms of the opening of the economy and trade flows. This study will fill the research gap in my understanding by empirically analysing the impact of export and import on organised food processing sector employment, labour productivity and wages.

Chapter 3

TRADE PERFORMANCE OF THE ORGNAISED INDIAN FOOD PROCESSING INDUSTRY IN PERIOD 1991 TO 2010

Trade theories suggest that trade openness through trade liberalisation can bring gains for a country by exploiting their comparative advantage, obtaining their benefits of scale economies and ensure competition, greater variety and, potentially, more stable markets and prices. Trade liberalisation involves removing barriers to trade between different countries and encouraging free trade. It is imagined that trade liberalisation will lead to a transformation which can further direct to a healthy growth in India's international trade. Contrary to this, studies done by Topalova et.al (2005)[1], Balakrishnan et. al. (2000)[2], Trivedi et. al (2000)[3], Srivastava (2000)[4] and Das. D.K (2004)[5] suggest that trade exposure has increased inequality and decreased the productivity of Indian manufacturing industries. The infant industry argument also suggests that trade protection is justified to help developing economies to diversify and develop new industries. Because of this argument, some argue that trade liberalisation often benefits developed countries more than developing countries.

Trade liberalisation often leads to a shift in the balance of an economy. Some industries grow, some decline. As food industry has emerged as one of the fastest-growing industry in the Indian manufacturing sector, trade liberalisation is expected to improve the scope of exports for the Indian food processing industry, while

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[1] Topalova et. al. (2011) Trade liberalization and firm productivity: the case of India, Review of economics and statistics, Vol. 93, No. 3 (August 2011) (pp. 995-1009).

[2] Balakrishnan et. al. (2000) Trade Liberalisation and Productivity Growth in Manufacturing: Evidence from Firm-Level Panel Data, Economic and Political Weekly, Vol. 35, No. 41 (Oct. 7-13, 2000), pp. 3679-3682.

[3] Trividi, P et al (2000): 'Productivity in Major Industries in India: 1973-74 to 1997-98', Development Research Group Study #20, Department of Economic Analysis and Policy, Reserve Bank of India, Mumbai.

[4] Srivastava, V (2000): 'The Impact of India's Economic Reforms on Industrial Productivity, Efficiency and Competitiveness', report of a project sponsored by the Industrial Development Bank of India, National Council of Applied Economic Research (NCAER), New Delhi.

[5] Das. D.K(2004): "Manufacturing Productivity under Varying Trade Regimes, 1980-2000", Economic and Political Weekly, Vol. 39, No. 5 (Jan. 31 - Feb. 6, 2004), pp. 423-433.

smoothening import barriers on inputs[6]. In order to test this hypothesis for Indian food processing industry for a liberalised period 1991 to 2010, an analyse of trade performance for this industry has been done in this chapter.

India follows national industrial classification (NIC) and harmonized system to classify its industries and commodities respectively. To analyse the trade performance of Indian organised food processing industry concordances has been made[7].

This chapter is organised as follows, section 3.1 deals with the compound growth of organised food processing industries in export as well as in import at three digit level and major trading partners and commodities in the period 1991-2010. Section 3.2 presents the inter or intra industrial nature of each organised food processing industries at three digit level, using Grubel-Lloyd index (GLI). In section 3.3 export intensity, import intensity and total trade intensity of major trading partners has been calculated and analysed in order to see the most preferred destinations for trade in this sector. Lastly section 3.4 briefly summarize the key findings of this chapter.

Section 3.1: Growth of export and import of Indian food processing industrial sector and major trading partners as well as commodities of Indian food processing industrial sector

The analysis for organized food manufacturing industries at 3 digit level has been performed by taking 20 years of liberalisation i.e. 1991 to 2010, which has been further divided into two sub-periods of 10 years each i.e. 1991 to 2000 and 2001 to 2010. Table 3.1, gives a picture about the growth of export and import in 3 digit industrial groups of organised Indian food processing sector. The export growth of overall organised food industry has been recorded as 7.93 percent for the period 1991 to 2010. It should be noted that the export growth rate was witnessed high in the period 2001 to 2010 then 1991-2000. On the other hand imports has grown at the rate of 13.13 percent which is more than the export growth for the period 1991-2010. In the following years of liberalisation India was importing more than what it was

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[6] Dinesh Awasthi, Raman Jaggi,V padmanand(2006) A Manual for Entrepreneurs: Food Processing Industry, Entrepreneurship Development Institute of India Ahmedabad.
[7] see Appendix A and B

exporting to other nations , as the import growth is around 25.32 percent and export growth is only 8.09 percent in period 1991-2000.But the picture is totally different for the next 10 years , Import growth falls short of export growth in the period 2001-2010.

Export growth of industrial group 151(production, processing and preservation of meat, fish, fruit, vegetables, oils and fats) was 6.66 percent in the period 1991-2010 while imports has grown at the rate 15.59 percent. It is illustrate that the export growth of this industrial group has increased from 4.14 percent in period 1991-2000 to 15.59 percent in period 2001-2010, whereas import growth has declined from 31.84 percent to just 8.19 percent. This indicates that net exports of this industrial group has been increasing in post liberalisation period and got its momentum in 20's. The major export partner of India for this particular industry are Viet Nam, Japan, China and Indonesia. While the major import partners are Indonesia, Malaysia, Brazil and Australia. The major basket of goods which is exported by India to other nations by this industrial group are oilcake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of soya bean oil, castor oil and its fractions, oilcake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of groundnut oil and vegetable fats and oils and their fraction. Major commodities which are imported by India under this industrial group are crude oil, vegetable fats and oils and their fractions, flours, meals and pellets, of fish or of crustaceans, molluscs or other aquatic invertebrates and pickles.

Table 3.1 : Export and import growth of India's food industries at 3 digit level for the period 1991-2010

151: Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats

	Export		Import	
	Growth	CV	Growth	CV
1991-2000	4.14	0.26	31.84	0.84
2001-2010	15.59	0.49	8.19	0.36
1991-2010	6.66	0.55	15.59	0.69

152: Manufacture of dairy products				
	Export		Import	
	Growth	CV	Growth	CV
1991-2000	71.46	1.30	-0.11	0.22
2001-2010	13.66	0.56	13.61	0.43
1991-2010	36.55	1.07	9.58	0.69

153 : Manufacture of grain mill products, starches and starch products, and prepared animal feeds				
	Export		Import	
	Growth	CV	Growth	CV
1991-2000	12.58	0.55	-2.91	0.30
2001-2010	9.21	0.31	13.40	0.48
1991-2010	8.09	0.49	4.89	0.51

154: Manufacture of other food products				
	Export		Import	
	Growth	CV	Growth	CV
1991-2000	6.74	0.49	14.67	1.04
2001-2010	8.86	0.58	21.16	1.16
1991-2010	11.14	0.86	5.07	1.09

155: Manufacture of beverages				
	Export		Import	
	Growth	CV	Growth	CV
1991-2000	5.57	0.58	16.36	0.49
2001-2010	17.16	0.58	29.77	0.69
1991-2010	9.81	0.78	23.03	1.24

All (151-155)				
	Export		Import	
	Growth	CV	Growth	CV
1991-2000	8.09	0.34	25.32	0.70
2001-2010	11.62	0.40	9.79	0.43
1991-2010	7.93	0.54	13.13	0.68

Source : Author estimates based on Un Comtrade database

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Growth rate of export of 152(manufacture of dairy products) industry has been recorded as 132 percent for the period 1991-2010 and the import growth was around 25 percent. Scenario of export and import in the two sub periods is totally different from each other. In period 1991-2000 export growth was 418.3 percent and import growth was negative at -0.26 percent. But in period 2001-2010 export growth has drastically dipped down to 36.9 percent and import growth has increased to 36.8 percent. The major export partner of India for industrial group 152(manufacture of dairy products) are USA, Germany, France and Saudi Arabia and major import partners are Netherlands, Germany, USA and New Zealand. The major basket of goods which are traded by India under this industrial group are casein, containing by weight 99 % or more lactose, expressed as anhydrous lactose, calculated on the dry matter, Ice cream and other edible ice, whether or not containing cocoa. and lactose and lactose syrup.

Industrial group 153(manufacture of grain mill products, starches and starch products, and prepared animal feeds) export growth was calculated as 20.4 percent and import growth was 11.9 percent for the period 1991-2010. In period 1991-2000 the export growth was 33.6 percent which has fallen to 23.63 percent in 2001-2010, on the other hand import growth has raised from a negative value of -6.48 percent to 36.17 percent. The major export partner of India for this particular industry are Saudi Arabia, United Arab Emirates, Bangladesh and United Kingdom. While the major import partners are USA, China, Thailand and Indonesia. The major basket of goods which are exported by India to other countries under this industrial group are semi milled or wholly milled rice, whether or not polished or glazed, wheat or meslin flour, broken rice, glucose and glucose syrup, not containing fructose or containing in the dry state less than 20 % by weight of fructose and prepared foods obtained by the swelling or roasting of cereals or cereal products. Major commodities which are imported by India under this industrial group are dextrin's and other modified starches, semi milled or wholly milled rice, whether or not polished or glazed, groats and meal Of maize (corn) and wheat gluten, whether or not dried.

154(manufacture of other food products)industrial group has an export growth of around 29.2 percent and import growth of 12.4 percent for study period. In the sub-periods, both export growth as well import growth has raised. Export growth has

raised from 16.8 percent in 1991-2000 to 22.6 percent in 2001-2010 and import growth has raised from 40.2 percent to 62.7 percent. The major export partner of India under this particular industry are Pakistan, Russian Federation, United Arab Emirates and Bangladesh. While the major import partners are Brazil, USA, Thailand and Pakistan. The major basket of goods which are exported by India to the rest of the world by this industrial group are extracts, essences and concentrates, cane sugar, sugar containing added flavouring or colouring matter and cane molasses. Major commodities which are imported by India under this industrial group are cane sugar, inactive yeasts; other single cell microorganisms, dead, homogenised composite food preparations, preparations for infant use, put up for retail sale and cane molasses .

Export growth of 155(manufacture of beverages industry) industry was been recorded as 25.3 percent and import growth as 69.9 percent in period 1991-2010. Export growth has raised from 13.7 percent in 1991-2000 to 48.4 percent in 2001-2010 and import growth has raised from 45.7 percent to 98.4 percent. The major export partner of India for this particular industry are United Arab Emirates, Netherlands, Japan and Bhutan and major import partners are Brazil, United Kingdom, Nepal and France. The major basket of goods which exported by India to other nations by this industrial group are whiskies, ethyl alcohol and other spirits, denatured, of any strength, beer made from malt, un denatured ethyl alcohol of an alcoholic strength by volume of 80 % or higher and spirits obtained by distilling grape wine or grape marc Major commodities which are imported by India under this industrial group are other then the above mentioned commodities are waters, including mineral waters and aerated waters, containing added sugar or other sweetening matter or flavoured and mineral waters and aerated waters.

To sum up, export growth of organised food industrial sector has increased overall as we compare the two sub periods, But in the case of 152(manufacture of dairy products) and 153(manufacture of grain mill products, starches and starch products, and prepared animal feeds) industrial groups the scenario is opposite. Overall Import growth of organised food industrial sector has came down as we compare the two sub periods, but only 151(production, processing and preservation of meat, fish, fruit, vegetables, oils and fats) industrial group supports this trend while the other industrial groups support to an opposite trend. The key trading partners of

India on the basis of share in the total trade for the period 1991-2010 in food processing sector are Brazil, China, Germany, Indonesia, Japan, Netherlands, Pakistan, Saudi Arabia, Thailand, UAE, UK and USA.

Section 3.2 : Inter or Intra industrial nature of organised food processing industries at three digit level in period 1991-2010.

This section reveals about the trading nature of each food processing industry at three digit level. There are several alternative measures which have been developed to estimate the degree of intra-industry trade (IIT) for an industry. To measure the extent of IIT, this study uses the most widely preferred index, Grubel-Lloyd (G-L). This index measures intra-industry trade as a percentage of a industries total trade which is assumed to be balanced, that is exports equal imports. It should be noted that the closer GL index is to 1 (that is, $X_i = M_i$), the more trade in industry i is intra-industry trade. The closer GL index is to zero (that is, either $X_i = 0$ or $M_i = 0$), the more trade in industry i is inter-industry trade.

Table (3.2) and figures 3.1 to 3.6 shows the trends of G-L index for the period 1991-2010 for Indian food processing industry at 3 digit level. It is analysed the value of G-L index in most of the years is closer to 1 or lies above 0.5 for the industrial group 151(production, processing and preservation of meat, fish, fruit, vegetables, oils and fats) and 155(manufacture of beverages industry). This shows that the nature of trade in these industries is intra industrial kind. In industry groups 152(manufacture of dairy products) and 154(manufacture of other food products) GL-index in most of the years lies below 0.5 or closer to 0, which indicates that these industries have inter industry trade. In industry group153(manufacture of grain mill products, starches and starch products, and prepared animal feeds) GL-index completely lies below 0.5 or closer to 0 which clearly shows that this industrial group have inter industrial trade with other nations.

Figure 3.1 -3.6 : Tends of G-L Index from industry 151 to 155

Fig 3.1: 151 (Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats)	Fig 3.2: 152(Manufacture of dairy products)
Fig 3.3: 153 (Manufacture of grain mill products, starches and starch products, and prepared animal feeds)	Fig 3.4:154 (Manufacture of other food products)
Fig3.5: 155(Manufacture of beverages)	Fig 3.6 151-155(ALL)
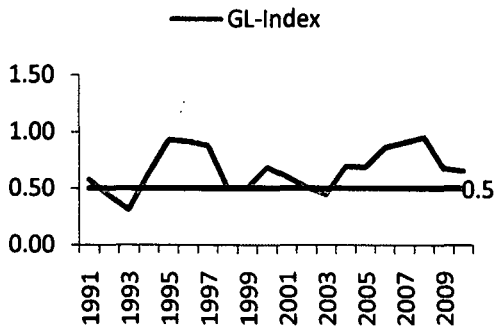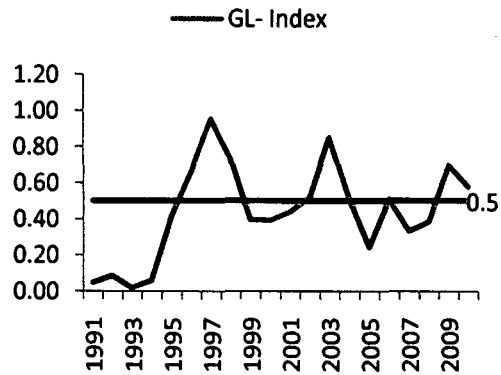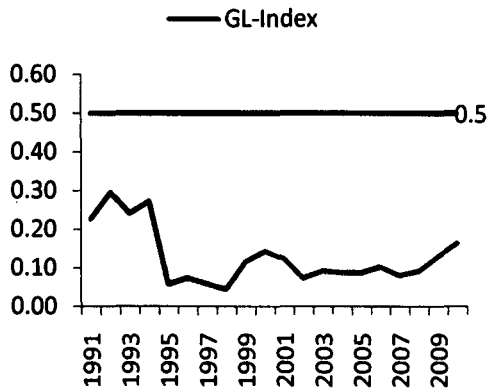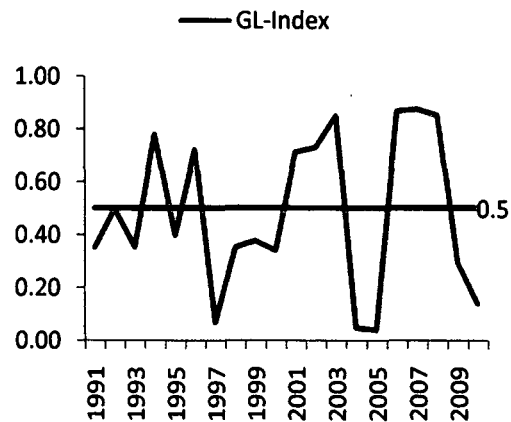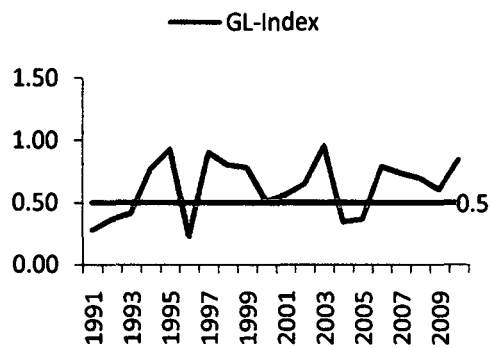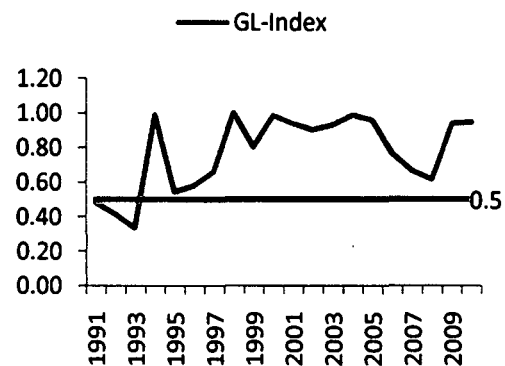
Table 3.2	Grubel-Lloyd Index of Indian food processing industry					
Years	151	152	153	154	155	All
1991	0.58	0.04	0.23	0.35	0.28	0.48
1992	0.44	0.08	0.30	0.50	0.36	0.41
1993	0.31	0.02	0.24	0.35	0.41	0.33

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1994	0.63	0.06	0.27	0.78	0.77	0.99
1995	0.93	0.42	0.06	0.40	0.93	0.54
1996	0.91	0.66	0.07	0.72	0.23	0.58
1997	0.88	0.95	0.06	0.07	0.90	0.66
1998	0.50	0.73	0.04	0.35	0.80	1.00
1999	0.51	0.39	0.12	0.38	0.78	0.80
2000	0.69	0.39	0.14	0.34	0.51	0.98
2001	0.61	0.44	0.12	0.71	0.56	0.94
2002	0.51	0.52	0.07	0.73	0.65	0.90
2003	0.44	0.85	0.09	0.85	0.96	0.93
2004	0.70	0.51	0.09	0.05	0.34	0.99
2005	0.69	0.24	0.09	0.04	0.36	0.96
2006	0.86	0.51	0.10	0.87	0.79	0.76
2007	0.90	0.33	0.08	0.87	0.74	0.67
2008	0.95	0.38	0.09	0.85	0.70	0.61
2009	0.68	0.70	0.13	0.29	0.60	0.94
2010	0.65	0.58	0.16	0.14	0.85	0.95
Source : Author estimates based on Un Comtrade Database						

Considering the whole food industry (151-155) it can be easily analysed that the GL-Index for this industry has been more than 0.5 or closer to 1 , which shows that the trade in food processing industry is intra industrial by nature. That means most of the trade occurs within the food industry. This gives a support to the hypothesis of Veeramani (2001)[8] that the trade liberalization has biased exports in the direction of intra-industry trade. Veeramani (2003)[9] pointed out that the intensity of Intra-industrial trade would be larger if an industry is characterized by a greater degree of product differentiation which is true in the case of food industry. It is good from the point of view of a country like India because grain from trade will be larger when economies of scale are strong and products are highly differentiated.

[8] Veeramani, C. (2001), India's Intra-Industry Trade under Economic Liberalization: Trends and Country Specific Factors, Working Paper No. 313,March, Center for development Studies, Thiruvananthapuram

[9] Veeramani, C. (2003), Liberalization, Industry-Specific Factors and Intra-Industry Trade in India, Working Paper No. 97, March, ICRIER, New Delhi.

Section 3.3: Export intensity, import intensity and total trade intensity of major trading partners

In section I, the major trading partners were decided on the basis of their share in the total trade in the period 1991-2010 which is represented in table (3.3), but this do not provide any indication as to the extent to which two countries prefer to trade amongst themselves relative to their other trading partners in the rest of the world. This is why bilateral trade intensity indices are more useful tools to analyse the bilateral trade linkages.[10]

Table(3.4) represents export intensity, import intensity and total trade intensity of 20 major selected trading partners of India in food processing industry . Export intensity, import intensity and total trade intensity captures the extent to which the home country prefers to export/import or trade with their trading partners in comparison with the rest of the world. The value of indices higher than unity imply higher concentration of export/import or trade with the trading partner.

Table : 3. 3	Share of Industrial groups in the total export or import in period 1991-2010											
	151		152		153		154		155		151-155	
Countries	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
Australia	0.4	3.5	0.1	2.7	0.4	2.6	0.7	0.6	0.4	1.0	0.31	3.05
Brazil	0.3	3.8	0.0	0.0	0.0	0.3	0.0	45.4	1.4	34.1	0.16	4.16
China	8.3	0.3	0.3	0.2	0.1	10.1	1.2	4.8	0.4	2.3	3.49	0.61
France	3.7	0.3	3.0	1.0	0.5	4.3	0.8	1.5	1.8	5.0	1.78	0.49
Germany	1.2	0.6	13.5	22.0	0.5	4.6	0.7	0.6	0.3	1.0	0.83	0.72
Indonesia	7.7	41.7	0.0	0.1	1.7	5.2	3.2	0.9	0.1	0.0	3.83	34.69
Italy	1.4	0.3	1.0	1.3	0.4	1.1	0.5	0.6	0.3	1.2	0.76	0.34
Japan	8.9	0.0	0.1	0.1	0.1	0.8	0.7	0.1	4.6	0.2	3.82	0.06
Malaysia	2.2	20.6	0.1	0.0	0.7	2.2	3.7	1.9	0.9	0.2	1.20	17.14
Netherlands	4.1	0.6	0.2	35.0	0.5	3.0	1.4	1.4	5.7	1.7	2.00	0.74
New Zealand	0.1	0.6	0.0	11.3	0.1	0.1	0.1	0.1	0.2	0.1	0.06	0.51
Pakistan	2.7	0.0	0.0	0.0	0.0	0.8	12.4	5.1	0.1	0.6	1.13	0.08
Russian Federation	1.6	0.3	0.0	0.1	1.2	0.0	8.8	0.0	1.2	0.5	1.16	0.25
Saudi Arabia	1.2	0.2	1.7	0.0	26.2	0.0	1.4	0.0	0.4	0.4	10.95	0.17
Singapore	5.7	0.3	1.1	0.3	0.8	2.6	1.6	1.6	3.3	1.3	2.73	0.34
Viet Nam	9.8	0.0	0.0	0.0	0.2	3.0	0.3	0.0	0.4	0.0	4.17	0.11
Thailand	5.8	0.5	0.0	0.3	0.1	8.0	0.5	6.8	1.9	0.2	2.49	0.69

[10] see Asher, M.G and Sen R. (2005). India-East Asia integration: A win-win for Asia. Economic and Political Weekly, Vol. XL(36): 3932-3940.

United Arab Emirates	2.0	0.5	0.3	0.3	12.0	0.1	7.1	2.1	31.4	1.9	6.07	0.44
United Kingdom	1.4	0.3	0.2	0.5	3.8	3.0	3.5	1.1	1.8	26.1	2.12	1.08
USA	4.5	2.5	66.6	15.6	2.9	27.0	6.0	13.9	3.4	4.0	3.64	3.02

Source: Author estimation based on Un Comtrade data

In the industrial group 151(production, processing and preservation of meat, fish, fruit, vegetables, oils and fats) with export intensity value 30.34 , Indonesia emerged as the most preferred export destination. Partners like China, Japan, Malaysia, Pakistan, Russian Federation , Saudi Arabia, Singapore, Viet Nam, Thailand and UAE has also been rate high in the list. Australia, Brazil, France, Germany, Italy, Netherlands, New Zealand, United Kingdom and USA are the countries which have lower than unity EII value. In terms of import the most preferred nation is again Indonesia with import intensity value 37.18. Australia, Malaysia, Saudi Arabia and UAE has more than unit III Value. Considering the total trade in this industrial group Indonesia topped the list with Total trade intensity value 42.2 . Other countries like Australia, Malaysia, Pakistan, Singapore , Viet Nam, Thailand and UAE has also been a preferred trading partner of India for this industrial group.

United States of America with EII 5.39 has topped the list of preference in term of export in industrial group 152(manufacture of dairy products). other countries which are preferred by India for the export of dairy products are Germany, Saudi Arabia, Singapore and UAE . In terms of import the most preferred nation is United Arab Emirates with III 5.05 followed by Netherlands, Indonesia, Singapore, USA, Germany and New Zealand. Considering the total trade including both export and imports United States of America with TII value 5.61 is the most preferred destination, chased by Saudi Arabia, United Arab Emirates, Singapore, Netherlands and Germany.

In the case of 153(manufacture of grain mill products, starches and starch products, and prepared animal feeds) industrial group only Saudi Arabia and United Arab Emirates are the preferred destination for export. Out of these two countries United Arab Emirates is preferred more with EII 649.98 which is much high then the other countries. In terms of import Indonesia is the most preferred country with III 31.94 followed by Malaysia, Singapore, China, USA and Australia. Taking into

account the total trade United Arab Emirates with TII 99.09 has topped the list of the preferred nations, other countries like Saudi Arabia, Indonesia, Russian Federation and Singapore comes after him.

Considering the export by 154(manufacture of other food products) industrial group Pakistan is the most preferred destination among all 20 countries with highest Export intensity of 107.8 , followed by countries like United Arab Emirates, Indonesia, Russian Federation , Malaysia, Singapore, Saudi Arabia and Viet Nam. When talking about the import of 154(manufacture of other food products) industrial group from the other countries Pakistan again is the most preferred destination with III 88.52. Other countries which follow him are United Arab Emirates, Brazil, Thailand, China, Indonesia, United States of America, Malaysia and Singapore. Considering the total trade in this industrial group it is obvious that Pakistan is the most preferred destination with TII 113.6.

India prefer United Arab Emirates the most as a export designation for industry 155(manufacture of beverages industry) because its export intensity is recorded as 476.52 which is much higher than the other 19 countries. Countries like Pakistan, Russian Federation, Malaysia, Singapore, Netherlands and Brazil follows him. With import intensity 71.34 United Arab Emirates again becomes the most preferred destination in term of import for this industrial group. Other preferred nations are Brazil, Pakistan, Saudi Arabia, United Kingdom, China, Russian Federation and Indonesia. It is clear when we consider the total trade United Arab Emirates is the most preferred destination with total intensity 288.8 which is much high then the other 19 countries.

Considering the whole food processing industry , the most preferred nation is United Arab Emirates in term of export and Indonesia in terms of Import with Export intensity 103.14 and import intensity of 76.66 respectively. Considering the total trade of food processing industry the three more preferred destinations are UAE with total trade intensity of 68.73, Indonesia with TII of 45.42 and Saudi Arabia with 25.76 total intensity.

Table: 3.4	Export Intensity, Import intensity and total Trade intensity of the 20 major countries in period 1991-2010																	
	151			152			153			154			155			151-155		
Countries	EII	III	TTI	EII	III	TTI	EII	III	TTI	EII	III	TTI	EII	III	TTI	EII	III	TTI
Australia	0.34	3.36	2.15	0.06	1.24	0.47	0.49	1.23	0.35	0.39	0.45	0.42	0.35	0.33	0.37	0.43	2.40	1.51
Brazil	0.56	0.62	0.75	0.05	0.18	0.08	0.01	0.53	0.03	0.02	7.62	5.09	1.33	28.93	18.98	0.25	1.59	1.19
China	1.52	0.05	0.61	0.31	0.29	0.32	0.06	2.85	0.24	0.85	2.30	1.40	0.57	1.79	1.54	1.42	0.21	0.83
France	0.60	0.08	0.35	0.41	0.07	0.24	0.10	0.50	0.11	0.14	0.19	0.15	0.44	0.25	0.31	0.47	0.08	0.24
Germany	0.14	0.09	0.11	1.30	1.70	1.35	0.07	0.57	0.09	0.09	0.06	0.07	0.04	0.15	0.09	0.14	0.15	0.15
Indonesia	30.34	37.18	42.20	0.04	3.58	0.26	0.93	31.94	1.91	5.47	2.04	4.73	0.91	1.06	0.94	12.38	76.66	45.42
Italy	0.26	0.08	0.16	0.21	0.21	0.20	0.11	0.32	0.13	0.18	0.11	0.13	0.14	0.16	0.17	0.25	0.10	0.18
Japan	1.03	0.07	0.74	0.02	0.56	0.04	0.03	0.92	0.06	0.18	0.13	0.20	0.81	0.61	0.64	0.75	0.17	0.78
Malaysia	2.55	3.09	3.66	0.18	0.07	0.21	0.38	5.69	0.70	3.15	1.37	2.42	3.01	0.55	1.41	1.99	6.48	5.09
Netherlands	0.85	0.08	0.33	0.04	5.10	1.44	0.12	0.34	0.10	0.41	0.18	0.26	1.56	0.33	0.74	0.65	0.15	0.37
New Zealand	0.25	0.98	0.82	0.02	1.11	0.55	0.12	0.53	0.18	0.17	0.09	0.14	0.45	0.17	0.26	0.23	1.06	0.69
Pakistan	5.15	0.76	3.61	0.17	0.06	0.24	0.63	0.37	0.07	107.80	88.52	113.60	10.19	5.82	7.16	5.38	0.27	2.69
Russian Federation	1.13	0.63	0.84	0.00	0.05	0.02	0.90	0.09	1.39	3.20	0.01	3.41	0.56	1.71	0.65	1.07	0.89	1.10
Saudi Arabia	2.01	1.50	1.59	3.44	0.00	4.87	24.09	0.10	40.87	1.07	0.21	1.20	3.20	3.51	3.34	28.03	1.98	25.76
Singapore	8.70	0.60	4.32	1.34	2.63	1.90	0.72	4.43	1.05	1.62	1.24	1.43	1.96	0.83	1.28	3.93	0.62	2.70
Viet Nam	21.95	0.07	10.13	0.09	0.00	0.14	0.59	0.92	0.20	1.10	0.13	0.89	2.95	0.97	2.00	17.28	0.21	6.46
Thailand	7.72	0.14	1.16	0.08	0.55	0.21	0.16	0.72	0.09	0.83	2.58	1.69	4.33	0.62	2.13	5.40	0.24	1.05
United Arab Emirates	18.14	7.22	12.16	2.74	5.05	3.57	649.98	0.55	99.09	25.66	12.44	24.19	476.52	71.34	288.81	103.14	8.00	63.72
United Kingdom	0.22	0.19	0.18	0.03	0.16	0.05	0.76	0.70	0.82	0.48	0.26	0.47	0.17	2.25	1.52	0.42	0.32	0.40
USA	0.46	0.25	0.33	5.39	2.34	5.61	0.48	1.89	0.41	0.59	1.83	0.97	0.16	0.84	0.28	0.42	0.47	0.45

Source: Author estimation based on Un Comtrade data

Note: EII: Export Intensity Index, III: Import Intensity Index, TII: Total trade intensity index

Section 3.4: Major findings

The major findings of this chapter are as follows:

- Export growth of India's organised food processing industry is more in the second half of the study period as compared with the first half. Reverse is true in the case of Import growth. Export growth of industrial groups 151(production, processing and preservation of meat, fish, fruit, vegetables, oils and fats), 154(manufacture of other food products) and 155(manufacture of beverages industry) has been more in the second half of the study period as compared to the first half. Only in the case of industrial group 151(production, processing and preservation of meat, fish, fruit, vegetables, oils and fats) the import growth has reduced in the second half of the study period in comparison with the first half.

- On the basis of their share in the total export and import the major trading partners of India in the food processing sector are, Brazil, China, Germany, Indonesia, Japan, Netherlands, Pakistan, Saudi Arabia, Thailand, UAE, UK and USA. But this does not indicates that these countries are the most preferred destinations for India for this reason export intensity, import intensity and total trade intensity has been computed for 20 selected countries. The result shows that UAE for export and Indonesia for import is the most preferred countries among the 20 selected countries.

- Using Grubel-Lloyd index it has been shown that liberalisation has lead to intra industrial trade in the food processing industry. This may be because that this sector have a immense product differentiation.

Chapter 4

PERFORMANCE OF THE MAIN INDICATORS OF THE ORGANISED INDIAN FOOD PROCESSING INDUSTRY IN THE PERIOD 1991-2010

The objective of this chapter is to analysis the performance of organised food manufacturing industry in a liberalised era starting from 1991 to 2010. Studies done by Trivedi et. al (2000)[1], Srivastava (2000)[2],Balakrishnan et. al (2000)[3], Goldar (2000)[4] , Banga (2003)[5] and Das. D.K (2004)[6] has proved that liberalisation has lead to a slowdown in the productivity of the manufacturing industries. To study this hypothesis , performance of organised food processing industry as a part of manufacturing sector has been analysed in this chapter. The study period is divided in two half's, first half contain period 1991 to 2000 and second half contain period 2001-2010.

Annual survey of industries database for the period 1991-2010 has been used for this study. To proceed in the study as mentioned in chapter 3 concordances has been made between NIC 87,NIC98,NIC2004 and NIC 2008[7]. According to NIC 1998 and NIC 2004 organised food processing industries are classified under manufacturing as division 15.

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[1] Trividi, P et al (2000): 'Productivity in Major Industries in India: 1973-74 to 1997-98', Development Research Group Study #20, Department of Economic Analysis and Policy, Reserve Bank of India, Mumbai.

[2] Srivastava, V (2000): 'The Impact of India's Economic Reforms on Industrial Productivity, Efficiency and Competitiveness', report of a project sponsored by the Industrial Development Bank of India, National Council of Applied Economic Research (NCAER), New Delhi.

[3] Balakrishnan, P, K Pushpangadan and M Suresh Babu (2000): 'Trade Liberalisation and Productivity Growth in Manufacturing: Evidence from Firm Level Panel Data', Economic and Political Weekly, October 7, 3679-82.

[4] Goldar, B N (2000): 'Productivity Growth in Indian Manufacturing in the 1980s and 1990s', paper presented in the Conference to Honor Professor K L Krishna, on the theme 'Industrialisation in a Reforming Economy: A Quantitative Assessment' Centre for Development Economics, Delhi School of Economics, Delhi.

[5] Banga, R (2003): 'Differential Impact of Japanese and US Foreign Direct Investments on Productivity Growth: A Form Level Analysis', Economic and Political Weekly, this issue.

[6] Das. D.K(2004): "Manufacturing Productivity under Varying Trade Regimes, 1980-2000", Economic and Political Weekly, Vol. 39, No. 5 (Jan. 31 - Feb. 6, 2004), pp. 423-433.

[7] See the Appendix A for the concordances .

This chapter is segregated into 5 sections. Section 4.1 deals with the share of number of factories, fixed capital, workers and GVA of organised food industries in the total manufacturing sector. Section 4.2 analyse the rate of growth of fixed capital, workers, GVA and value of output of organised food processing industries. Section 4.3 gives an insight about the organisational feature of food industries at three digit level by analysing the per factory output, wages, capital, GVA and worker. Section 4.4 deals with trends of labour productivity, capital productivity, capital intensity and wage rate of each organised food industrial group. Section 4.5 give a brief summary about the key results of this chapter.

Section 4.1: Share in total manufacturing industries

The key performance indicators of organised food processing industries are provided in table(4.1) and figures(4.1- 4.6). Food processing industry had 18.75 percent of share in total factories of organised manufacturing sector in 1991, it has declined to 17.87 percent in 2000, after that in 2010 it has raised to 19.11 percent. Share of fixed capital of food processing industry in the total fixed capital of the manufacturing sector in period 1991 was 7.11 percent raised to 8.63 percent in 2010. Opposite has happened in the case of share of workers of food processing sector in the total manufacturing workforce. This show that capital intenstiy in this industry is raising over the years. It should also be noted that share of workers is more than the share of fixed capital for this industry which indicates that this industry has high labour absorptive capacity. Share of GVA of food processing industry in the total manufacturing GVA has raised from 8.74 percent in 1991 to 10.33 percent in 2010.

Industrial group 151 (Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) has 3.32 percent of total factories in the organized manufacturing sector in 1991. Fixed capital employed is around 1.4 percent and 2.02 percent of the workers in the organized manufacturing sector in 1991. This industrial group creates 1.76 percent of the GVA. In 2010 , the share of factories had declined to 2.48 percent and share of fixed capital has increase slightly to 1.66 percent , it may be because investment on the modern know-how has increased both in the old as well as new enterprises. The share of workers has declined to 1.84 percent in 2010 and

the share of GVA has fallen down to 1.12 percent. Briefly saying for industrial group 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) there is a higher share of workers employed as compared to capital intake in total manufacturing sector, this shows that this industry has high labour absorptive capacity which is social required in a country like India.

Industrial group 152 (Manufacturing of dairy products) have a very minor share in the organized manufacturing sector , this is due to the fact that major activities of this group is confined to the unorganized sector. It has only 0.43 percent of the factories in 1991 and it has only utilized 0.53 percent of the capital. It employs 0.81 percent of workers and produced GVA of 0.64 percent. The share of factories of this industrial group has increased to 0.75 percent in 2010 but the share of capital has declined to 0.49 percent. This decline in the share of fixed capital has lead to decline in the share of GVA to 0.55 percent. Analysing the share of workers in the organised sector it is found that it has increase to 0.92 percent in year 2010. Organised dairy sector has comparatively higher share of workers then capital. This shows the societal practicality of this sector.

Table 4.1:	Share of factories (in numbers), fixed capital, workers and GVA in the total manufacturing sector			
				(in Rs Lakh)
	Factories	Fixed Capital	Worker	GVA
151:Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats				
1991	3.32	1.40	2.02	1.76
2000	3.03	1.46	1.86	1.49
2010	2.48	1.66	1.84	1.12
152: Manufacture of dairy products				
1991	0.43	0.54	0.81	0.62
2000	0.59	0.55	1.02	1.35
2010	0.75	0.49	0.92	0.55
153: Manufacture of grain mill products, starches and starch products, and prepared animal feeds				
1991	9.03	0.99	3.20	1.39
2000	10.07	0.88	3.99	1.47
2010	9.70	1.14	3.28	1.99

154: Manufacture of other food products				
1991	4.68	3.94	8.76	5.26
2000	4.84	3.81	9.24	5.11
2010	4.24	3.73	6.50	3.47
155: Manufacture of beverages				
1991	0.74	0.75	0.81	1.13
2000	0.88	1.40	1.07	1.28
2010	0.92	1.35	1.05	1.19
ALL				
1991	18.76	7.11	15.26	8.74
2000	17.87	8.14	15.76	9.38
2010	19.11	8.63	14.89	10.33
Source: Author estimates based on ASI data				

Share of factories in industrial group 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) in total manufacturing is quite high at 9.03 percent in 1991. This industrial group provides basic staple food to the common public, so it is considered as an renowned industrial group among food processing industries. It has relatively lower capital share (0.99 percent) as compared with workers(3.2 percent) in the manufacturing industry in 1991 and It produces 1.39 percent of the GVA. In 2010, the share of factories has increased to 9.7 percent and the share of capital has also increased to 1.14 percent. Share of workers increased to 3.28 percent, this indicates that technology has increased a bit as compared to workers in this sector. GVA's share increased to 1.99 percent. This may be because of better utilization of capital and man power. This sector has the second lowest value addition as compared to the other food processing industrial groups it can be addressed due to the fact that it only processes food grains and other products for final consumption.

Industrial group 154(Manufacture of other food products) has 4.68 percent of factories in 1991. The share of fixed capital is 3.94 percent, it should be noted that this is the highest share as compared to other food processing industrial groups. Other food products industries employs the highest 8.76 percent of workers showing very high labour absorbing capacity among the food industries and generates GVA 5.26 percent. The share of the number of factories and fixed capital has slightly declined to 4.24 percent and 3.73percent in 2010 respectively. The share of workers employed

has declined to 6.5 percent in 2010. The share of GVA has reduced to 3.14 percent. This may be due to the increase in the prices of inputs.

Fig 4.1-4.6: Share of food industrial groups in total manufacturing factories, fixed capital , worker and GVA in period 1991-2010.	
fig 4.1:151:Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats ——Factories ——Fixed Capital ——Workers ——GVA 	fig. 4.2: 152: Manufacture of dairy products ——Factories ——Fixed Capital ——Worker ——GVA
fig 4.3: 153: Manufacture of grain mill products, starches and starch products, and prepared animal feeds ——Factories ——Fixed Capital ——Workers ——GVA 	fig 4.4:154: Manufacture of other food products ——Factories ——Fixed Capital ——Workers ——GVA

Lastly, industrial group 155(Manufacture of beverages) has as share of 0.74 percent of factories, ,0.75 percent of fixed capital, 0.81 percent of worker and 1.13 percent of GVA in total manufacturing in 1991. This industrial group has consistently shown an increase in its share of factories, fixed capital, workers as well as GVA in organised manufacturing sector from the period 1991-2010.

Above analysis shows a picture of organised food processing industry when compared with the whole organised manufacturing sectors. It has been illustrated above that workers employed in this sector are relatively more than the capital employed, this indicates that this sector has a high labour absorbing capacity, which is a good sign from the societal point of view. Except 151(manufacture & processing of meat, fish, fruit & vegetables) and 154(Manufacture of other food products) industrial groups of food industry the rest of the industrial groups has enjoyed an increase in the share of factories in total organised manufacture sector in period 1991-2010. In industrial groups 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) and 152(Manufacturing of dairy products) the share of fixed capital in organised manufacture sector has declined in the study period. The changes in the share of number of factories, fixed capital, workers and GVA in the various food processing industries to total organised manufacturing in the period 1991 to 2010 can be attributed to a degree of difference in the rates of growth and factors concentration.

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Section 4.2 : **Growth rate of capital, workers, GVA, output and wages of organised food industries at base price 2004-05 for the period 1991-2010.**

Table(4.2) shows the growth rate and coefficient of variation of capital, workers, GVA, output and wages of organised manufacturing food processing industries for the period 1991-2010 with a base price 2004-05. The capital employed in the food sector has grown at a rate of 8.79 percent for the period 1991-2010 were as in overall manufacturing sector the grown rate was 7.87 percent . It should be noted that the growth rate of capital for both manufacturing sector and organised food processing industries has been reduced in the second half of the study period i.e. 2001-2010 in comparison with the first half of it. Growth rate of the workers was 1.38 percent in organised food processing sector which is less than the recorded growth in whole organised manufacturing sector. Important point note here is that the growth of workers was more in period 2001-2010 in comparison with the period 1991-2000. This is totally opposite what is happing in the case of growth rate of capital. This indicates that organised food industries is a labour absorbing industries which is socially required also. Gross value added and Output of organised food processing sector has grown at the rate of 6.54 percent and 7.61 percent respectively in period 1991-2010, growth rate was high in period 2001-2010 in comparison with period 1991-2000. Growth rate of wages of organised food processing industries has jumped from 2.07 percent in period1991-2000 to 4.27 percent in 2001-2010, this can be attributed to the change in the wage laws and high negotiation power of the workers in this sector.

Capital growth of industrial group 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) has gone down from 11.3 percent to 7.07 percent from the period 1991-2000 to 2001-2010. It should be noted that this downfall has contributed to more variation in the capital intake in the period 2001-2010. Overall growth of capital for this industrial group has been recorded as 7.35 percent for the period 1991-2010. Growth rate of workers, GVA, output and wages was calculated as 1.64 percent, 6.09 percent, 8.2 percent and 2.99 percent respectively for the period 1991-2010,It is important to know that growth rate of

these variables has increased in period 2001-2010 as compared with period 1991-2000.

Table 4.2:	Growth rate of capital, workers, GVA, output and wages of organised food industries at base price 2004-05 for the period 1991-2010.				
	Capital	Workers	GVA	output	Wages
151:Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats					
Growth					
1991-2000	11.30	0.80	5.48	3.88	1.10
2001-2010	7.07	5.64	10.26	10.52	7.38
1991-2010	7.35	1.64	6.09	8.20	2.99
CV					
1991-2000	0.32	0.08	0.27	0.25	0.08
2001-2010	0.36	0.17	0.33	0.35	0.23
1991-2010	0.48	0.15	0.43	0.55	0.24
152: Manufacture of dairy products					
Growth					
1991-2000	13.46	2.77	16.53	10.85	4.00
2001-2010	10.69	3.88	2.99	8.28	4.76
1991-2010	7.73	2.38	8.43	7.91	3.52
CV					
1991-2000	0.49	0.10	0.54	0.34	0.13
2001-2010	0.46	0.13	0.19	0.28	0.16
1991-2010	0.56	0.16	0.45	0.46	0.22
153: Manufacture of grain mill products, starches and starch products, and prepared animal feeds					
Growth					
1991-2000	11.21	2.82	9.92	10.79	5.03
2001-2010	12.98	2.92	14.93	10.54	5.76
1991-2010	9.86	2.14	9.63	8.72	4.06
CV					
1991-2000	0.48	0.12	0.35	0.34	0.16
2001-2010	0.43	0.09	0.51	0.37	0.19
1991-2010	0.64	0.14	0.68	0.55	0.26
154: Manufacture of other food products					
Growth					
1991-2000	10.60	0.77	6.46	7.06	1.08
2001-2010	9.52	1.89	7.29	8.20	2.59
1991-2010	8.78	0.52	4.47	5.54	0.76
CV					
1991-2000	0.37	0.03	0.21	0.21	0.06
2001-2010	0.31	0.07	0.31	0.30	0.10
1991-2010	0.52	0.05	0.34	0.38	0.09

155: Manufacture of beverages					
Growth					
1991-2000	16.69	3.04	12.50	12.52	2.80
2001-2010	8.55	5.67	18.18	11.65	6.07
1991-2010	11.10	4.21	8.35	10.00	4.92
CV					
1991-2000	0.49	0.11	0.41	0.38	0.12
2001-2010	0.30	0.18	0.65	0.35	0.19
1991-2010	0.58	0.27	0.74	0.58	0.31
Division 15(ALL)					
Growth					
1991-2000	11.84	1.48	8.42	7.96	2.07
2001-2010	9.86 /	2.99 /	10.20	9.72	4.27
1991-2010	8.79	1.38	6.54	7.61	2.18
CV					
1991-2000	0.36	0.05	0.25	0.25	0.07
2001-2010	0.34	0.09	0.33	0.32	0.14
1991-2010	0.53	0.10	0.43	0.48	0.15
Manufacturing Sector					
Growth					
1991-2000	11.33	0.67	7.48	8.01	1.12
2001-2010	9.80	5.86	12.15	12.71	5.89
1991-2010	7.87	1.89	8.04	9.23	1.97
CV					
1991-2000	0.33	0.05 /	0.23	0.24	0.09
2001-2010	0.34	0.18 /	0.35	0.38	0.19
1991-2010	0.48	0.16	0.51	0.59	0.17
Source: Author estimates based on ASI data					

In industrial group 152(Manufacturing of dairy products) the capital has grown at the rate of 7.73 percent for the period 1991-2010. Growth rate of capital for this industrial group has gone down from 13.46 percent in period 1991-2000 to 10.69 percent in 2001-2010 with reduction in the variation in the capital intake. Growth rate of workers and their wages both has increased raised in the second half of the study period in contrast with the first half of it. For the overall period 1991-2010 the growth rate of workers and their wages was calculated at 2.38 percent and 3.52 percent respectively. On the other hand GVA and output has shown a reduction in the period 2001-2010 when compared with period 1991-2000. Reduction in GVA may be due a raise in the value of inputs. Growth rate of GVA and output was noted as 8.43 percent and 7.91 percent for the period 1991-2010.

Growth rate of capital, worker, GVA, and wages in industrial group 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) has increased in the period 2001-2010 in contrast with the period 1991-2000. Coefficient of variation has reduced in the case of capital and workers, otherwise it has increase in GVA, output and wages. The growth rate of capital, workers, GVA, output and wages as documented in table(4.2) for this industrial group in period 1991-2010 are 9.86 percent, 2.14 percent, 9.63 percent, 8.72 percent and 4.06 percent respectively.

In industrial group 154(Manufacture of other food products) the growth rate of capital has reduced from 10.64 percent in period 1991-2000 to 9.52 percent in period 2001-2010. This shows that this industrial group is under utilising its capacity. Whereas the growth rate of worker, GVA, output and wages has increase in the second half of the study period in comparison with the first half . The overall growth rate of capital, worker, GVA , output and wages in the period 1991-2010 for this industrial group are 8.78 percent , 0.52 percent, 4.47 percent,5.54 percent and 0.76 percent respectively.

Growth rate of industrial group 155(Manufacture of beverages) in terms of capital and output has gone done in period 2001-2010 when compared with the period 1991-2000. Whereas growth rate of workers, GVA and wages has increased in the second half of the study period in comparison with the first half. It should be noted that growth rate in output has reduced on the other hand growth rate of GVA has increased in period 2001-2010 in contrast with the period 1991-2000, this can be attributed to a sharp fall in the input prices for this particular industrial group. .The overall growth rate of capital, worker, GVA, output and wages in period 1991-2010 was correspondingly recorded as 11.1 percent , 4.21 percent, 8.35 percent, 10 percent and 4.92 percent .

To sum up this section, it should be noted that the growth rate of capital for the food processing industry is more than the whole manufacturing sector in the study period. Growth rate of capital , output, workers and wages was high in 155(Manufacture of beverages) industrial group in comparison with the other food

processing industrial groups in period 1991-2010. Industrial group 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) has the highest growth of GVA in period 1991-2010 when compared with other food processing industrial groups. On dividing the study period into two half, it is noted that industrial groups 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) ,154(Manufacture of other food products) and 155(Manufacture of beverages) has shown a reduction in the growth rate of capital in the second half as compared with the first half. It is worth pointing that in terms of growth rate of workers and their wages all the industrial groups of food processing industry has shown an increasing trend in the second half when compared with the first half. Only 152(Manufacturing of dairy products) industrial group has shown a decline in the growth rate of GVA in the second half this can attributed to an increase in the input value and reduction in the growth of output of this industrial group. Lastly, growth rate of output has decreased in the second half of the study period for the industrial groups 152(Manufacturing of dairy products), 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) and 155(Manufacture of beverages), this may be due to under utilisation of their capacity by these industrial groups.

Section 4.3: Analysis of per factory capital , worker, GVA, output and wages of organised food processing industry

Table(4.3) captures the structural characteristics of food industry . It shows per factory capital, worker, GVA, output and wages of each organised food processing industry for the year 1991, 2000 and 2010. Considering the overall food industry it has been analysed that per factory capital has raised increased in approximately in 9 folds from Rs. 35.69 lakh in 1991 to Rs. 336.81 in 2010, this shows that growth of capital is more than the growth of factories. Whereas worker per factory has reduced from 57.74 in 1991 to 46.36 in 2010. This may be due to decline in the labour absorption for incremental capital or may be due to use of new technology in the existent firm as well as the incumbent firms. Per factory wages has increased from Rs. 6.26 lakh in 1991 to Rs. 23.14 lakh in 2010. Both per factory output and GVA denotes the scope of operation of an industry or a group of industry. Output per factory has increased approximately in 3 folds for every 10 years. It has

increased from Rs. 229.2 lakh in 1991 to Rs. 614.35 lakh in 2000 and in 2010 recorded as Rs.1624.94 lakh.

In industrial group 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) per factory capital has increased 13.5 times from Rs. 35.94 lakh in 1991 to Rs. 487.96 lakh in 2010 and it should be noted that this increase was higher in period 1991 to 2000 .This shows that growth of capital is more than that of factories in the given industry. It might be because new technologies has been adopted by this industry. This can be attributed to the demand pressure from domestic as well as from the international markets .Per factory worker on the other has reduced from 40.94 in 1991to 38.6 in 2000 and thereafter it has increased to 45.7 in 2010. Per factory output ,GVA and wage has increased in 6.4 times ,8.9 times and 6.1 times correspondingly to Rs. 3508.68 lakh ,Rs. 177.52 lakh and Rs. 23.76 lakh in 2010.

Table 4.3:	Per factory capital, worker(in number), GVA, output and wages				
					(in Rs Lakh)
	Capital	Workers	GVA	output	Wages
151:Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats					
1991	35.94	40.94	27.49	393.62	3.88
2000	153.52	38.60	70.04	961.01	8.03
2010	487.96	45.78	177.52	3508.68	23.76
152: Manufacture of dairy products					
1991	107.37	127.79	75.66	885.98	20.88
2000	293.42	107.94	321.70	2505.09	41.97
2010	471.86	75.29	288.30	4035.85	59.70
153: Manufacture of grain mill products, starches and starch products, and prepared animal feeds					
1991	9.37	23.87	8.01	94.86	1.61
2000	27.85	24.86	20.70	279.61	3.88
2010	85.75	20.87	80.74	822.38	7.83
154: Manufacture of other food products					
1991	71.74	126.07	58.25	303.67	14.80
2000	250.58	119.72	150.01	805.45	29.22
2010	640.91	94.75	321.66	1823.79	46.46
155: Manufacture of beverages					
1991	86.77	73.99	79.37	282.68	11.20

2000	510.65	76.73	207.84	925.17	24.92
2010	1069.83	70.42	510.53	2127.58	45.86
Division 15					
1991	35.69	57.74	28.96	229.20	6.26
2000	132.93	55.55	78.32	614.35	12.97
2010	336.81	46.36	180.84	1624.94	23.14
Source: Author estimates based on ASI data					

Capital per factory has increased 4.3 times from Rs. 107.37 lakh in 1991 to Rs. 471.86 lakh in the case of 152(Manufacturing of dairy products) industrial group and it was high in the first half of the study period as compared with the second half. On the other hand per factory worker has declined overall in this industrial group. A positive growth in per factory capital and decline in the per factory worker gives a indication about the rise in the capital deepening in this industrial group. Per factory GVA, output and wages has increased under this industrial group in the span of 1991 to 2010. This shows that the scale of operation of this industrial group has increased over the study period.

In industrial group 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) , the capital per factory has increased in 9 folds from Rs. 9.37 lakh in 1991 to Rs. 85.75 lakh in 2010 and the increase was larger in the period 2000 to 2010. Per factory worker in the given factory has fallen from 23.87 in 1991 to 20.87 in 2010 though it has increased to 24.86 in 2000. The scale of operation (output per factory) of this industrial group has increase 8 time from 1991 to 2010. On the other hand GVA per factor and wages per factory has increase 10 and 4.8 time for the study period.

Per factory capital intake has increased 8.9 times for industrial group 154(Manufacture of other food products) in period 1991 to 2010. It has increase from Rs. 71.74 lakh in 1991 to Rs. 640.91 lakh in 2010. On the contrary to this per factory worker has declined from 126.07 in 1991 to 94.75 in 2010. This show that growth of capital is more than the growth of labour in this industry , which clearly indicates that the capital deepening of this industrial group has been increasing over the years. Scale of operation(per factory output) of this industrial group has increased 6 times over the period 1991 to 2010. Wages has also increased from Rs. 14.8 lakh in 1991 to 46.46

lakh in 2010. Industrial group 155(Manufacture of beverages) has recorded an increase in per factory capital intake . It has increased 12.3 times in the period 1991 to 2010. Employment per factory increased from 73.99 in 1991 to 76.73 in 2000, there after it has declined to 70.42 in 2010. Output per factory , GVA per factory and wages per factory has increased 7.5 times, 6.4 times and 4 times in the period 1991 to 2010.

In short, per factory capital intake is increasing in all the five industrial groups. It is because the growth of capital is more than that of factories in a given industry. Due to increase in the demand and competition pressure on food processing sector every factory might have increased their intake of capital. It should be noted that the highest jump in per factory capital intake was recorded by the industrial group 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) while the highest per factory capital intake is done by industrial group 155(Manufacture of beverages) in period 1991 to 2010. Except industrial group 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) all the other food processing industrial groups has recorded a decline in the per factory worker. High per factory worker intake was noted in industrial group 152(Manufacturing of dairy products) and 154(Manufacture of other food products). Here it is clear that there is a sluggish change in per factory workers which can be attributed to a decrease in the labour intake against rise in the capital intake by each of the factories. This shows that it is case of capital deepening at the factory level as the growth of capital is higher in relation to low or negative growth rates of worker per factory. This phenomena is valid for all the food processing industry groups. As far as increase in the scale of operation(Output per factory) is concerned all the five industrial group has done well with industrial group 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) and 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) recording a high jump of 8.9 times and 8.6 times respectively in period 1991-2010. High wages per factory is noted in industrial group 152(Manufacturing of dairy products), 154(Manufacture of other food products) and 155(Manufacture of beverages), but the highest jump of 6.1 times in the period 1991-2010 was recorded by industrial group 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats).

Section 4.4: Analysis of labour productivity, capital productivity , capital intensity (capital deepening), wage rate of organised food processing sector in period 1991-2010

Table(4.4) and fig.(4.7-4.12) shows the performance of labour productivity, capital productivity, capital intensity and wage rate of food processing industrial groups taking 2004-05 as the base price . Labour productivity has increased at rate of 5.17 percent for overall food processing industry over the period 1991 to 2010. Whereas capital productivity has shown a declining trend in this period. On comparing the two sub periods of the study it is found that growth rate of labour productivity has slightly increased in the second sub period and growth rate of capital productivity has raised from negative value -3.42 percent in period 1991-2000 to a positive value 0.34 in period 2000-2010. The rate of growth of capital labour ratio in overall food industry is recorded as 7.41 percent in period 1991 to 2010. Wage rate has increased at the rate 0.8 percent in the study period, it has grown more in period 2001-2010 then period 1991-2000.

Table 4.4:	Analysis of Labour Productivity, Capital Productivity, Capital Intensity and wage rate of organised food processing industries with base price 2004-05			
				(in RS. Lakh)
	Labour Productivity	Capital Productivity	Wage rate	Capital Intensity
151:Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats				
CGR				
1991-2000	4.68	-5.71	-0.07	10.50
2001-2010	4.59	0.70	1.68	3.78
1991-2010	4.45	-1.26	1.35	5.71
CV				
1991-2000	0.26	0.24	0.04	0.30
2001-2010	0.20	0.20	0.08	0.22
1991-2010	0.31	0.23	0.10	0.35
152: Manufacture of dairy products				
CGR				
1991-2000	13.74	3.11	1.20	10.68
2001-2010	-0.91	-7.67	0.90	6.81
1991-2010	6.05	0.71	1.14	5.35
CV				
1991-2000	0.49	0.27	0.05	0.42

	L̇ab	*Cap*	*wage*	*Cap. int*
2001-2010	0.14	0.25	0.04	0.32
1991-2010	0.38	0.27	0.08	0.40

153: Manufacture of grain mill products, starches and starch products, and prepared animal feeds

CGR				
1991-2000	7.11	-1.33	2.37	8.35
2001-2010	11.97	1.95	2.86	10.04
1991-2010	7.49	-0.22	1.94	7.73

CV				
1991-2000	0.29	0.20	0.11	0.41
2001-2010	0.41	0.10	0.09	0.33
1991-2010	0.53	0.16	0.13	0.50

154: Manufacture of other food products

CGR				
1991-2000	5.70	-4.11	0.43	9.87
2001-2010	5.40	-2.24	0.54	7.63
1991-2010	3.96	-4.34	0.28	8.27

CV				
1991-2000	0.20	0.37	0.05	0.36
2001-2010	0.25	0.16	0.04	0.25
1991-2010	0.29	0.41	0.04	0.47

155: Manufacture of beverages

CGR				
1991-2000	9.47	-4.17	-0.17	13.66
2001-2010	12.53	9.74	0.52	2.88
1991-2010	4.14	-2.73	0.73	6.89

CV				
1991-2000	0.37	0.22	0.06	0.41
2001-2010	0.54	0.54	0.02	0.14
1991-2010	0.50	0.39	0.06	0.37

Division 15

CGR				
1991-2000	6.94	-3.42	0.59	10.36
2001-2010	7.21	0.34	1.28	6.87
1991-2010	5.17	-2.25	0.80	7.41

CV				
1991-2000	0.21	0.15	0.04	0.33
2001-2010	0.23	0.07	0.05	0.24
1991-2010	0.32	0.18	0.06	0.43

Source: Author estimates based on ASI data

Fig 4.7:151:Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats

—labour productivity —Capital Productivity —Capital Intensity —Wage Rate

10.00
8.00
6.00
4.00
2.00
0.00

1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
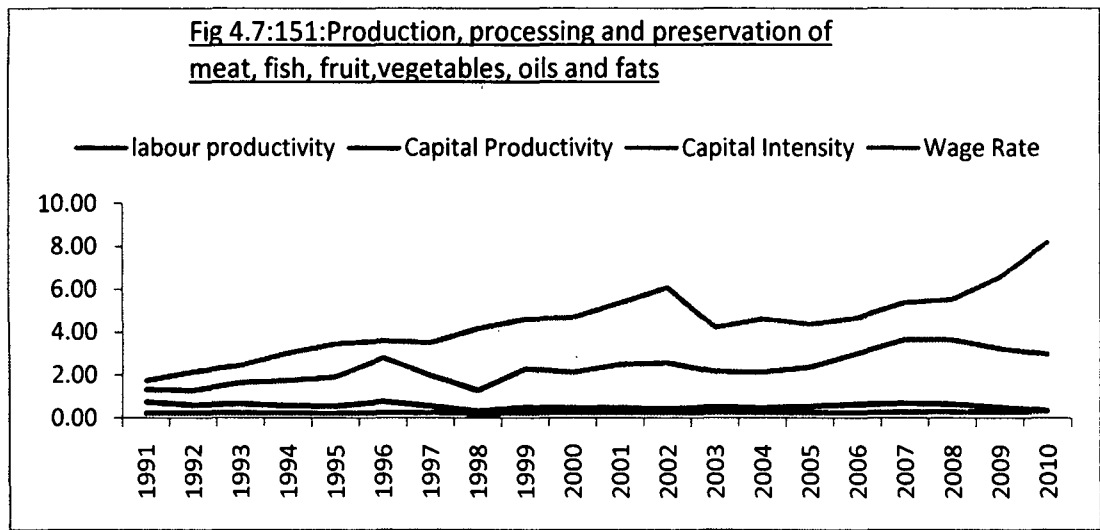
Figure(4.7) shows that labour productivity of industrial group 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) has been increasing over the years with a growth rate of 4.45 percent in period 1991-2010. In contrast to this capital productivity has declined with negative growth of -1.26 percent. Capital intensity has grown at the rate 5.71 percent in the period 1991-2010,on comparing the two sub period of the study it is evaluated that growth of capital labour ratio has declined in the second half of the study period, the reason is straight forward capital productivity has increased in this sub period. Wage rate showed a low negative growth of -0.07 in period 1991-2000 and increase to a positive value 1.68 in period 2001-2010.

fig 4.8: 152: Manufacture of dairy products

—Labour Productivity —Capital Productivity —Capital Intensity —Wage Rate

8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00

1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

59
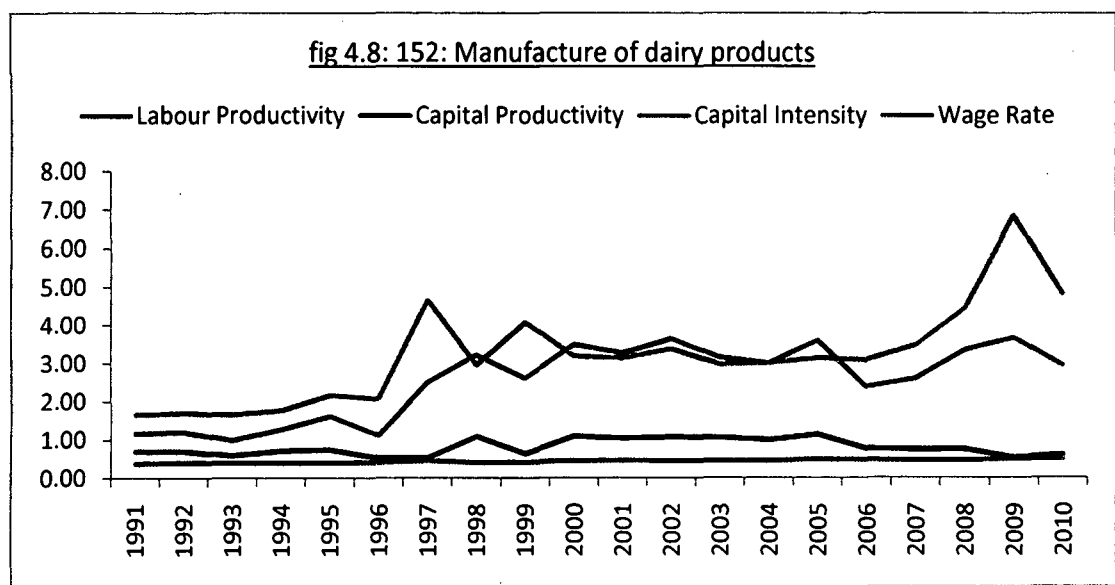
It is surprising that in industrial group 152(Manufacturing of dairy products) the growth of labour productivity was 13.74 percent in period 1991-2000 and it has reduced to a negative value -0.91 in period 2001-2010. This is due to the fact that in period 2001-2010 growth of labour intake is more than the growth of gross value added. Capital productivity of the given industrial group has considerably declined in the second half of the study period in comparison with the first half and lead to just 0.71 percent growth in the period 1991-2010. Capital labour ratio has grown at the rate 10.68 percent in 1991-2000 , but it has reduced to 6.81 percent in period 2001-2010. This shows that capital intake relative to labour intake has reduced in the second half of the study period as compared with the first half. Wage rate in given industrial group has witnessed a growth of 1.14 percent in period 1991-2010.

In the first sub period of the study industrial group 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) has noted a growth of 7.11 percent in its labour productivity, which has raised to 11.97 percent in period 2001-2010 and growth rate of capital productivity has increase from negative -1.33 percent to positive 1.95 percent. It is clear from the figure(4.9) that capital intensity and labour productivity is moving along with each other whereas capital intensity and capital productivity is moving in opposite directions. It indicates that rising labour productivity and falling capital productivity can be the reason for the rise in the capital Intensity of this industrial group. Growth in capital intensity was 7.73 percent in period 1991-2010. It is noted that in the second half of the study period the growth was high in comparison with the first half. Wage rate of this industrial group has grown at the rate 1.94 percent in period 1991-2010.
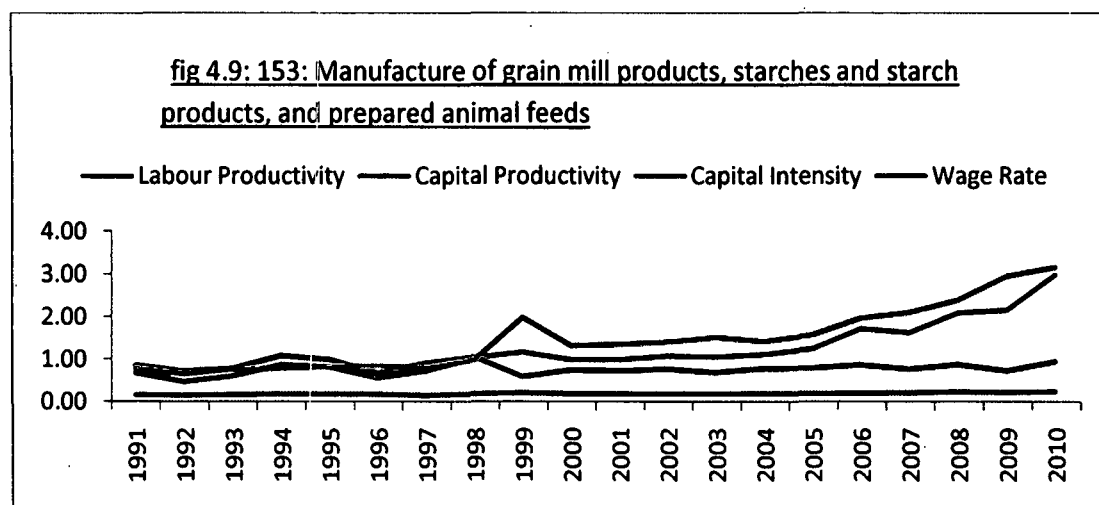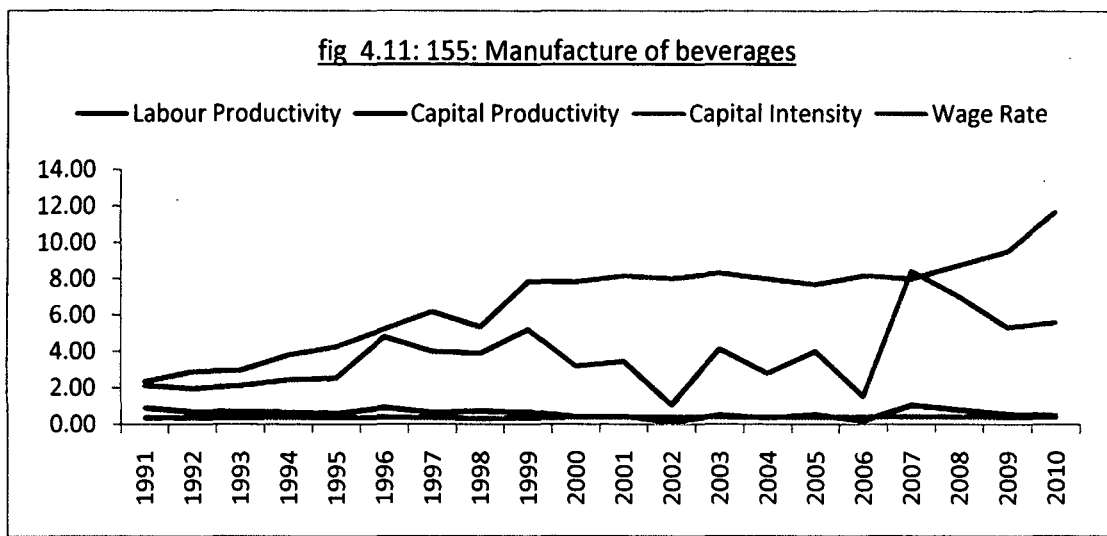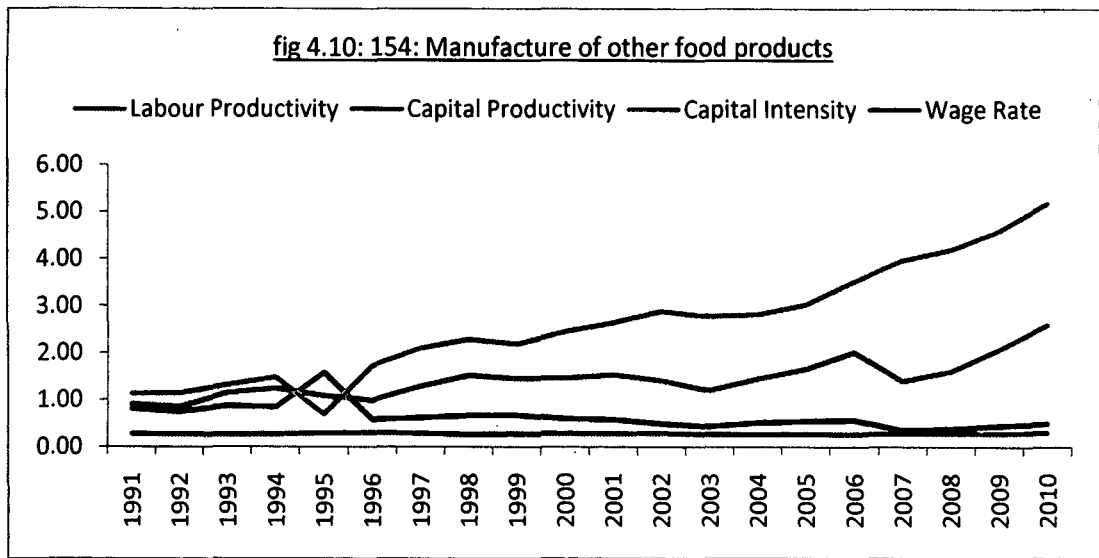
fig 4.9: 153: Manufacture of grain mill products, starches and starch products, and prepared animal feeds

fig 4.10: 154: Manufacture of other food products

——Labour Productivity ——Capital Productivity ——Capital Intensity ——Wage Rate

fig 4.11: 155: Manufacture of beverages

——Labour Productivity ——Capital Productivity ——Capital Intensity ——Wage Rate

In industrial group 154(Manufacture of other food products) labour productivity has grown at the rate 3.96 percent in period 1991-2010, whereas capital productivity has a negative growth of -4.11 percent. Capital Intensity of this industry has grown at the rate 8.27 percent in period 1991-2010. This shows that this industry is also using more capital then labour to produce an output. Wage rate of the workers in the given industrial group has increased at the rate 0.28 percent, note that wage rate has grown more in the second half of the study period then in the first half. Growth rate of labour productivity in industrial group 155(Manufacture of beverages) has raised from 9.47 percent in period 1991-2000 to 12.53 percent in period 2001-2010. Capital productivity on the other side has increased from negative growth of -4.17 percent to positive 9.74 percent, which is a remarkable jump. Growth of capital intensity and wage rate of this industrial group was recorded as 6.89 percent and 0.73 percent in period 1991-2010.

fig 4.12: Division 15

─── Labour Productivity ─── Capital Productivity ─── Capital Intensity ─── Wage Rate
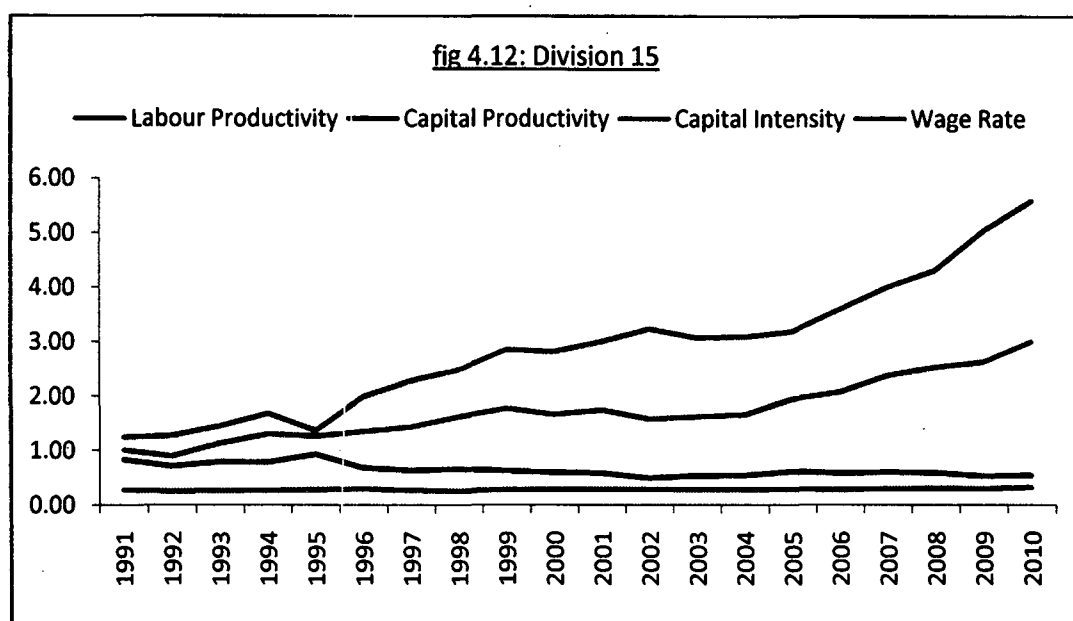
To put it briefly, in this section it has been revealed that labour productivity has increased overall in the food industry. Besides this it has also increased in all three digit industrial groups ie.151-155. The main reason of this raise in labour productivity can be higher growth of GVA as compared to labour growth. It is analysed that capital intensity has increased in every food industry group , this indicates that every industrial group is using more capital then labour to produce its output. In period 1991-2010 the highest capital intensity was recorded by the industrial group 155(Manufacture of beverages) and highest growth by industrial group 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds). Capital productivity growth has shows a declining trend in food industry during the study period. This may be due to under utilization of capacity and huge pressure of demand as well as competition for this industry. Only 152(Manufacturing of dairy products) has positive growth of capital productivity in period 1991-2010. Wage rate has increase at a growth rate of 0.8 percent in the period 1991 to 2010 for overall food industry. Highest wage rate growth was recorded in industrial group 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) followed by 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) and 152(Manufacturing of dairy products)

Section 4.5: Main findings

The main findings of this chapter are :

- It has been shown that on comparing with total manufacturing the share of workers employed in this sector are relatively more than the share of capital employed, this indicates that this sector has a high labour absorbing capacity, which is a socially desirable. Industrial groups 151 (manufacture & processing of meat, fish, fruit & vegetables) and 154(Manufacture of other food products) of food industry has reported a decline in the share of factories, worker and GVA in total organised manufacture sector in period 1991-2010. In industrial groups 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) and 152(Manufacturing of dairy products) the share of fixed capital in organised manufacture sector has declined in the study period. 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) industrial group has the highest share in terms of factories, while 154(Manufacture of other food products) industrial group has highest share in fixed capital, workers and GVA respectively in total manufacturing in period 1991-2010.

- Comparing the growth rate of capital in food processing industry and manufacturing sector it is found that it is greater in the case of food processing industry for the period 1991-2010. Growth rate of capital , output, workers and wages was high in 155(Manufacture of beverages) industrial group. while industrial group 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) has the highest growth of GVA in period 1991-2010.

- Industrial groups 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) ,154(Manufacture of other food products) and 155(Manufacture of beverages) has shown a reduction in the growth rate of capital in the second half as compared with the first half of the study period. It is worth pointing that in all the industrial groups the growth rate of workers and their wages has increased in the period 2001-2010 when compared with the period 1991-2000. Only 152(Manufacturing of dairy products) industrial group has shown a decline in the growth rate of GVA in the second half this

can be due to an increase in the input value and reduction in the growth of output for this particular industrial group.

- Per factory capital intake is increasing in all the five industrial groups. This can be due to demand and competition pressure on the factories to upgrade their technologies .Highest per factory capital intake is done by industrial group 155(Manufacture of beverages) in period 1991 to 2010. Except industrial group 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) all the other food processing industrial groups has recorded a decline in the per factory worker. As far as increase in the scale of operation(Output per factory) is concerned all the five industrial group has done well . High wages per factory is noted in industrial group 152(Manufacturing of dairy products), 154(Manufacture of other food products) and 155(Manufacture of beverages).

- Labour productivity has increased overall in the food industry. whereas capital intensity has declined.

- Capital productivity growth has shown a increasing trend in food industry during the second half of the study period. Increasing trend of capital productivity is prominent in every food industrial group except industrial group 152(Manufacturing of dairy products).

- Highest wage rate growth was recorded in industrial group 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) followed by 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) and 152(Manufacturing of dairy products).

Chapter 5

EMPIRICAL ANALYSIS FOR THE IMPACT OF TRADE ON THE LABOUR MARKET IN ORGANISED INDIAN FOOD PROCESSING INDUSTRY IN THE PERIOD 1991-2010

International trade as a main source of growth plays an important role in the development of a country. International trade allows countries to specialise in producing narrower range of goods and give them greater efficiencies of large-scale production. however still there are range of criticisms in favour of international trade. Developing country like India often worry that opening their economies to international trade will lead to a disaster because their industries won't be able to compete. On other side, peoples in the developed nations where workers earn high wages have fear that trading with less advanced countries will adversely affect their standard of living by reducing their real wages .

Most of the economic literature considers that trade liberalization leads to an increase in welfare derived from an improved allocation of domestic resources. Import restrictions of any kind create an anti-export bias by raising the price of importable goods relative to exportable goods. The removal of this bias through trade liberalization will encourage a shift of resources from the production of import substitutes to the production of export-oriented goods India initiated trade liberalisation in year 1991, before that India was pursuing import substitution policy. Import Substitution policy aimed to encourage domestic industries by limiting competing imports. This was based on a notion that poor countries would be exploited by rich countries through international financial markets and trade. But by the mid-1980s many governments had lost faith in import substituting industrialization and began to liberalize trade as India was one of them.

The main objective of trade liberalisaton was to being economic development through trade openness. Some of the proponents thinks that increases in India's trade has helped some of the sectors to grow faster, but declaring that increase in trade has cause higher overall economic growth has attracted some doubts. Some also argues

that trade openness will increase income inequality. Studies done by Goldar(2000)[1], Balakrishnan. P. et. a l(2000)[2], Das (2004)[3] shows that productivity has gone down immediately after liberalisation in India's organised manufacturing industry. Though the evidence of impact of trade on employment and wages are mixed in the case of post liberalisation period.

As there is no consensus about the impact of trade on employment, productivity and wages of the workers. This chapter tries to empirically examine the impact of India's trade in libarlised era on employment, productivity and wages of the labours in organised food industry as a part of organised manufacturing sector.

This chapter is divided into four sections. Section 5.1 shows the impact of trade on employment for this sector. Section 5.2 empirically observe the impact of trade on labour productivity. In Section 5.3 it is empirically shown that how wages of the workers get affected by trade. Section 5.4 gives a summary of the major findings .

Section 5.1 Impact of trade on labour demand of India's food processing industry in 1991-2010.

The purpose of liberalising the trade in 1991 was to bring more openness in the trade with other countries by removing protection against import and promoting export. Does this has served any good for workers or it has simply added more problems for the domestic workers? This needs to be analysed. In this section researcher has tried to empirically study the impact of trade on demand of labours in food industry in post liberalisations period

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[1] Goldar, B N (2000): 'Productivity Growth in Indian Manufacturing in the 1980s and 1990s', paper presented in the Conference to Honor Professor K L Krishna, on the theme 'Industrialisation in a Reforming Economy: A Quantitative Assessment' Centre for Development Economics, Delhi School of Economics, Delhi

[2] Balakrishnan, P, K Pushpangadan and M Suresh Babu (2000): 'Trade Liberalisation and Productivity Growth in Manufacturing: Evidence from Firm Level Panel Data', Economic and Political Weekly, October 7, 3679-82.

[3] Das. D.K(2004): "Manufacturing Productivity under Varying Trade Regimes, 1980-2000", Economic and Political Weekly, Vol. 39, No. 5 (Jan. 31 - Feb. 6, 2004), pp. 423-433.

Following functional relationship has been used to analyse the link between trade and labour demand:

No. of Workers = f (Export Intensity or Import Intensity or Both , Wage Rate, GVA)

The estimates are generated using OLS(ordinary least square) technique. After trying for various functional forms the analysis is restricted to log- linear form . Cointegration test has been performed to check whether the models are spurious or not[4]. Following model has been tested to check the impact of trade on labour demand in each 3 digit organised Indian food industrial groups (151 to 155) as well as on the entire organise Indian food industry with base year 2004-05:

Model 1: $\log(Worker_t) = \hat{\beta}_{0t} + \hat{\beta}_{1t} \log(Wage\ Rate) + \hat{\beta}_{2t} \log(GVA)$

$$+ \hat{\beta}_{3t} \log(export\ Intensity) + \hat{\beta}_{3t} \log(Import\ Intensity) + \hat{u}_t$$

Table5.1: Results of regression model to see the impact of trade on labour demand in organised Indian food processing Industry in period 1991-2010 with base year 2004-05.

Dependent Variable	Log(Worker)					
Independent Variables In Log	151	152	153	154	155	Food Industry
Constant	4.074 (5.416)*	4.823 (8.474)*	3.104 (7.445)*	5.635 (24.367)*	4.689 (11.532)*	4.438 (14.052)*
Wage Rate	0.111 (0.287)	0.752 (1.209)	**-0.681 (-3.097)***	0.314 (1.648)	0.811 (1.403)	-0.159 (-0.852)
GVA	**0.253 (2.75)***	**1.120 (1.86)***	0.328 (6.322)*	**0.0791 (2.696)***	**0.145 (2.766)***	0.256 (7.850)*
Export Intensity	**0.183 (2.427)***	0.004 (0.203)	0.014 (0.014)	0.030 (1.495)	0.029 (0.348)	**0.052 (2.002)***
Import Intensity	0.007 (0.201)	0.093 (1.308)	-0.045 (-1.124)	0.021 (1.563)	**0.132 (2.938)***	**-0.031 (-1.876)***
Unadjusted R²	0.694	0.749	0.872	0.713	0.814	0.937
Adjusted R²	0.612	0.682	0.838	0.636	0.764	0.920
DW d stat	1.882	1.960	2.021	1.905	2.102	2.170
F Stats	8.496	11.178	25.62	9.315	16.407	55.685
P-Value	0.001	0.000	0.000	0.001	0.000	0.000

Note: Values in the brackets is the t-value
* Significant at 1% level of significance
** Significant at 5% level of significance
*** Significant at 10% level of significance

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[4] See Appendix D for co-integration test

5.1..1 Interpretation of the results in table 5.1

5.1.1.1 Interpretation of the results in table 5.1 for the industrial groups 151 to 155

Elasticity of demand of labour in every industrial group is less than one or differently saying demand curve faced by workers in each of the industrial groups is inelastic. Except 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) industrial group none of the other industrial group supports the wage demand theory. Industrial group 151(Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats),153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds),154(Manufacture of other food products) and 155(Manufacture of beverages) shows that if wage rate increase by 1 % labour demand will increase by 0.1%, 0.6%, 0.3% and 0.8% respectively keeping the other variables constant. It should be noted that only industry 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) has significant relationship between wage rate and labour demand. Elasticity of worker with respect to GVA is significant in all the industrial groups. GVA is used as a proxy variable to capture the size of the industry. It is analysed that size has a positive and significant effect on the demand of the labour in all the industrial groups for the period 1991-2010.

Considering the impact of trade on labour demand of the food industry in period 1991-2010. Table 5.1 shows that export intensity has played a positive role in increasing the labour demand in the food processing industries. For all the industrial groups 151 to 155 elasticity of labour demand with respect to export intensity has been positive. 151(Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats) industry is the only one which shows this relationship a significant one. As far as import intensity is concern , industrial group 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) shows a negative elasticity, where as other industrial groups have positive elasticity's. Industrial group 151(Production, processing and preservation of

meat, fish, fruit, vegetables, oils and fats) and 155(Manufacture of beverages) show a positive significant effect of export intensity and import intensity respectively on the labour demand.

5.1.1.2 Interpretation of the results in table 5.1 for the food industry

Results of the regression models shows that coefficient of log wage rate have negative sign as expected according to wage and demand theory of the labour. The own elasticity of wage rate is less than 1, which indicates the labour in this industry is facing inelastic demand. However relationship between wage rate and labour demand in this industry turned out to be insignificant for the period 1991-2010. Size of the food industry is captured though gross value added, it is assumed that if the size of the industry expands it will require more labour and capital to fulfil its growing demand. Coefficient of log GVA has a positive and significant impact on labour demand in food industry. The elasticity of labour demand with respect to GVA is 0.25. This suggests that if the size of the industry increases by 1% on average labour demand will increase by 0.25 %.

Export intensity and Import penetration has a significant impact on the employment of the organised food industry in period 1991-2010.Taking log of export intensity as export by output has a positive impact on employment of this industry in the study period, where as import penetration as import by output has negative impact. Liberalisation of imports through reduction in tariffs and NTB has replaced the foreign worker with the domestic workers leading to reduction in the demand of the labours in food industry. When a country is importing more of finished goods relative to intermediate goods, in that case imports are consider to substitute foreign labours with domestic labours. Policies which are implemented to increase the export in this sector has successively increased the demand for labour .

Though the results of this study is directly not comparable with other studies due to the fact that nature of operations of other studies were organised and unorganised and varying time periods for time series/ cross sections analysis, and also none of the study has seen the impact of trade on employment , wage rate and labour productivity by separately taking food industry, but we can compare the intuition behind the impact of export ,import and other variable on employment. On comparing we found that results given in table 5.1 is consistent with the studies done by

Bishwanath Goldar(2002), Rashmi Banga (2005(a)) , Rashmi Banga and Seema Bathla (2012) and Sharma . R. K, Rashmi Banga and Seema Bathla (2008)[5].

Analysing that in post liberalisation period 1991 to 2010 it is found that, wage rate has negative effect on employment in food industry, where as size of the industry plays a significant positive role. Export intensity and import penetration has significantly affected the employment of organised food industry , export intensity has positive impact whereas import penetration has negative. So it can be visualised that in post liberalisation period policies in favour of export promotion has done well by increasing the employment indirectly, where as policies to relax the tariffs and NTB to promote imports in this sector has negatively affected the employment of this industry.

Section 5.2   Impact of trade on labour productivity of India's food processing industry in 1991-2010.

As we know that liberalisation came with a goal to improve the economic growth of our country. No doubt the growth of India in post liberalisation period of was impressive, but how much liberalisation has contributed to it is a matter of debate. How labour market is influenced by liberal trade policies need a further discussion, as there is no consensus on this topic. This section tries to empirically capture the impact of export and import on labour productivity of organised food industry in post liberalisation period. Following functional relationship has been tested to see the impact of export and import on labour productivity of this sector.

$Labour\ Productivity = f(Export\ Intensity\ or\ Import\ Intensity\ or\ Both, Capital\ Intensity, GVA)$

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[5] Goldar (2002) has shown in his study that in post liberalisation period employment elasticity has increased only in export oriented industries where as in import competing industries it has declined. Studys done by Rashmi Banga (2005(a)), has shown a positive impact of export and negative impact of imports on organised employment. Studies done by Rashmi Banga and Seema Bathla (2012) and R. K Sharma , Rashmi Banga and Seema Bathla (2008) on unorganised manufacturing sector show that export intensity has postive impact whereas import intensity has negative on the employment.

The estimates are generated using OLS(ordinary least square) technique. After trying for various functional forms the analysis is restricted to log-linear form only. Cointegration test has been performed to check whether the models are spurious or not[6]. Following model has been tested to check the impact of trade on labour productivity in each 3 digit organised Indian food industrial groups(151 to 155) as well as on the entire organised Indian food industry with base year 2004-05:

$$Model\ 2 :\ \log(labour\ Productivity_t) = \hat{\beta}_{0t} + \hat{\beta}_{1t}\log(Capital\ Intensity) + \hat{\beta}_{2t}\log(GVA) +$$
$$\hat{\beta}_{3t}\log(Export\ Intensity) +$$
$$\hat{\beta}_{4t}\log(Import\ Intensity) + \hat{\mu}_t$$

Table 5.2: Result of the Regression model to see the impact of trade on labour productivity in organised Indian food processing industry in 1991-2010 with base year 2004-05.

Dependent Variable	Log(Labour Productivity)					
Independent Variables in log	151	152	153	154	155	Food Industry
Constant	-4.120 (-4.487)*	-0.226 (-0.514)	-2.672 (-11.328)*	-4.498 (-7.21)*	-1.022 (-1.597)	-4.898 (-6.258)*
Capital Intensity	0.013 (0.073)	0.144 (1.397)	0.304 (2.128)***	0.0788 (0.936)	0.396 (2.472)**	0.311 (2.371)**
GVA	0.873 (8.275)*	0.465 (6.171)*	0.542 (10.755)*	0.873 (9.013)*	0.233 (2.75)**	0.8937 (9.957)*
Export Intensity	-0.715 (-5.729)*	0.041 (1.051)	0.060 (0.801)	0.085 (1.556)	0.063 (0.508)	0.127 (1.055)
Import Intensity	-0.053 (-0.647)	0.136 (1.742)	-0.097 (-1.368)	-0.038 (-0.964)	0.170 (2.762)**	-0.033 (-0.363)
Unadjusted R²	0.895	0.646	0.854	0.729	0.777	0.818
Adjusted R²	0.867	0.631	0.841	0.610	0.713	0.796
DW d stat	2.066	1.888	2.160	1.905	1.820	1.923
F Stats	32.03	65.326	77.358	49.16	12.821	41.804
P-Value	0.000	0.000	0.000	0.000	0.000	0.000

Note: Values in the brackets is the t-value
* Significant at 1% level of significance
** Significant at 5% level of significance
*** Significant at 10% level of significance

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[6] See Appendix D for co-integration test

5.2.1 Interpretation of the results in table 5.2

5.2.1.1 Interpretation of the results in table 5.2 for the industrial groups 151 to 155

Elasticity of labour productivity with respect to capital intensity turn out to be positive for each industrial group. This indicates that capital intensity have positive impact on the labour productivity of the worker in each food industrial group. This suggest that increase in the capital deepening of an industry lead to increase in the labour productivity of the worker in that particular industry. Only industrial groups 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) and 155(Manufacture of beverages) advocates this relationship a significant one, where as in other industrial groups this relationship turned out to be insignificant.

Elasticity of labour productivity with respect to size of the industry turned out to be positive and significant in all 3 digit industrial groups. This illustrates that GVA as a proxy variable for the size of the industry has a significant role in increasing the labour productivity in each of the industrial group.

In case of trade, coefficient of log export intensity of industrial group 151(Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats) has significant negative impact on the log labour productivity, while keeping other factors constant. This indicates that as the export intensity of this industry increase by 1% it reduces the labour productivity by 0.71 % in period 1991-2010. Export intensity of other industrial groups 152 to 155 has positive but insignificant impact on the labour productivity of their workers. Import intensity on the other hand has negative impact on the labour productivity in the industrial groups 151(Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats),153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) and 154(Manufacture of other food products), while positive impact in the industrial groups 152(Manufacture of dairy products) and 155(Manufacture of beverages). It is noted that relationship between import intensity

and labour productivity turned out to be significant only in industrial group 155(Manufacture of beverages).

5.2.1.2 Interpretation of the results in table 5.2 for the food industry

Coefficient of log capital intensity has a positive and significant impact on the log labour productivity of the workers of this industry in the period 1991-2010. This shows that 1% increase in capital intensity will increase labour productivity of this industry by 0.3 percent keeping other variables constant. This indicates that in the food industry, capital intensity and labour productivity go hand in hand, as capital intensity increases it leads to a rise in the labour productivity as well.

GVA used as a proxy of the size of the industry has positive and significant impact on the labour productivity of the workers in food industry in period 1991-2010. Elasticity of labour productivity with respect to GVA is around 0.6 which is less then 1.This indicates that there is inelastic relationship between GVA and labour productivity, means if the change in GVA is high it will positively change the labour productivity but in small amount. This fact can be analysed trough table 4.2 and 4.4. table 4.2 shows that GVA has grown from 8.42% in 1991-2000 to 10.2 % in 2001-2010, while labour productivity has grown at a less pace 6.94% in 1991-2000 to 7.21% in 2001-10.

As far as trade is concerned, it is analysed that trade had no statistical significant impact on the labour productivity of this sector in post liberlisation period 1991-2010. Though the sign of export intensity is positive and import intensity has negative sign. Insignificance of these partial coefficients may be due to the fact that the sample size is small. Negative sign of import intensity suggest that higher import competition for food industry in period 1991-2010 has reduced the labour productivity. As mentioned earlier also that the results of this study is directly not comparable with other studies due to the fact that nature of operations of these studies were organised and unorganised and varying time periods for time series/ cross sections analysis, but we can compare the logic(signs) behind the impact of export and import on labour productivity with the other studies. On comparing with other studies it is found that results of table 5.2 is consistent with the studies done by

Rashmi Banga and Seema Bathla (2012) and R. K .Sharma, Rashmi Banga and Seema Bathla (2008) [7].

Section 5.3   Impact of trade on wages of the workers in India's organised food industry in period 1991-2010.

International trade affects the prices of products in both exporting and importing countries and this in turn affects the price of labour (wages) within countries by influencing the demand for labour. This is a researchable issue that how change in trade has influenced the wage of the labours in the organised food industry of India. The main objective of liberalisation was to increase the trade openness with other countries by relaxing the tariffs and NTBS. Does this trade openness has resulted in a change in the earnings of the workers, this needs an investigation. This section deals with the impact of trade on wages of the workers in the food industry in post liberalisation period. Following relation has been studied in this section:

$Wage = f(Export\ Intensity\ or\ Import\ Intensity\ or\ both, labour\ Productivity, Capital\ intensity\ )$

The estimates are generated using OLS(ordinary least square) technique. After trying for various functional forms the analysis is restricted to log-linear form only. Cointegration test has been performed to check whether the equations are spurious or not[8]. Following model has been tested to check the impact of trade on wages of the 3 digit organised Indian food industries and the food industry as a whole with base year 2004-05:

$Model\ 3$: $\log(Wage_t) = \hat{\beta}_{0t} + \hat{\beta}_{1t} \log(Labour\ Productivity) + \hat{\beta}_{2t} \log(Capital\ Intensity) +$
$\hat{\beta}_{3t} \log(Export\ Intensity) + \hat{\beta}_{4t} \log(Import\ Intensity) + \hat{\mu}_t$

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[7] Rashmi Banga and Seema Bathla (2012) in his study found that labour productivity of enterprises in unorganised sector increases if the industry to which they belong is export- oriented.. R. K .Sharma, Rashmi Banga and Seema Bathla (2008) in their study revealed that higher exports lead to higher employment, higher labour productivity and higher wages while reverse was true in the case of higher imports.

[8] See Appendix D for cointegration test.

Table 5.3: Result of the regression models to analyse the impact of trade on wages of organised Indian food processing industry in period 1991-2010 with base year 2004-05.

Dependent Variable	Log(Wage)					
Independent Variables in log	151	152	153	154	155	Food Industry
Constant	5.080 (12.816)*	4.034 (9.7)*	4.212 (24.372)*	5.554 (32.491)*	4.608 (16.56)*	5.346 (22.040)*
Labour Productivity	0.422 (5.544)*	0.498 (3.148)*	0.646 (11.397)*	0.129 (1.907)***	0.529 (4.087)*	0.375 (8.724)*
Capital Intensity	-0.229 (-1.811)***	-0.142 (-1.273)	0.059 (0.591)	-0.067 (-1.166)	0.067 (0.578)	-0.042 (-0.504)
Export Intensity	0.377 (3.557)**	0.278 (2.295)**	-0.010 (-0.218)	0.0815 (2.109)***	0.141 (1.856)***	0.096 (1.751)***
Import Intensity	-0.0937 (-1.741)	0.177 (1.865)	0.0310 (0.649)	0.045 (1.860)	0.127 (2.735)***	-0.013 (-0.324)
Unadjusted R^2	0.769	0.827	0.650	0.678	0.875	0.882
Adjusted R^2	0.708	0.781	0.636	0.566	0.842	0.850
DW d stat	1.729	1.917	1.740	1.819	1.969	1.836
F Stats	12.469	17.912	70.954	5.145	26.337	27.951
P-Value	0.000	0.000	0.000	0.009	0.000	0.000

Note: Values in the brackets is the t-value
* Significant at 1% level of significance
** Significant at 5% level of significance
*** Significant at 10% level of significance

5.3.1 Interpretation of the results of table 5.3

5.3.1.1 Interpretation of the results in table 5.3 for the industrial groups 151 to 155

Elasticity of wage with respect to labour productivity turned out to be positive and significant for all the 3 digit food industries , i.e. 151 to 155. This indicates that increase in the wages in every industrial group is greatly influenced by the labour productivity of that particular industrial group. Only industry 151(Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats) shows a significant impact of capital intensity on the wages of the workers , whereas other industrial groups explains an insignificant impact of capital intensity on wages. Out of all the 3 digit food industries , 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) and 155(Manufacture of beverages) industrial groups has positive impact of capital intensity on the wages. Elasticity of

wage with respect to capital intensity turned out to be negative in the case of 151(Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats), 152(Manufacture of dairy products) and 154(Manufacture of other food products) industries.

Exploring the liberalised period 1991-2010 it was found that export intensity have positive and significant impact on the wages of the workers in each 3 digit food industry except 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds). This fact can be visualised by seeing the elasticity of wage with respect to export intensity for each 3 digit food industry in table 5.3. Elasticity of wage with respect to import intensity was significant only in industry 155(Manufacture of beverages), whereas in the other food industries i.e. 151-154 it turned out to be insignificant. It is prominent that impact of import intensity on wages was negative only in 151(Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats) industrial group, while in the case of other industrial groups i.e. 152-155, it has positive impact on the wages.

5.3.1.2 Interpretation of the results in table 5.3 for the food industry

Coefficient of log labour productivity shows a significant positive impact on the log wages of the labours working in the food industry in period 1991-2010. This indicates that if the labour productivity of the workers increases by 1% it will increase the wages of the workers by 0.3%, keeping the other independent variables constant. This positive association between wage and labour productivity can be seen in the table 4.2 and 4.4. In chapter 4, table 4.2 shows that as the labours in this industry has grown from 1.48% to 2.99 % from the period 1991-2000 to 2001-2010, wages of the workers has also recorded an increase from 2.07% to 4.27% from the period 1991-2000 to 2001-2010. In table 4.4 it has been analysed that as the growth rate of labour productivity of the organised food industry increased from 6.94% in 1991-2000 period to 7.21 % in period 2001-2010. Accordingly growth of wage rate has also increased from 0.59% in period 1991-2010 to 1.28% in 2001-2010.

It is studied that capital intensity as a ratio of capital to labour has a negative impact on the wages of the workers in food industry in period 1991-2010. Table 4.2

and 4.4 in chapter 4 shows the similar trends, in table 4.2 it is shown that growth of capital has declined while growth of the wages of the workers has increase from period 1991-2000 to 2001-2010. Analogously table 4.4 suggest that as the capital intensity has declined from 10.36 % to 6.87 % from period 1991-2000 to 2001-2010, wage rate of the worker has increased from 0.59% to 1.28%. It should be noted that relationship between log capital intensity and log wages has turned out to be insignificant. This may be due to the fact that sample data is very small to capture this relationship. May be in long run it turned out to be significant.

Considering the impact of trade on wage of the workers in food industry ,it is found that export has played a significant positive role in raising the wages in the food industry in period 1991-2010. On the other hand import has negatively hampered the wages of the worker in the food industry for the same period. This analysis coincide with the notion of Rama (2003) which confirms that trade openness can have negative impact on wages in the short run. The above model suggest that increase in the export by 1% leads to increasing in the wages by 0.09 % in the period, whereas increase in import by 1% decrease the wages by 0.01%. It should be noted that the relationship between imports and wage is insignificant. These fact is observable through table 3.1 and 4.2. On comparing these tables we can analyse that export by food industry has grown from 8.09% in 1991-2000 to 11.62% in 2001-2010 and growth of imports in this sector has decreased from 25.32% in 1991-2000 to 9.79% in 2001-2010, meanwhile wages of the workers in food industry has also increased from 0.59% in period 1991-2010 to 1.28% in 2001-2010. Results of these analysis matches with the other studies done by Banga and sharma (2008) , R. K .Sharma, Rashmi Banga and Seema Bathla (2008) and Rashmi Banga and Seema Bathla (2012) [9]

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[9] Rashmi Banga and R K sharma(2008) has shown in their study that export has a favourable impact on wages of unskilled worker in organised manufacturing and imports does not displace labour or adversely affect wages. R. K .Sharma, Rashmi Banga and Seema Bathla (2008) in their study revealed that higher exports lead to higher employment, higher labour productivity and higher wages while reverse was true in the case of higher imports. Rashmi Banga and Seema Bathla (2012) has exposed that if the enterprises in the unorganised sector belong to export oriented industry it will pay higher wage rates.

Section 5.5   Main findings

The main findings of the chapter are:

- As the wage rate theories suggest wage rate has negative relationship between wage rate and demand of the workers. Only 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) industrial group has reported a negative and significant impact of wage rate on labour demand. Whereas in the other industrial groups it has positive and insignificant impact on labour demand. Considering the whole organised food industry , it has been shown that wage rate has negative effect on the employment of the food industry in period 1991-2010. Elasticity of demand curve remained less than 1 in all the industrial groups as well as in the whole food industry, which shows that labour in food industries if facing inelastic demand curve. It should be noted that wage rate has insignificant impact on the employment of the food industry as a whole.

- GVA has been used as a proxy variable to capture the size of the industry. Results in the table 5.1 and 5.2 shows that size of the industry has positive and significant effect on the labour demand and labour productivity in all the organised food industrial groups i.e. 151-155, as   well as in the case of organised food industry as a whole. It should be noted that elasticity of labour demand with respect to the size of the industry is inelastic for every industrial groups except 152(Manufacture of dairy products) where it is more then 1.

- In industrial group 151(Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats) export intensity has a positive and significant impact on the employment of this industry in period 1991-2010. Where as in the case of other industrial groups i.e. 152-155 export intensity has positive but insignificant impact on the employment. As far as import is concern , import intensity has positive and significant impact in raising the employment of 155(Manufacture of beverages) industrial group. Only industrial group 153(Manufacture of grain mill products, starches and starch products, and

prepared animal feeds) shows a negative relationship between import intensity and employment, while industrial group 151(Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats),152(Manufacture of dairy products) and 154(Manufacture of other food products) has positive signs. It should be noted that except industrial group 155(Manufacture of beverages) none of the industries has recorded a significant impact of import intensity on the employment.

- Considering the whole organised Indian food industry result of table 5.1 show that trade has played a significant role in shaping the demand of the labours in food industry in period 1991-2010. Export intensity as a ratio of export to total output has a significant positive effect on the employment of organised food industry in period 1991-2010. On the other hand import penetration has negatively affected the employment in this sector. This shows that increase in import competition in post liberalisation period has displaced the domestic workers, whereas rise in export has encouraged the employment in this sector. So, trade policies to promote export and relaxation in restrictions put up by other countries has promoted the export in our country which indeed has increased the demand for labour in food industry. Whereas policies which are implemented to increase the trade openness in this sector has reduced the employment in this sector in post liberalisation.

- Export intensity has a negative and significant impact on labour productivity of industrial group 151(Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats), whereas in the case of other industrial groups 152-155 export intensity has positive but insignificant impact on labour productivity of the particular industry. Only in case of industrial group 155(Manufacture of beverages) , Import penetration has positive and significant impact on the labour productivity. In other industrial groups i.e. 151-154, the relationship between import intensity and labour productivity turned out to be insignificant.

- Empirically analysing the whole organised food industry it is found that trade has no significant role in influencing the labour productivity in the post liberalised period 1991-2010. Though coefficient of log export intensity has positive sign and coefficient of log import intensity have negative signs. This points out that higher import competition in food industry has lowered its labour productivity, were as increase in import competition in other countries has increased the labour productivity in our country. But statistically these relationships are not significant.

- Labour productivity of the worker in the food industry has increase in the study period, likewise wages and wage rate of the worker in this sector has increased. This is prominently shown in table 4.2 and 4.3. So the study assumes that there must be positive relationship between labour productivity and wages of the workers. Table 5.3 shows that labour productivity has significant positive impact on wages of the worker in all the organised food industrial groups i.e. 151-155 as well as in the whole organised food industry. Elasticity of wage with respect to labour productivity turned out to be inelastic or less than one.

- On comparing the two sub period in table 4.2 and 4.4 it has been shown that as the growth of capital intensity has reduced in food industry, growth rate of wages and wage rate both has increased. This shows that capital intensity have negative relationship in this sector. The sign of coefficient of capital intensity is as per the expectations. But this relationship turned out to be insignificant for all the industrial groups except 151(Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats).

- Export intensity has played a positive and significant role in increasing the wages of the workers in all the organised food industrial groups except industrial group 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) where it has positive but insignificant impact on the wage of the workers.

- Import intensity has insignificant impact on the wages of the workers in all the organised food industrial groups except 155(Manufacture of beverages) where it has positive and significant impact on the wages of the workers. It should be noted that coefficient of log import intensity has negative sign only in the case of 151(Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats) industrial group.

- Considering the whole organised Indian food industry export intensity has significant positive effect on the wage of the workers of the food industry in the liberalised period 1991-2010. On the other hand import intensity has negative but insignificant impact on the wages of the workers in the food industry in 1991-2010.

CONCLUSION

The purpose of the current study was to analyse the impact of trade on the labour market of India's organised food processing industry in the liberalised era starting from 1991. In support to this objectives were framed at the beginning of the study. Returning to our first objective to examine the trade performance of India's food processing industry in post liberalisation period ,it is now possible to state that exports in this sector has grown at a rate of 7.93 percent and imports at 13.13 percent in period 1991-2010. On comparing the first half and second half of the study period, it was found that export growth is more in the second half of the study period as compared with the first half, while reverse has happened in the case of Import growth. On observing the 5 food processing industrial groups, it is shown that export growth of industrial groups 151(production, processing and preservation of meat, fish, fruit, vegetables, oils and fats), 154(manufacture of other food products) and 155(manufacture of beverages industry) has been more in the second half of the study period as compared to the first half. Only in the case of industrial group 151(production, processing and preservation of meat, fish, fruit, vegetables, oils and fats) the import growth has reduced in the second half of the study period in comparison with the first half.

Brazil, China, Germany, Indonesia, Japan, Netherlands, Pakistan, Saudi Arabia, Thailand, UAE, UK and USA has emerged as the major trading partners in post liberalisation period, but the most preferred destinations among these were UAE for export and Indonesia for import. According to Grubel-Lloyd index it was found that trade liberalisation has moved food processing industry toward intra industrial trade. The reason behind this may be the immense product differentiation present in this industry. By this token we can say that trade performance of Indian food processing industry has satisfactory in the post liberalisation period (1991-2010), as net export has grown much faster in the second half of the study period. But we cannot predict or say how much growth in the trade is contributed by the trade liberalisation.

The second object was designed to examine the performance of India's organised food processing industry in the post liberalisation period. It has been found

that share of workers employed in this sector in total manufacturing are relatively more than the share of capital employed, this shows that food industry has a high labour absorbing capacity, which is good from the societal point view. Growth of capital in food processing industry and manufacturing sector was compared and it was found that it is higher in the case of food processing industry in post liberalisation period. On analysing the growth rate of worker and their wages for the two sub periods , it is analysed that both has increased in the second sub period(2001-2010), while opposite has happened in the case of capital. Labour productivity and wage rate of the worker in food industry has increased in post liberalisation period, but growth rate of wage remained low for this sector. GVA and output of food processing industry has increased immensely after liberalisation , but how much liberalisation has added to this growth is still a doubt, which need to be worked out.

Studying the five 3 digit industrial groups of food industry, it is found that growth rate of capital , output, workers and wages was high in 155(Manufacture of beverages) industrial group. 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) industrial group has the highest growth of GVA in the liberalised period 1991-2010. In all the five industrial groups per factory capital intake has increased , this shows that organised food industry face a high demand and competition pressure not only from the domestic market but also from international markets. In terms of scale of operation(Output per factory) all the five industrial group has done well. Except industrial group 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) all the other food processing industrial groups has recorded a decline in the per factory worker.

By analysing the performance of the main indicators of the organised food industry in period 1991-2010 , we conclude that this industry is growing at a very fast pace. Labour productivity and wages still maintained an increasing trend though the per factory labour intake has slightly declined in post liberalisation period. In term of GVA and output this industry has grown at a good rate which makes this sector a priority sector.

log-Linear regression models has been used to empirically study the impact of trade on employment, labour productivity and wages of the organised Indian food processing industry in the liberalised period 1991-2010. According to wage demand

theory wage rate has opposite relationship with the demand of the labour. While considering the whole organised Indian food processing industry it is revealed that it truly support this theory, But when we analyse organised food industrial groups i.e. 151-155, it is found that only 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) industrial group has reported a negative and significant impact of wage rate on labour demand,. whereas in the other industrial groups it has positive and insignificant.

This study has taken GVA as a proxy variable to capture the impact of size of the industry. It is analysed that size of the industry has positive and significant effect on the labour demand and labour productivity in all the organised food industrial groups i.e. 151-155, as well as in the case of organised food industry as a whole. It was noted that elasticity of labour demand with respect to the size of the industry is inelastic for every industrial groups except 152(Manufacture of dairy products) where it is more then unity.

Capital intensity as a ratio of capital to labour has a positive impact on the labour productivity of the workers in the organised food industrial groups (151-155) and organised food industry in total. However this relationship turned out to be significant only in the case of industrial groups 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats), 155(Manufacture of beverages) and in organised food industry as a whole. Capital intensity has negative impact on the wage of the workers in the organised food industrial groups 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats), 152(Manufacture of dairy products),154(manufacture of other food products) and 155(manufacture of beverages industry) and also in the case of total organised food industry, although the significant relationship between capital intensity and wage was reported only in the case of industrial group 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats).

The third and the main objective of the study was to see the impact of trade on the labour market of the organised food industry in the liberalised period 1991-2010. While estimating the models it is found that trade has significantly affected the employment of the organised food processing industry as a whole, But failed to build

a statistically significant relationship with labour productivity of this sector. Though the sign of the log export intensity and log import intensity in model1 and model2 for the entire organised Indian food industry is positive and negative respectively.

On estimating the model 1 which was purposed to see the impact of trade on the labour demand in the organised food industrial groups (151-155), it is found that export intensity has a positive impact on the labour demand of the each industrial group in the period 1991-2010, but it is significant only in the case of 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats) industry. Import intensity has positive and significant impact on the labour demand in 155(Manufacture of beverages) industrial group, otherwise in all the other industrial groups it is found to be insignificant in period 1991-2010.

Considering all the organised food industrial groups (151-155) it is revealed that export intensity has negative and significant impact on the labour productivity of 151(Production, processing and preservation of meat, fish, fruits, vegetable oil and fats)) industry, whereas in case of other industrial groups it has insignificant impact. Import intensity has positive and significant impact on the labour productivity of industry 155(Manufacture of beverages), while in other industrial group the relationship turned out to be insignificant.

On examining the results of model 3 for all the organised food industrial groups and the entire organised food industry, it is revealed that with only one exception 153(Manufacture of grain mill products, starches and starch products, and prepared animal feeds) industrial group export intensity has significantly influenced that wages of the worker not only in that particular industrial group but also in the case of organised food industry as a whole in period 1991-2010. Import intensity on the other hand does not have a significant relationship with the wage of the workers in all the industrial groups except industry 155(Manufacture of beverages) industry , which shows a positive elasticity of wage with respect to import penetration.

Though the current study is based on small sample with 20 observation, still the results of this study provided additional evidence to the previous studies done by Banga and Sharma (2008) , R. K .Sharma, Rashmi Banga and Seema Bathla (2008)

and Rashmi Banga and Seema Bathla (2012) suggesting that reduction in the trade barriers has negatively affected the employment, wages, and labour productivity and opposite has happened in the case of increase export. In this study we have found that in post liberalisation period (1991-2010) imports has negative and significant impact on the employment of the entire organised food industry. Whereas export plays a positive role in increasing the employment and wages of the workers. This conclude that growing export of food industry according to table 3.1 in the post liberalisation period(1991-2010) it has lead to a generation more demand for domestic labours and rise in their wages too, whereas reduction in the growth of imports in the post liberalisation period (1991-2010) has lead to an increase in the employment of the workers in the entire organised food industry as a whole. It is worth noting that this empirical study fails to finds any significant impact of trade on labour productivity in total organised food industry.

APPENDIX A

Concordance between HS88/92, HS 1996, HS 2002 and HS 2007

NIC-2004	HS 88/92(1988 to1995)	HS 96(1996 to 2002)	HS 2002(2003 to 2008)	HS 2007(2009 to 2012)
1511	20110,20120,20130, 20210,20220,20230, 20311,20312,20319, 20321,20322,20329, 20410,20421,20422, 20423,20430,20441, 20442,20443,20450, 20500,20610,20621, 20622,20629,20630, 20641,20649,20680, 20690,20710,20721, 20722,20723,20731, 20739,20741,20742, 20743,20750,20810, 20890,20900,21011, 21012,21019,21020, 21090,150100,150200,160100,160220,160231,160239,160241,160242,160249,160250,160290,160300, 230110,410110,410121,410122,410129,410130,410140,410210,410221,410229,410310,510119	20110,20120,20130,20210,20220,20230,20311,20312,20319,20321,20322,20329,20410,20421,20422,20423,20430, 20441,20442,20443,20450,20500,20610,20621,20622,20629,20630,20641,20649,20680,20690,20711,20712,20713, 20714,20724,20725,20726,20727,20732,20733,20734,20735,20736,20810,20890,20900,21011,21012,21019,21020, 21090,150100,150200,160100,160220,160231,160232,160239,160241,160242,160249,160250,160290,160300,230110,410110,410121,410122,410129,410130,410140,410210,410221,410229,410310,510119	20110,20120,20130, 20210,20220,20230, 20311,20312,20319, 20321,20322,20329, 20410,20421,20422, 20423,20430,20441, 20442,20443,20450, 20500,20610,20621, 20622,20629,20630, 20641,20649,20680, 20690,20711,20712, 20713,20714,20724, 20725,20726,20727, 20732,20733,20734, 20735,20736,20810, 20830,20840,20850, 20890,20900,21011, 21012,21019,21020, 21091,21092,21093, 21099,150100,150200,160100,160220,160231,160232,160239,160241,160242,160249,160250,160290,160300,230110,410120,410150,410190,410210,410221,410229,410310,510119	20110,20120,20130, 20210,20220,20230, 20311,20312,20319, 20321,20322,20329, 20410,20421,20422, 20423,20430,20441, 20442,20443,20450, 20500,20610,20621, 20622,20629,20630, 20641,20649,20680, 20690,20711,20712, 20713,20714,20724, 20725,20726,20727, 20732,20733,20734, 20735,20736,20810, 20830,20840,20850, 20890,20900,21011, 21012,21019,21020, 21091,21092,21093, 21099,150100,150200,160100,160220,160231,160232,160239,160241,160242,160249,160250,160290,160300,230110,410120,410150,410190,410210,410221,410229,510119
1512	30270,30310,30321, 30322,30329,30331, 30332,30333,30339, 30341,30342,30343, 30349,30350,30360, 30371,30372,30373, 30374,30375,30376, 30377,30378,30379, 30380,30410,30420, 30490,30510,30520, 30530,30541,30542, 30549,30551,30559, 30561,30562,30563, 30569,30611,30612, 30613,30614,30619, 30729,30739,30749,	30270,30310,30321,30322,30329,30331,30332,30333,30339,30341,30342,30343,30349,30350,30360,30371,30372,30373,30374,30375,30376,30377,30378,30379,30380,30410,30420,30490,30510,30520,30530,30541,30542,30549,30551,30559,30561,30562,30563,30569,30611,30612,30613,30614,30619,30	30270,30311,30319, 30321,30322,30329, 30331,30332,30333, 30339,30341,30342, 30343,30344,30345, 30346,30349,30350, 30360,30371,30372, 30373,30374,30375, 30376,30377,30378, 30379,30380,30410, 30420,30490,30510, 30520,30530,30541, 30542,30549,30551, 30559,30561,30562, 30563,30569,30611, 30612,30613,30614,	30270,30311,30319, 30321,30322,30329, 30331,30332,30333, 30339,30341,30342, 30343,30344,30345, 30346,30349,30351, 30352,30361,30362, 30371,30372,30373, 30374,30375,30376, 30377,30378,30379, 30380,30411,30412, 30419,30421,30422, 30429,30491,30492, 30499,30510,30520, 30530,30541,30542, 30549,30551,30559,

	30759,30799,51191,160411,160412,160413,160414,160415,160416,160419,160420,160430,160510,160520,160530,160540,160590,230120	729,30739,30749,30759,30799,51191,160411,160412,160413,160414,160415,160416,160419,160420,160430,160510,160520,160530,160540,160590,230120	30619,30729,30739,30749,30759,30799,51191,160411,160412,160413,160414,160415,160416,160419,160420,160430,160510,160520,160530,160540,160590,230120	30561,30562,30563,30569,30611,30612,30613,30614,30619,30729,30739,30749,30759,30799,51191,160411,160412,160413,160414,160415,160416,160419,160420,160430,160510,160520,160530,160540,160590,230120
1513	71010,71021,71022,71029,71030,71040,71080,71090,71110,71120,71130,71140,71190,71210,71220,71230,71290,81110,81120,81190,81210,81220,81290,81400,110510,110520,121230,200110,200120,200190,200210,200290,200310,200320,200410,200490,200520,200530,200540,200551,200559,200560,200570,200580,200590,200791,200799,200811,200819,200820,200830,200840,200850,200860,200870,200880,200891,200892,200899,200911,200919,200920,200930,200940,200950,200960,200970,200980,200990	71010,71021,71022,71029,71030,71040,71080,71090,71110,71120,71130,71140,71190,71220,71230,71290,81110,81120,81190,81210,81220,81290,81400,110510,110520,121230,200110,200120,200190,200210,200290,200310,200320,200410,200490,200520,200540,200551,200559,200560,200570,200580,200590,200791,200799,200811,200819,200820,200830,200840,200850,200860,200870,200880,200891,200892,200899,200911,200919,200920,200930,200940,200950,200960,200970,200980,200990	71010,71021,71022,71029,71030,71040,71080,71090,71120,71130,71140,71151,71159,71190,71220,71231,71232,71233,71239,71290,81110,81120,81190,81210,81290,81400,110510,110520,121230,200110,200190,200210,200290,200310,200320,200390,200410,200490,200520,200540,200551,200559,200560,200570,200580,200590,200791,200799,200811,200819,200820,200830,200840,200850,200860,200870,200880,200891,200892,200899,200911,200912,200919,200921,200929,200931,200939,200941,200949,200950,200961,200969,200971,200979,200980,200990	71010,71021,71022,71029,71030,71040,71080,71090,71120,71140,71151,71159,71190,71220,71231,71232,71233,71239,71290,81110,81120,81190,81210,81290,81400,110510,110520,200110,200190,200210,200290,200310,200320,200390,200410,200490,200520,200540,200551,200559,200560,200570,200580,200591,200599,200791,200799,200811,200819,200820,200830,200840,200850,200860,200870,200880,200891,200892,200899,200911,200912,200919,200921,200929,200931,200939,200941,200949,200950,200961,200969,200971,200979,200980,200990
1514	120810,120890,140420,150300,150410,150420,150430,150600,150710,150790,150810,150890,150910,150990,151000,151110,151190,151211,151219,151221,151229,151311,151319,151321,151329,151410,151490,151511,151519,151530,151540,151550,151560,151590,151610,151620,151710,151790,152110,152200,230400,230500,230610,230620,230630,230640,230650,230660,230690	120810,120890,140420,150300,150410,150420,150430,150600,150710,150790,150810,150890,150910,150990,151000,151110,151190,151211,151219,151221,151229,151311,151319,151321,151329,151410,151490,151511,151519,151530,151540,151550,151560,151590,151610,151620,151710,151790,152110,152200,230400,230500,230610,230620,230630,230640,230650,230660,2306	120810,120890,140420,150300,150410,150420,150430,150600,150710,150790,150810,150890,150910,150990,151000,151110,151190,151211,151219,151221,151229,151311,151319,151321,151329,151411,151419,151491,151499,151511,151519,151530,151540,151550,151590,151610,151620,151710,151790,152110,152200,230400,230500,230610,230620,230630,230641,230649,230650,230660,230670,230	120810,120890,140420,150300,150410,150420,150430,150600,150710,150790,150810,150890,150910,150990,151000,151110,151190,151211,151219,151221,151229,151311,151319,151321,151329,151411,151419,151491,151499,151511,151519,151530,151550,151590,151610,151620,151710,151790,152110,152200,230400,230500,230610,230620,230630,230641,230649,230650,230660,230690

		70,230690	690	
1520	40110,40120,40130, 40210,40221,40229, 40291,40299,40310, 40390,40410,40490, 40500,40610,40620, 40630,40640,40690, 170210,210500,3501 10	40110,40120,40130 ,40210,40221,4022 9,40291,40299,403 10,40390,40410,40 490,40510,40520,4 0590,40610,40620, 40630,40640,40690 ,170211,170219,21 0500,350110	40110,40120,40130, 40210,40221,40229, 40291,40299,40310, 40390,40410,40490, 40510,40520,40590, 40610,40620,40630, 40640,40690,170211 ,170219,210500,350 110	40110,40120,40130, 40210,40221,40229, 40291,40299,40310, 40390,40410,40490, 40510,40520,40590, 40610,40620,40630, 40640,40690,17021 1,170219,210500,35 0110
1531	100620,100630,1006 40,110100,110210,1 10220,110230,11029 0,110311,110312,11 0313,110314,110319 ,110321,110329,110 411,110412,110419, 110421,110422,1104 23,110429,110430,1 10610,110620,11063 0,190120,190410,19 0490	100620,100630,100 640,110100,110210 ,110220,110230,11 0290,110311,11031 2,110313,110314,1 10319,110321,1103 29,110411,110412, 110419,110421,110 422,110423,110429 ,110430,110610,11 0620,110630,19012 0,190410,190420,1 90490	100620,100630,1006 40,110100,110210,1 10220,110230,11029 0,110311,110313,11 0319,110320,110412 ,110419,110422,110 423,110429,110430, 110610,110620,1106 30,190120,190410,1 90420,190430,19049 0	100620,100630,100 640,110100,110210, 110220,110290,110 311,110313,110319, 110320,110412,110 419,110422,110423, 110429,110430,110 610,110620,110630, 190120,190410,190 420,190430,190490
1532	110811,110812,1108 13,110814,110819,1 10820,110900,15152 1,151529,170230,17 0240,170250,170260 ,170290,190300,350 510	110811,110812,110 813,110814,110819 ,110820,110900,15 1521,151529,17023 0,170240,170250,1 70260,170290,1903 00,350510	110811,110812,1108 13,110814,110819,1 10820,110900,15152 1,151529,170230,17 0240,170250,170260 ,170290,190300,350 510	110811,110812,110 813,110814,110819, 110820,110900,151 521,151529,170230, 170240,170250,170 260,170290,190300, 350510
1533	230910,230990	230910,230990	230910,230990	230910,230990
1541	190510,190520,1905 30,190540,190590	190510,190520,190 530,190540,190590	190510,190520,1905 31,190532,190540,1 90590	190510,190520,190 531,190532,190540, 190590
1542	170111,170112,1701 91,170199,170220,1 70310,170390	170111,170112,170 191,170199,170220 ,170310,170390	170111,170112,1701 91,170199,170220,1 70310,170390	170111,170112,170 191,170199,170220, 170310,170390
1543	170410,170490,1803 10,180320,180400,1 80500,180610,18062 0,180631,180632,18 0690,200600	170410,170490,180 310,180320,180400 ,180500,180610,18 0620,180631,18063 2,180690,200600	170410,170490,1803 10,180320,180400,1 80500,180610,18062 0,180631,180632,18 0690,200600	170410,170490,180 310,180320,180400, 180500,180610,180 620,180631,180632, 180690,200600
1544	190211,190219,1902 20,190230,190240	190211,190219,190 220,190230,190240	190211,190219,1902 20,190230,190240	190211,190219,190 220,190230,190240
1549	40811,40819,40891, 40899,90112,90121, 90122,90140,90210, 90230,160210,19011 0,190190,200510,20 0710,210110,210120 ,210130,210210,210 220,210230,210310, 210320,210330,2103 90,210410,210420,2 10610,210690,22090 0,350210	40811,40819,40891 ,40899,90112,9012 1,90122,90190,902 10,90230,160210,1 90110,190190,2005 10,200710,210111, 210112,210120,210 130,210210,210220 ,210230,210310,21 0320,210330,21039 0,210410,210420,2 10610,210690,2209 00,350211,350219	40811,40819,40891, 40899,90112,90121, 90122,90190,90210, 90230,160210,19011 0,190190,200510,20 0710,210111,210112 ,210120,210130,210 210,210220,210230, 210310,210320,2103 30,210390,210410,2 10420,210610,21069 0,220900,350211,35 0219	40811,40819,40891, 40899,90112,90121, 90122,90190,90210, 90230,160210,1901 10,190190,200510,2 00710,210111,2101 12,210120,210130,2 10210,210220,2102 30,210310,210320,2 10330,210390,2104 10,210420,210610,2 10690,220900,3502 11,350219
1551	220710,220720,2208 10,220820,220830,2 20840,220850,22089	220710,220720,220 820,220830,220840 ,220850,220860,22	220710,220720,2208 20,220830,220840,2 20850,220860,22087	220710,220720,220 820,220830,220840, 220850,220860,220

	0	0870,220890	0,220890	870,220890
1552	220410,220421,2204 29,220430,220510,2 20590,220600	220410,220421,220 429,220430,220510 ,220590,220600	220410,220421,2204 29,220430,220510,2 20590,220600	220410,220421,220 429,220430,220510, 220590,220600
1553	110710,110720,2203 00	110710,110720,220 300	110710,110720,2203 00	110710,110720,220 300
1554	220110,220190,2202 10,220290	220110,220190,220 210,220290	220110,220190,2202 10,220290	220110,220190,220 210,220290

Appendix B

Concordance between NIC-87,NIC-98,NIC-2004 and NIC-2008 at 3 digit level

NIC-2008	NIC-2004	NIC-1998	NIC-1987
101+102+103+104 +Manufacture of prepared fish dishes +Manufacture of dishes of vegetables - Manufacture of tofu (Bean Curd)	151 +Roasti ng of nuts	151 (wet corn milling and production of corn oil is classified in 1532 and treatment of oils and fats by chemical processing is classified in class 2429)	200+202+203+210+211+212
105	152	152 (Production of raw milk is classified in class 0121)	201
106+108	153	153(manufactu re of potato flour and meal is classified in class 1513, production of corn oil is classified in 1532)	204+218+217
107 - Manufacture of prepared fish dishes -Manufacture of dishes of vegetables +Manufacture of tofu (Bean Curd) +Manufacture of ice for food purpose	154 - Roastin g of nuts	154 (manufacture of glucose and other sugars made from starches is classified in class 1532)	205+206+207+209+213+214+215+ 219
110+Production of ethyl alcohol from fermented materials	155	155	216+220+221+222+223++224

Industrial codes	Industry Name
101	Processing and preserving of meat
102	Processing and preserving of fish, crustaceans and molluscs
103	Processing and preserving of fruit and vegetables
104	Manufacture of vegetable and animal oils and fats
105	Manufacture of dairy products
106	Manufacture of grain mill products, starches and starch products
107	Manufacture of other food products
108	Manufacture of prepared animal feeds
110	Manufacture of beverages
200	Slaughtering, preparation and preservation of Meat
201	Manufacture of dairy products
202	Canning and preservation of fruits and vegetables
203	Processing, canning, and preserving of fish, crustacea and similar foods
204	Grain milling
205	Manufacture of bakery products
206	Manufacture and refining of sugar (vacuum pan sugar factories)
207	Production of indigenous sugar, 'boora', 'khandsari' 'gur', etc. from sugar-cane, palm juice, etc.
209	Manufacture of cocoa products and sugar confectionery(including sweet meats)
210	Manufacture of hydrogenated oils and vanaspati ghee etc.
211	Manufacture of vegetable oils and fats (other than hydrogenated)
212	Manufacture of animal oils and fats; manufacture of fish oil
213	Processing and blending of tea including manufacture of instant tea
214	Coffee curing, roasting, grinding and blending, etc including manufacture of instant coffee.
215	Processing of edible nuts
216	Manufacture of ice
217	Manufacture of prepared animal and bird feed
218	Manufacture of starch
219	Manufacture of food products n.e.c.
220	Distilling, rectifying and blending of spirits; ethyt alcohol production from fermented materials.
221	Manufacture of wines
222	Manufacture of malt liquor and malt
223	Production of country liquor (arrack and toddy etc.)
224	Manufacture of soft drinks and syrups

Appendix C

Formulas of various variable used in the study.

Variables	Formulas
Labour Productivity	$$\frac{GVA}{Total\ Person\ Engaged}$$
Capita Productivity	$$\frac{Value\ of\ Output}{Fixed\ capital}$$
Capital Labour Ratio or Capital Intensity	$$\frac{Fixed\ Capital}{Total\ Person\ Engaged}$$
Wage rate	$$\frac{Wage}{Total\ Person\ Engaged}$$
Export Intensity	$$\frac{Value\ of\ Export}{Value\ of\ Output}$$
Import Penetration or external dependence	$$\frac{Value\ of\ Import}{Value\ of\ Output + (Value\ of\ Import - Value\ of\ export)}$$

Note: Capital in the whole study means fixed capital.

Appendix D

E-views results of Engle-Granger(EG) test for co-integration

Model 1: $\log(Worker_t) = \hat{\beta}_{0t} + \hat{\beta}_{1t} \log(Wage\ Rate) + \hat{\beta}_{2t} \log(GVA)$

$$+ \hat{\beta}_{3t} \log(export\ Intensity) + \hat{\beta}_{3t} \log(Import\ Intensity) + \hat{\mu}_t$$

151: Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats

ADF Test Statistic	-2.900826	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 1% critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for 151 industry is not spurious, even though individually the variables may be non-stationary.

152 : Manufacture of dairy products

ADF Test Statistic	-2.485647	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 5% critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for 152 industry is not spurious, even though individually the variables may be non-stationary.

153: Manufacture of grain mill products, starches and starch products, and prepared animal feeds

ADF Test Statistic	-6.226470	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 1% critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for 153 industry is not spurious, even though individually the variables may be non-stationary.

154:    Manufacture of other food products

ADF Test Statistic	-2.681389	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 5 % critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for 154 industry is not spurious, even though individually the variables may be non-stationary.

155:    Manufacture of beverages

ADF Test Statistic	-3.785893	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 1% critical value. so the residuals from above regression are stationary. Hence we conclude that co- integrated above regression for 155 industry is not spurious, even though individually the variables may be non-stationary.

151-151:   Food Industry

ADF Test Statistic	-3.182580	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 1% critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for the whole food industry is not spurious, even though individually the variables may be non-stationary.

Model 2 : log (*labour Productivityr_t*) = $\hat{\beta}_{0t}$ + $\hat{\beta}_{1t}$ log(*Capital Intensity*) + $\hat{\beta}_{2t}$ log(*GVA*) +

$$\hat{\beta}_{3t} \log(Export\ Intensity) +$$

$$\hat{\beta}_{4t} \log(Import\ Intensity) + \hat{\mu}_t$$

151: Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats

ADF Test Statistic	-4.747649	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 1 % critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for 151 industry is not spurious, even though individually the variables may be non-stationary.

152 : Manufacture of dairy products

ADF Test Statistic	-3.809952	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 1% critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for 152 industry is not spurious, even though individually the variables may be non-stationary.

153: Manufacture of grain mill products, starches and starch products, and prepared animal feeds

ADF Test Statistic	-5.105282	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 1% critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for 153 industry is not spurious, even though individually the variables may be non-stationary.

154: Manufacture of other food products

ADF Test Statistic	-4.534844	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 1 % critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for 154 industry is not spurious, even though individually the variables may be non-stationary.

155: Manufacture of beverages

ADF Test Statistic	-3.504203	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 1% critical value. so the residuals from above regression are stationary. Hence we conclude that co- integrated above regression for 155 industry is not spurious, even though individually the variables may be non-stationary.

151-151: Food Industry

ADF Test Statistic	-2.341097	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 5 % critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for the whole food industry is not spurious, even though individually the variables may be non-stationary.

Model 3: $\log(Wage_t) = \hat{\beta}_{0t} + \hat{\beta}_{1t} \log(Labour\ Productivity) + \hat{\beta}_{2t} \log(Capital\ Intensity) +$
$$\hat{\beta}_{3t} \log(Export\ Intensity) + \hat{\beta}_{4t} \log(Import\ Intensity) + \hat{\mu}_t$$

151:    Production, processing and preservation of meat, fish, fruit, vegetables, oils and fats

ADF Test Statistic	-2.584393	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 5 % critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for 151 industry is not spurious, even though individually the variables may be non-stationary.

152 :   Manufacture of dairy products

ADF Test Statistic	-3.542360	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 1 % critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for 152 industry is not spurious, even though individually the variables may be non-stationary.

153:    Manufacture of grain mill products, starches and starch products, and prepared animal feeds

ADF Test Statistic	-5.752853	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 1 % critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for 153 industry is not spurious, even though individually the variables may be non-stationary.

154: Manufacture of other food products

ADF Test Statistic	-2.594808	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 5 % critical value. so the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for 154 industry is not spurious, even though individually the variables may be non-stationary.

155: Manufacture of beverages

ADF Test Statistic	-2.720583	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 1% critical value. so the residuals from above regression are stationary. Hence we conclude that co- integrated above regression for 155 industry is not spurious, even though individually the variables may be non-stationary.

151-151: Food Industry

ADF Test Statistic	-1.709453	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

*MacKinnon critical values for rejection of hypothesis of a unit root.

Since the ADF test statistic value in absolute sense is greater than 10 % critical value. So the residuals from above regression are stationary. Hence we conclude that co-integrated above regression for the whole food industry is not spurious, even though individually the variables may be non-stationary.

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