

## Appendix 3

### Appendix 3.1 Alternative Indices for Measuring Multifactor Productivity

In this annexure, we provide the details of the three major MFP indices, viz., the Kendrick Index (KI), the Solow Index (SI) and the Domar Index (DI).

#### (i) Kendrick Index

Kendrick index may be interpreted as the ratio of value added in production to a weighted average of the factors of production, in absence of technological change. Kendrick index for TFP ( $A_t$ ) for the time period 't' is stated in equation.

$$A_t = \frac{w_o L_t}{r_o K_t} \quad \text{Equation (1)}$$

In the above equation notations ' $w_o$ ' and ' $r_o$ ' denote the factor payment to labour and capital, respectively, 'o' is the base year. Generally, income shares are used as weights to compute the ratio of output to a weighted combination of inputs and thereby measure  $A_t$ . A number of assumptions, implicit in use of these weights are as follows. First, factor payments are equal to their marginal productivity i.e. total earnings of labour and capital in the base year exactly equal to output of that year. Second, technological change is of Hicks-neutral type i.e. the marginal rates of technical substitution between factors of production are constant. The third assumption made in the empirical studies is that of constant returns to scale. Main limitations of the Kendrick Index is that it involves a linear production function and, thus fails to allow for the possible diminishing marginal productivity of factors.

#### (ii) Solow Index

This alternative index due to Solow (1957), used a linear homogenous Cobb-Douglas production function with the assumptions of constant returns to scale i.e. unitary elasticity of substitution, autonomous Hick's neutral technical progress and the factor payments being equal to their marginal products. The Solow index is a number describing empirical productivity growth in an economy from year to year and decade to decade. It is also called geometric index and it is superior over Kendrick's arithmetic index.

$$G_s = \frac{\dot{A}}{A} = \frac{\dot{Y}}{Y} - \left[ S_K \left( \frac{\dot{K}}{K} \right) + S_L \left( \frac{\dot{L}}{L} \right) \right] \quad \text{Equation (2)}$$

Where  $S_L$  and  $S_K$  are the wage share and capital share respectively. Feeding the data on Y, L, K and i, we get a numerical expression for the residual  $\dot{A}/A$  from equation (2). This term is designated as growth rate of TFP (TFPG). Growth rates of TFP are used to construct TFP indices across time. Indices of  $\dot{A}$  are also referred to as the Solow TFP indices or Solow index of technological progress. The Solow concept of TFPG is unambiguous for infinitesimally small and continuous shifts in

technology across time. Estimation of productivity change empirically are based on a discrete set of price and quantity data. A solution to this problem lies in using a ‘flexible’ functional form of production function which is a second-order approximation to any arbitrary production function which is twice differentiable.

**Domar index** (1961) is the principle that the growth rate of an aggregate is the weighted average of the growth rates of its components, where each component is weighted by the share of the aggregate it makes up. Domar was the first to work on the aggregate measure of productivity and recognize the complications introduced by the presence of intermediate goods. Domar aggregation of total factor productivity assumes a Cobb-Douglas production function with unit elasticity of substitution. It is defined as the ratio of value added to a weighted average (geometric mean) of the two factors of production, the weights being constant factor shares. Domar’s aggregation method can be defined as:

$$\mu^{DA} = \sum_i \left( \frac{q_i Y_i}{\sum q_i Z_i} \right) \mu_i \quad \text{Equation (3)}$$

Where  $\mu_i$  is the growth rate of TFP for the  $i^{\text{th}}$  industry.  $q_i$  is the price.  $Y_i$  is the nominal gross output and  $Z_i$  is the nominal final output. Note that  $\mu^{DA}$  is a weighted sum of the industry TFP growth rates, weights are calculated as the ratios of nominal gross output of each industry to nominal final output.

### Appendix 3.2 Selected Industries and their National Industrial Classification (NIC) Code

<b>Sr. No.</b>	<b>Industry (Code as per NIC-1998)</b>	<b>Industry (Code as per NIC-2004)</b>	<b>Industry (Code as per NIC-2008)</b>
1	Division 15: Manufacture of Food Products and Beverages	Division 15: Manufacture of Food Products and Beverages	Division 10: Manufacture of food products Division 11: Manufacture of beverages
2	Division 16: Manufacture of Tobacco Products	Division 16: Manufacture of Tobacco Products	Division 12: Manufacture of tobacco products
3	Division 17: Manufacture of Textiles	Division 17: Manufacture of Textiles	Division 13 Manufacture of textiles
4	Division 18: Manufacture of Wearing Apparel Dressing and Dyeing of Fur	Division 18: Manufacture of Wearing Apparel Dressing and Dyeing of Fur	Division 14 Manufacture of wearing apparel
5	Division 19: Tanning and Dressing of Leather Manufacture of Luggage, Handbags, Saddlery, Harness and Footwear	Division 19: Tanning and Dressing of Leather Manufacture of Luggage, Handbags, Saddlery, Harness and Footwear	Division 15 Manufacture of leather and related products
6	Division 20: Manufacture of Wood and Products of Wood and Cork, Except Furniture, Manufacture of Articles of Straw and Plating Materials	Division 20: Manufacture of Wood and Products of Wood and Cork, Except Furniture, Manufacture of Articles of Straw and Plating Materials	Division 16 Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
7	Division 21: Manufacture of Paper and Paper Products	Division 21: Manufacture of Paper and Paper Products	Division 17 Manufacture of paper and paper products
8	Division 22: Publishing, Printing and Reproduction of Recorded Media	Division 22: Publishing, Printing and Reproduction of Recorded Media	Division 18 Printing and reproduction of recorded media

9	Division 23: Manufacture of Coke, Refined Petroleum Products and Nuclear Fuel	Division 23: Manufacture of Coke, Refined Petroleum Products and Nuclear Fuel	Division 19 Manufacture of coke and refined petroleum products
10	Division 24: Manufacture of Chemicals and Products	Division 24: Manufacture of Chemicals and Products	Division 20 Manufacture of chemicals and chemical products Division 21 Manufacture of pharmaceuticals, medicinal chemical and botanical products
11	Division 25: Manufacture of Rubber and Plastic Products	Division 25: Manufacture of Rubber and Plastic Products	Division 22 Manufacture of rubber and plastics products
12	Division 26: Manufacture of Other Non-Metallic Mineral Products	Division 26: Manufacture of Other Non-Metallic Mineral Products	Division 23 Manufacture of other non-metallic mineral product
13	Division 27: Manufacture of Basic Metals	Division 27: Manufacture of Basic Metals	Division 24 Manufacture of basic metals
14	Division 28: Manufacture of Fabricated Metal Products, Except Machinery and Equipments	Division 28: Manufacture of Fabricated Metal Products, Except Machinery and Equipments	Division 25 Manufacture of fabricated metal products, except machinery and equipment
15	Division 29: Manufacture of Machinery and Equipments N.E.C	Division 29: Manufacture of Machinery and Equipments N.E.C	Division 28 Manufacture of machinery and equipment n.e.c.
16	Division 30: Manufacture of Office, Accounting and Computing Machinery	Division 30: Manufacture of Office, Accounting and Computing Machinery	Group 262 (Division 26): Manufacture of computers and peripheral equipment
17	Division 31: Manufacture of Electrical Machinery and Apparatus N.E.C.	Division 31: Manufacture of Electrical Machinery and Apparatus N.E.C.	Division 27 Manufacture of electrical equipment

18	Division 32: Manufacture of Radio, Television and Communication Equipments and Apparatus	Division 32: Manufacture of Radio, Television and Communication Equipments and Apparatus	<p>Group 261 (Division 26): Manufacture of electronic components</p> <p>Group 263 (Division 26): Manufacture of communication equipment</p> <p>Group 264 (Division 26): Manufacture of consumer electronics</p> <p>Group 266 (Division 26): Manufacture of irradiation, electromedical and electrotherapeutic equipment</p> <p>Group 268 (Division 26): Manufacture of magnetic and optical media</p>
19	Division 33: Manufacture of Medical, Precision and Optical Instruments, Watches and Clocks	Division 33: Manufacture of Medical, Precision and Optical Instruments, Watches and Clocks	<p>Group 265 (Division 26): Manufacture of measuring, testing, navigating and control equipment; watches and clocks</p> <p>Group 267 (Division 26): Manufacture of optical instruments and equipment</p> <p>Group 325 (Division 32): Manufacture of medical and dental instruments and supplies</p>
20	Division 34: Manufacture of Motor Vehicles, Trailers and Semi-Trailers	Division 34: Manufacture of Motor Vehicles, Trailers and Semi-Trailers	Division 29 Manufacture of motor vehicles, trailers and semi-trailers
21	Division 35: Manufacture of Other Transport Equipment	Division 35: Manufacture of Other Transport Equipment	Division 30 Manufacture of other transport equipment

22	Division 36: Manufacture of Furniture; Manufacturing N.E.C.	Division 36: Manufacture of Furniture; Manufacturing N.E.C.	Division 31 Manufacture of furniture Group 321 (Division 32): Manufacture of jewellery, bijouterie and related articles Group 322 (Division 32): Manufacture of musical instruments Group 323 (Division 32): Manufacture of sports goods Group 324 (Division 32): Manufacture of games and toys
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### Appendix 3.3 Construction of Wholesale Price Index for industries.

Sr. No.	Industry (Code as per NIC-1998)	Wholesale Price Index upto 1980-81	Wholesale Price Index after 1981-82
1	Division 15: Manufacture of Food Products and Beverages	<b>1. Food Product</b> (A) Dairy Products a. Butter b. Ghee (B) Canning & Preserving & Processing of Fish (C) Grain Mill Products a. Maida b. Suji(Rawa) c. Atta d. Bran (D) Bakery Products Bread Biscuits (E) Sugar, Khandsari & Gur a. Sugar b. Khandsari c. Gur (F) Manufacture of Common Salt (G) Cocoa,Chocolate & Sugar Confect- ionery (H) Edible Oils a. Hydrogenated Vanaspati b. Gingelly Oil c. Solvent Extracted Groundnut Oil d. Rape & Mustard Oil e. Coconut Oil f. Groundnut Oil g. Cotton Seed Oil h. Rice Bran Oil	<b>1. Food Product</b> (A) Dairy Products a. Butter b. Ghee c. Baby Food d. Skimmed Milk Powder (B) Canning & Preserving & Processing of Fish (C) Grain Mill Products a. Maida b. Suji(Rawa) c. Atta d. Bran (D) Bakery Products Bread Biscuits (E) Sugar, Khandsari & Gur a. Sugar b. Khandsari c. Gur (F) Manufacture of Common Salt (G) Cocoa,Chocolate & Sugar Confect- ionery (H) Edible Oils a. Hydrogenated Vanaspati b. Gingelly Oil c. Solvent Extracted Groundnut Oil d. Rape & Mustard Oil e. Coconut Oil f. Groundnut Oil

	Continued... Division 15: Manufacture of Food Products and Beverages	(I) Oil Cakes a. Rape & Mustard Seed Cake b. Groundnut Cake c. Cotton Seed Oil Cake d. Deoiled Meal Cake (J) Other Food Products n.e.c. a. Cattle Feed b. Malted Food <b>2. Beverages, Tobacco &amp; Tobacco Products</b> (A) Wine Industries a. Rectified Spirit (Industrial Alcohol) b. Indian Made Foreign Spirit (B) Malt Liquor (C) Soft Drinks & Carbonated Water	g. Cotton Seed Oil h. Rice Bran Oil (I) Oil Cakes a. Rape & Mustard Seed Cake b. Groundnut Cake c. Cotton Seed Oil Cake d. Deoiled Meal Cake (J) Other Food Products n.e.c. a. Cattle Feed b. Malted Food <b>2. Beverages, Tobacco &amp; Tobacco Products</b> (A) Wine Industries a. Rectified Spirit (Industrial Alcohol) b. Indian Made Foreign Spirit (B) Malt Liquor (C) Soft Drinks & Carbonated Water
2	Division 16: Manufacture of Tobacco Products	Bidi Cigarettes Zarda	Bidi Cigarettes Zarda
3	Division 17: Manufacture of Textiles	(A) Cotton Textiles a. Cotton Yarn b. Cotton Cloth (Mills) (B) Woollen Textiles a. Woollen Yarn b. Woollen Cloth (C) Jute, Hemp & Mesta Textiles a. Hessian Cloth b. Hessian & Sacking Bags	(A) Cotton Textiles a. Cotton Yarn Hanks Cones b. Cotton Cloth (Mills) Long Cloth/Sheeting Poplin/Shirting Coating/Drill Dhoties, Sarees & Voils Misc. cotton cloth(Mills) (B) Woollen Textiles a. Woollen Yarn b. Woollen Cloth



	Continued... Division 17: Manufacture of Textiles		(C) Jute, Hemp & Mesta Textiles a. Hessian Cloth b. Hessian & Sacking Bags
4	Division 18: Manufacture of Wearing Apparel Dressing and Dyeing of Fur	(A) Fibres a. Raw Cotton b. Raw Jute c. Mesta d. Raw Wool e. Raw Silk f. Coir Fibre (B) Other Non-Food Articles a. Raw Hides b. Raw Skins c. Tanning Materials	(A) Fibres a. Raw Cotton b. Raw Jute c. Mesta d. Raw Wool e. Raw Silk f. Coir Fibre (B) Other Non-Food Articles a. Raw Hides b. Raw Skins c. Tanning Materials
5	Division 19: Tanning and Dressing of Leather Manufacture of Luggage, Handsbages, Saddlery, Harness and Footwear	(A) Leather & Leather Products  a. Footwear Western Type	(A) Leather & Leather Products  a. Footwear Western Type
6	Division 20: Manufacture of Wood and Products of Wood and Cork, Except Furniture, Manufacture of Articles of Straw & Plating Materials	(A) Wood & Wood Products	(A) Wood & Wood Products  Ply Wood Commercial Planks  Timber Planks
7	Division 21: Manufacture of Paper and Paper Products	(A) Paper & Pulp	(A) Paper & Pulp
		a. Pulp b. Printing Paper White c. Map Litho Paper d. Cream Laid Woven Paper e. M.G. Paper Poster f. Kraft Paper g. Newsprint	a. Pulp b. Printing Paper White c. Map Litho Paper d. Cream Laid Woven Paper e. M.G. Paper Poster f. Kraft Paper g. Newsprint
		(B) Manufacture of Board	(B) Manufacture of Board

	Continued...	a. Duplex Board b. Straw & Mill Board c. Other Boards	a. Duplex Board b. Straw & Mill Board c. Other Boards
8	Division 22: Publishing, Printing and Reproduction of Recorded Media	(A) Printing & Publishing of Newspapers etc. a. Newspaper	(A) Printing & Publishing of Newspapers etc. a. Newspaper
9	Division 23: Manufacture of Coke, Refined Petroleum Products and Nuclear Fuel	(A) Coal Mining a. Coal b. Coke c. Lignite (B) Mineral Oils a. Petrol b. Kerosene c. Aviation Turbine Fuel d. High Speed Diesel Oil e. Light Diesel Oil f. Furnace Oil g. Lubricants	(A) Coal Mining a. Coal b. Coke c. Lignite (B) Mineral Oils a. Petrol b. Kerosene c. Aviation Turbine Fuel d. High Speed Diesel Oil e. Light Diesel Oil f. Furnace Oil g. Lubricants
10	Division 24:  Manufacture of Chemicals and Products	(A) Basic Heavy Inorganic Chemicals a. Sodium Hydroxide (Caustic Soda) b. Sodium Carbonate (Soda Ash) c. Oxygen d. Titanium Dioxide e. Liquid Chlorine (B) Basic Heavy Organic Chemicals (C) Fertilizers & Pesticides a. Fertilizers b. Pesticides (D) Paints, Varnishes & Lacquers	(A) Basic Heavy Inorganic Chemicals a. Sodium Hydroxide (Caustic Soda) b. Sodium Carbonate (Soda Ash) c. Oxygen d. Titanium Dioxide e. Liquid Chlorine (B) Basic Heavy Organic Chemicals (C) Fertilizers & Pesticides a. Fertilizers Ammonium Sulphate N- Content Urea N-Content
		a. Paints (Except Alum. Paints)	Complex Fertilizers N-Content
	Continued...	b. Enamels	Di-Ammonium Phosphate N- Content

	Manufacture of Chemicals and Products	c. Varnishes  (E) Dyestuffs & Indigo  (G) Drugs & Medicines (H) Perfumes, Cosmetics, Toiletries etc.  a. Soaps & Detergents Laundry Soap Toilet Soap Synthetic Detergents b. Others Tooth Paste  Hair Oils (H) Tarpetine, Synthetic Resins & Plastic Materials etc. a. Synthetic Resins  b. Synthetic Rubber  c. Rubber Chemicals  d. P.V.C. Resins  e. Polystyrene (I) Matches, Explosives, Inedible Oils etc.	Super Phosphate P <sub>2</sub> O <sub>5</sub> Content Complex Fertilizers NPK Content Calcium Ammonium Nitrate N-Content  b. Pesticides (D) Paints, Varnishes & Lacquers a. Paints (Except Alum. Paints) b. Enamels c. Varnishes (E) Dyestuffs & Indigo (G) Drugs & Medicines Vitamin Tablets (A,B,C,D & Others)  Vitamin Liquids Penicillin Powder/Granules (Other Than Vitamin) Liquid Oral (Other Than Vitamin) Liquid Injectable (Other Than Vitamin) Capsules (Other Than Vitamin & Antibiotics) Tablets (Except Vitamin & Penicillin) Ointments Syrup Ayurvedic Medicines (H) Perfumes, Cosmetics, Toiletries etc. a. Soaps & Detergents Laundry Soap Toilet Soap
			Synthetic Detergents b. Others

			Tooth Paste Hair Oils (H) Tarpendine, Synthetic Resins & Plastic Materials etc. a. Synthetic Resins b. Synthetic Rubber c. Rubber Chemicals d. P.V.C. Resins e. Polystyrene (I) Matches, Explosives, Inedible Oils etc. a. Safety Matches b. Blasting Powder c. Cine Colour Positive d. Printing Ink e. Carbon Black f. Fireworks
11	Division 25: Manufacture of Rubber and Plastic Products	(A) Tyres & Tubes a. Tyres b. Tubes (B) Other Rubber & Plastic Products	(A) Tyres & Tubes a. Tyres Giant Tyres Motor Tyres Cycle Tyres Tractor Tyres b. Tubes Giant Tubes Cycle Tubes (B) Other Rubber & Plastic Products
12	Division 26: Manufacture of Other Non-Metallic Mineral Products	(A) Structural Clay Products a. Fire Bricks b. Building Bricks c. Ceramic Tiles (B) Glass, Earthenware, Chinaware & Their Products a. Bottles b. Sheet Glass	(A) Structural Clay Products a. Fire Bricks b. Building Bricks c. Ceramic Tiles (B) Glass, Earthenware, Chinaware & Their Products a. Bottles b. Sheet Glass
		(C) Cement, Lime & Plaster (D) Cement, Slate & Graphite Products	(C) Cement, Lime & Plaster (D) Cement, Slate & Graphite Products

			a. Asbestos Cement Corrugated Sheets b. Electrodes c. Grinding Wheels d. Coated Abrasives e. Hume Pipes
13	Division 27: Manufacture of Basic Metals	(A) Basic Metals and Alloys a. Iron & Steel b. Foundries For Casting & Forging & Structural c. Pipes, Wire Drawings & Others Pipes & Tubes Steel Wire d. Ferro Alloys Ferro Manganese Ferro Silicon (B) Non-Ferrous Metals a. Aluminium  b. Other Non Ferrous-Metals  Copper & Brass Rods Lead Nickel Zinc (C) Metal Products a. Barrels b. Utensils	(A) Basic Metals and Alloys a. Iron & Steel  Basic Pig Iron  Foundry Pig Iron Steel Ingots(Plain Carbon) Billets & Slabs(Semis) Oromild Steel Tensile Plates Angles, Channels & Sections Joists & Rolls Bars & Rods Stainless Steel b. Foundries For Casting & Forging & Structural c. Pipes, Wire Drawings & Others Pipes & Tubes Steel Wire d. Ferro Alloys Ferro Manganese Ferro Silicon (B) Non-Ferrous Metals a. Aluminium Aluminium Ingots Aluminium Sheets & Strips Aluminium Foils Aluminium Rolled Products b. Other Non Ferrous-Metals Copper & Brass Rods
			Lead Nickel Zinc (C) Metal Products

			a. Barrels b. Utensils
14	Division 28: Manufacture of Fabricated Metal Products, Except Machinery and Equipments	(A) Boilers (B) Gas Compressors (C) Tin Boxes/Containers (D) Springs (E) Bolts & Nuts	(A) Boilers (B) Gas Compressors (C) Tin Boxes/Containers (D) Springs (E) Bolts & Nuts (F) Stampings & Forgings
15	Division 29: Manufacture of Machinery and Equipments N.E.C	(A) Non-Electrical Machinery & Parts a. Heavy Machin- ery & Parts Tractors (B) Industrial Machinery For Food & Textiles	(A) Non-Electrical Machinery & Parts a. Heavy Machin- ery & Parts Tractors (B) Industrial Machinery For Food & Textiles a. Ring Spinning & Doubling Frames b. Powerlooms
16	Division 30: Manufacture of Office, Accounting and Computing Machinery	(A) Fridge,Office Equipment & Non-Elec. Machinery a. Power Driven Pumps b. Air & Gas Compressors c. Ball Bearings d. Sewing Machines e. Air Conditioners	(A) Fridge,Office Equipment & Non-Elec. Machinery a. Power Driven Pumps b. Air & Gas Compressors c. Ball Bearings d. Sewing Machines e. Air Conditioners
17	Division 31: Manufacture of Electrical Machinery and Apparatus N.E.C.	(A) Electrical Industrial Machinery a. Switch Gears b. Components & Accessories Of   Switch Gears c. Electric Motors Phase One HP d. Electric Motors Phase Three HP	(A) Electrical Industrial Machinery a. Switch Gears b. Components & Accessories Of   Switch Gears c. Electric Motors Phase One HP d. Electric Motors Phase Three HP
		(B) Industrial Wires & Cables (C) Dry & Wet Batteries/Cells a. Batteries b. Dry Cell	(B) Industrial Wires & Cables (C) Dry & Wet Batteries/Cells a. Batteries b. Dry Cell

18	Division 32: Manufacture of Radio, Television and Communication Equipments and Apparatus	(A) Electrical Apparatus, Appliances & Parts	(A) Electrical Apparatus, Appliances & Parts
		a. Ceiling Fans b. Gls Lamps (B) Radio & T.V. Sets	a. Ceiling Fans b. Gls Lamps (B) Radio & T.V. Sets
19	Division 33: Manufacture of Medical, Precision and Optical Instruments, Watches and Clocks	(A) Electrical Industrial Machinery a. Switch Gears b. Components & Accessories of Switch Gears c. Electric Motors Phase One HP d. Electric Motors Phase Three HP (B) Industrial Wires & Cables (C) Dry & Wet Batteries/Cells a. Batteries b. Dry Cell	(A) Electrical Industrial Machinery a. Switch Gears b. Components & Accessories of Switch Gears c. Electric Motors Phase One HP d. Electric Motors Phase Three HP (B) Industrial Wires & Cables (C) Dry & Wet Batteries/Cells a. Batteries b. Dry Cell
20	Division 34: Manufacture of Motor Vehicles, Trailers and Semi- Trailers	(A) Truck Chassis(Diesel) (B) Car Chassis (Assembled) (C) Bus Chassis(Diesel) (D) Three Wheelers (E) Motorcycles (F) Scooters (G) Bicycles (H) Springs	(A) Truck Chassis(Diesel) (B) Car Chassis (Assembled) (C) Bus Chassis(Diesel) (D) Three Wheelers (E) Motorcycles (F) Scooters (G) Bicycles (H) Springs
21	Division 35: Manufacture of Other Transport Equipment	(A) Locomotives, Railway Wagons & Parts	(A) Locomotives, Railway Wagons & Parts a. Broad Gauge Diesel Locomotives b. Broad Gauge Passenger Carriages
22	Division 36: Manufacture of Furniture; Manufacturing N.E.C.	(A) Steel Furniture	(A) Steel Furniture

**Appendix 3.4 Gross/Net Ratios of Different Categories of Fixed Capital by 3-digit level of ASI Industries-1960**

Sr. No.	Industry (Code as per NIC-1998)	3-digit level of ASI Industries-1960	Gross-Net Ratios			Average Gross- Net Ratio
			Building and Construction	Plant and Machinery	Other Equipment	



1	Division 15: Manufacture of Food Products and Beverages	205: Floor, Rice and Dal Mills	1.3781	2.6730	1.5200	1.8248
		206: Bakery Products	1.1682	1.1620	1.3941	
		207: Sugar and Gur	1.6555	2.2164	2.4659	
		208: Coca, Chocolate etc.	1.5071	1.8693	2.0360	
		209: Miscellaneous Food	1.3437	1.9630	1.8582	
		211: Alcohol and Spirits	1.9483	2.4021	2.0384	
		212: Wine	1.6448	1.7923	1.8812	
		312: Vegetable oils	1.6850	2.4827	1.7095	
2	Division 16: Manufacture of Tobacco Products	220: Tobacco	1.5380	1.9800	2.3875	1.9685
3	Division 17: Manufacture of Textiles	231: Textiles	1.9432	2.3190	2.2413	2.2666
		233: Rope and Twine	2.2226	2.5013	2.6493	
		239: Ginning, Pressing etc.	1.7290	2.6647	2.1294	
4	Division 18: Manufacture of Wearing Apparel Dressing and Dyeing of Fur	232: Knitting Mills	1.6667	2.7241	2.2500	2.2136
5	Division 19: Tanning and Dressing of Leather Manufacture of Luggage, Handsbages, Saddlery, Harness and Footwear	291: Tanneries	2.4860	2.8512	2.9528	2.7633
6	Division 20: Manufacture of Wood and Products of Wood and	251: Wood	1.3951	1.5861	2.1639	1.7090

	Cork, Except Furniture, Manufacture of Articles of Straw and Plating Materials	252: Wooden Products	1.5649	1.4751	2.0691	
7	Division 21: Manufacture of Paper and Paper Products	271: Paper and Paper Products	1.4501	1.6906	1.8135	1.6514
8	Division 22: Publishing, Printing and Reproduction of Recorded Media	280: Printing	1.2511	2.3460	2.1134	1.9035
9	Division 23: Manufacture of Coke, Refined Petroleum Products and Nuclear Fuel	321: Petroleum Refineries	1.3316	1.4973	1.8458	1.5582
10	Division 24: Manufacture of Chemicals and Products	311: Chemicals	1.2760	1.5382	1.6507	1.8370
		313: Paints, Varnishes, etc.	1.8848	2.6083	2.2842	
		319: Miscellaneous, Pharmaceuticals and Chemical Products	1.5043	1.8188	1.9680	
11	Division 25: Manufacture of Rubber and Plastic Products	300: Rubber and Rubber Products	1.3178	1.7100	1.6917	1.5732
12	Division 26: Manufacture of Other Non-Metallic	331: Bricks and Tiles	1.8957	2.2284	1.8558	1.8615
		332: Glass-wares	1.3443	1.5283	1.5013	
		333: China Clay wares	1.9037	2.1617	2.1064	
		3334: Cement	1.3256	1.7122	1.8770	

	Mineral Products	339: Miscellaneous non-metallic mineral products	1.6348	2.5093	2.3383	
13	Division 27: Manufacture of Basic Metals	341: Iron and Steel	1.3297	1.5777	1.5778	1.4951
14	Division 28: Manufacture of Fabricated Metal Products, Except Machinery and Equipments	342: Non-ferrous basic metal	1.4723	1.8871	1.9982	1.7859
15	Division 29: Manufacture of Machinery and Equipments N.E.C	350: Metal Products	1.3290	2.0077	2.0958	1.8108
16	Division 30: Manufacture of Office, Accounting and Computing Machinery	360: Non-electrical Machinery	1.3505	1.5564	1.5287	1.4785
17	Division 31: Manufacture of Electrical Machinery and Apparatus N.E.C.	370: Electrical Machinery	1.3386	2.0392	1.9140	1.7639
18	Division 32: Manufacture of Radio, Television and Communication Equipments and Apparatus	342: Non-ferrous basic metal	1.4723	1.8871	1.9982	1.9037
		399: Miscellaneous	1.5455	2.7050	1.8143	

19	Division 33: Manufacture of Medical, Precision and Optical Instruments, Watches and Clocks	399: Miscellaneous	1.5455	2.7050	1.8143	2.0216
20	Division 34: Manufacture of Motor Vehicles, Trailers and Semi-Trailers	383: Motor Vehicles	1.7376	1.6846	1.8238	1.7254
		384: Repair of Motor Vehicles	2.5124	2.2314	1.3776	
		385: Motor Cycles and Bicycles	1.2771	1.4159	1.4680	
21	Division 35: Manufacture of Other Transport Equipment	381: Ships and Boat Buildings	1.4199	1.4676	1.8063	1.5424
		382: Railway Rolling Stock	1.4789	1.9872	1.7144	
		389: Miscellaneous Transport Equipment	1.2771	1.3276	1.4030	
22	Division 36: Manufacture of Furniture; Manufacturing N.E.C.	260: Furniture and Fixture	1.0818	1.2399	1.2681	1.1966

### Appendix 3.5 Industry wise construction of Import Penetration Ratio

NIC Code	Name of the Industry	Industry included to construct IPR
15	Manufacture of Food Products and Beverages	Live animals chiefly for food Meat and meat preparations Dairy products and birds, eggs Fish, crustaceans and molluscs and preparation thereof Cereals and cereal preparations Vegetables and fruits Sugar, sugar preparations and honey Coffee, tea, cocoa, spices and manufactures thereof Feeding stuff for animals Miscellaneous edible products and preparations Oil-seeds and oleaginous fruit Beverages and Tobacco Animal and vegetable oil, fats and waxes
16	Manufacture of Tobacco Products	Tobacco and tobacco manufactures
17	Manufacture of Textiles	Textile fibres (other than wood tops) and their wastes (not manufactured into yarn or fabric)
18	Manufacture of Wearing Apparel Dressing and Dyeing of Fur	Dyeing, tanning and colouring materials Hides, skins and furskins, raw Articles of apparel and clothing accessories
19	Tanning and Dressing of Leather Manufacture of Luggage, Handbags, Saddlery, Harness and Footwear	Leather, leather manufactures n.e.s. and dressed furskins  Footwear
20	Manufacture of Wood and Products of Wood and Cork, Except Furniture, Manufacture of Articles of Straw and Plating Materials	Cork and wood  Cork and wood manufactures (excluding furniture)
21	Manufacture of Paper and Paper Products	Pulp and waste paper Paper, paperboard and articles of paper pulp, or paper or paperboard
22	Publishing, Printing and Reproduction of Recorded Media	Photographic or cinematographic goods.

23	Manufacture of Coke, Refined Petroleum Products and Nuclear Fuel	Mineals fuels, lubricants and related materials
24	Manufacture of Chemicals and Products	Chemicals and related products Organic chemicals Inorganic chemicals Medicinal and pharmaceutical products Essentials oils and prefume materials: toilet, polishing and cleansing preparations Fertilisers, manufactured Explosives and pyrotechnic products Artificials resins and plastic materials and cellulose esters and ethers Chemical materials and products n.e.s.
25	Manufacture of Rubber and Plastic Products	Rubber manufactures, n.e.s.
26	Manufacture of Other Non-Metallic Mineral Products	Non-Metallic manufactures n.e.s.
27	Manufacture of Basic Metals	Metalliferous ores and metal scrap Iron and steel Non-Ferrous metals
28	Manufacture of Fabricated Metal Products, Except Machinery and Equipments	Manufactures of metal n.e.s.
29	Manufacture of Machinery and Equipments N.E.C	Power generating machinery and equipment Machinery specialised for particular industries Metal working machinery General industrial machinery and equipment, n.e.s. and machine parts
30	Manufacture of Office, Accounting and Computing Machinery	Office machines and automatic data processing equipment
31	Manufacture of Electrical Machinery and Apparatus N.E.C.	Electircal Machinery, apparatus and appliances n.e.es. And electrical parts thereof (including non-electrical counterparts, n.e.s. of electrical household type equipment
32	Manufacture of Radio, Television and Communication Equipments and Apparatus	Telecommunication and sound recording and reporducing apparaturs and equipment

33	Manufacture of Medical, Precision and Optical Instruments, Watches and Clocks	Photographic apparatus, equipment and supplies and optical goods n.e.s. watches and clocks
34	Manufacture of Motor Vehicles, Trailers and Semi-Trailers	Road vehicles (including aircushion vehicles)
35	Manufacture of Other Transport Equipment	Other transport equipment
36	Manufacture of Furniture; Manufacturing N.E.C.	Miscellaneous Manufactured articles

### Appendix 3.6 Industry wise construction of Import Coverage Ratio

NIC Code	Name of the Industry	Industry included to construct ICR
15	Manufacture of Food Products and Beverages	Average of all Import Penetration Ratio
16	Manufacture of Tobacco Products	Tobacco products
17	Manufacture of Textiles	Cotton ginning, bailing & cleaning Cotton spinning not in Mills Cotton spinning in Mills Threads, Cordage, Ropes etc W&F cotton Khadi W&F of Cotton- Handloom W&F of Cotton-Powerloom Printing of Cotton Textiles
18	Manufacture of Wearing Apparel Dressing and Dyeing of Fur	Knitted or Crocheted Textiles Blankets, Shawl, Carpets & Rugs Textile Garments & Accessories Made-Up Textiles Water-Proof Textiles Textile Products nec
19	Tanning and Dressing of Leather Manufacture of Luggage, Handbags, Saddlery, Harness and Footwear	Tanning & Curing of Leather Leather Footwear Apparel of Leather & Subs Leather Products & Substitutes Leather & Fur Products nec
20	Division 20: Manufacture of Wood and Products of Wood and Cork, Except Furniture, Manufacture of Articles of Straw and Plating Materials	Metal Kitchen Ware
21	Division 21: Manufacture of Paper and Paper Products	Average of all Import Penetration Ratio
22	Division 22: Publishing, Printing and Reproduction of Recorded Media	Office & Computing Machinery
23	Manufacture of Coke, Refined Petroleum Products and Nuclear Fuel	Refined Petroleum Products Refined Petroleum Products nec Coke Oven Products
24	Manufacture of Chemicals and Products	Organic & Inorganic Chemicals Fertilizer & Pesticides Synthetic Rubber & Manmade Fibre



		Paints, Varnishes etc Explosives etc Chemical Products nec Perfumes, Cosmetics & lotions
25	Manufacture of Rubber and Plastic Products	Tyres & Tubes Rubber Products nec Plastic Products nec Rubber & Plastic Footwear
26	Manufacture of Other Non-Metallic Mineral Products	Other Coal Tar Products
27	Manufacture of Basic Metals	Iron and Steel in P/SF form Iron And Steel in SF form Ferro Alloys Copper manufacturing Aluminum manufacturing Zinc Manufacturing Metal scraps & Non Ferrous
28	Manufacture of Fabricated Metal Products, Except Machinery and Equipments	Fab Structural Metal Prods Fab Structural Metal nec Hand-tools, Weights etc
29	Manufacture of Machinery and Equipments N.E.C	Agr machinery, Eqpts & Parts Constr /Mining Machinery Prime Movers & Boilers Food & Textile Machinery Other Machinery General Purpose Machinery Machine-Tools & Accessories
30	Manufacture of Office, Accounting and Computing Machinery	Office & Computing Machinery Special Purpose Machinery
31	Manufacture of Electrical Machinery and Apparatus N.E.C.	Electrical Industrial Machinery Wires & Cables Cells & Batteries Refrigerators & Air conditioner Lamps & Domestic Appliances
32	Manufacture of Radio, Television and Communication Equipments and Apparatus	Radio & TV Electronic Valves & Tubes
33	Manufacture of Medical, Precision and Optical Instruments, Watches and Clocks	X-ray Machinery Drugs & Medicines
34		Ships and Boats

	Manufacture of Motor Vehicles, Trailers and Semi-Trailers	Locomotives and Parts Wagons and Coaches Aircraft and related products Motor Vehicles, cars & Products Motor-cycles & Related Products Bicycles & Parts
35	Manufacture of Other Transport Equipment	Transport Equipment nec
36	Manufacture of Furniture; Manufacturing N.E.C.	Furniture & Fixtures

### Appendix 3.7 Industry wise construction of Effective Rate of Protection

NIC Code	Name of the Industry	Industry included to construct ERP
15	Manufacture of Food Products and Beverages	Sugar Hydrogenated oil Tea & Coffee processing Miscellaneous food products Beverages
16	Manufacture of Tobacco Products	Tobacco products
17	Manufacture of Textiles	Cotton Textiles Threads, Cordage etc Power looms & Printed Cotton Textiles
18	Manufacture of Wearing Apparel Dressing and Dyeing of Fur	Cotton Khadi & Handloom Blankets, Shawls, Rugs etc Water Proof Textiles & others
19	Tanning and Dressing of Leather Manufacture of Luggage, Handbags, Saddlery, Harness and Footwear	Tanning & Curing of Leather Leather Footwear Leather Products
20	Manufacture of Wood and Products of Wood and Cork, Except Furniture, Manufacture of Articles of Straw and Plating Materials	Average of All Industries
21	Manufacture of Paper and Paper Products	Average of All Industries
22	Publishing, Printing and Reproduction of Recorded Media	Office & Computing
23	Manufacture of Coke, Refined Petroleum Products and Nuclear Fuel	Petroleum Products Coke, Coal
24	Manufacture of Chemicals and Products	Organic & Inorganic Chemical Fertilizer & Pesticides Synthetic Rub & Fibres Paints, Varnishes etc Explosives , Chemicals nec etc Perfum etc
25		Rubber Prods, Tyres & Tubes

	Manufacture of Rubber and Plastic Products	Plastic Prods nec Footwear- Rubber & Plastics
26	Manufacture of Other Non-Metallic Mineral Products	Cement
		Other Non-metallic mineral products
27	Manufacture of Basic Metals	Iron & Steel Ferro Alloys Copper, Aluminum, Zinc
28	Manufacture of Fabricated Metal Products, Except Machinery and Equipments	Fabricated Structural Metals Hand tools & Weights Wires & Cables
29	Manufacture of Machinery and Equipments N.E.C	Agr machinery, Parts & Equip Min mach, Boilers, Oth Mach Food & Textile Machinery Gen purpose Machinery Machine Tools & Accs
30	Manufacture of Office, Accounting and Computing Machinery	Office & Computing Mach
31	Manufacture of Electrical Machinery and Apparatus N.E.C.	Elect Industrial Machinery AC/Refgr, Lamps, Appliances
32	Division 32: Manufacture of Radio, Television and Communication Equipments and Apparatus	Cells & Batteries
33	Manufacture of Medical, Precision and Optical Instruments, Watches and Clocks	Apparatus, Valves, Machines Drugs & Medicines
34	Manufacture of Motor Vehicles, Trailers and Semi-Trailers	Locomotive, Wagon, coaches Aircraft, Transport nec etc Vehicles, Cars & Products Motor Cycles & Parts Bicycles & Parts
35	Manufacture of Other Transport Equipment	Ships & Boats
36	Manufacture of Furniture; Manufacturing N.E.C.	Furniture & Wares of Metals

## Appendix 4

#### Appendix 4.1 Industry wise Total Factor Productivity Growth rate

Year	15	16	17	18	19	20	21	22	23	24	25
1975-76	6.62	7.14	11.70	38.49	3.20	-4.72	-0.28	-25.06	12.40	10.80	15.85
1976-77	-0.39	24.45	5.73	27.91	36.92	9.54	4.21	12.91	15.02	10.65	10.77
1977-78	14.79	3.65	10.35	26.57	3.99	8.68	5.74	16.66	20.77	13.22	7.96
1978-79	6.64	-0.45	6.13	12.60	27.20	3.17	8.18	4.37	2.85	12.38	-9.17
1979-80	2.44	-13.82	-3.73	-0.10	16.90	3.52	4.95	-4.80	7.46	4.91	15.78
1980-81	-8.64	-7.70	10.82	31.34	-32.85	-2.67	1.43	-0.10	10.24	1.03	9.47
1981-82	7.91	18.49	6.80	7.88	-1.84	-9.99	8.59	13.94	7.16	13.80	4.63
1982-83	16.90	5.27	2.71	21.90	-2.78	3.79	-2.44	-0.05	18.82	6.01	11.80
1983-84	5.92	14.97	1.98	-21.03	-4.14	-4.79	8.47	1.71	-15.31	7.18	2.39
1984-85	3.38	-14.72	-7.91	3.31	15.96	3.31	20.59	2.78	1.74	6.58	11.82
1985-86	1.98	3.50	14.59	27.72	7.09	-16.31	-5.81	-11.36	25.52	3.00	9.36
1986-87	5.19	8.13	11.22	15.94	-1.66	9.83	8.87	5.79	-4.90	6.76	7.08
1987-88	4.43	5.43	-1.66	12.29	41.83	4.26	4.01	5.74	2.65	7.51	14.65
1988-89	10.78	8.79	1.07	21.86	10.51	23.08	11.56	-1.94	8.75	8.54	17.24
1989-90	15.66	16.50	14.55	12.10	-20.15	0.06	20.68	-0.86	7.29	22.17	18.08
1990-91	4.24	10.67	5.46	8.71	21.42	7.99	10.55	5.81	18.55	5.95	9.45
1991-92	6.33	5.60	2.69	31.67	-24.32	-25.07	1.82	-5.79	-50.63	-4.04	4.89
1992-93	4.47	9.14	8.77	20.89	-5.85	-0.45	3.88	-4.32	21.59	8.81	14.56
1993-94	4.25	9.84	10.02	26.39	22.97	11.91	8.51	15.47	12.06	4.66	14.93
1994-95	3.37	-2.91	0.36	-1.71	8.48	66.50	37.96	19.77	10.79	21.34	2.76
1995-96	7.20	-25.75	-0.81	-2.32	-1.65	-1.98	9.48	36.29	28.68	22.06	8.54
1996-97	3.04	20.29	3.30	-11.19	1.28	23.68	1.65	-10.50	-11.31	-2.16	13.71
1997-98	7.92	2.10	19.79	29.23	14.03	-49.11	-0.54	6.04	-2.70	24.20	14.22
1998-99	13.39	7.99	-5.56	11.76	-2.39	-40.35	9.45	-5.60	4.34	11.19	16.55
1999-00	6.06	4.70	12.29	14.40	-9.26	28.14	9.84	23.26	11.12	12.30	6.41
2000-01	-0.15	7.75	8.21	10.01	19.64	9.88	19.32	4.05	4.56	-2.37	-19.74
2001-02	0.90	-24.68	-15.61	-17.85	11.11	43.92	-11.17	-8.36	26.68	-7.26	14.40
2002-03	11.81	15.71	6.77	24.34	6.90	-16.54	20.76	3.09	35.00	7.23	3.82
2003-04	1.12	-2.17	7.27	-13.59	-2.37	20.37	8.31	4.44	7.94	7.01	9.91
2004-05	9.13	-2.10	7.64	28.14	1.44	13.42	7.74	17.40	12.53	8.54	26.87
2005-06	7.40	5.33	10.55	5.76	17.88	8.23	6.26	14.27	6.24	9.87	-3.82
2006-07	15.98	5.91	23.90	8.33	6.31	7.56	6.06	10.10	17.41	10.48	14.47
2007-08	14.20	-15.95	-1.03	-0.85	29.17	12.89	23.94	12.79	10.40	6.97	10.33
2008-09	9.94	23.59	0.58	33.49	2.20	7.96	8.20	-24.50	-10.34	19.68	19.69
2009-10	-1.27	-1.69	3.99	12.26	15.74	11.50	7.38	-6.28	15.27	2.60	20.78
2010-11	18.90	8.91	20.15	4.23	2.71	38.80	21.66	41.77	13.06	16.81	8.56
2011-12	20.17	-8.08	0.40	1.20	8.55	-6.05	8.38	0.10	-9.60	20.09	9.34

Continued...

<b>Year</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>	<b>31</b>	<b>32</b>	<b>33</b>	<b>34</b>	<b>35</b>	<b>36</b>
<b>1975-76</b>	11.96	14.13	3.11	-0.15	29.31	16.07	8.13	10.51	5.43	-11.02	-16.80
<b>1976-77</b>	12.12	7.61	11.44	20.47	4.71	17.47	20.23	28.16	12.44	8.72	11.50
<b>1977-78</b>	12.47	-0.12	7.40	6.37	3.82	5.71	9.60	18.08	-1.24	5.60	23.81
<b>1978-79</b>	-0.35	23.43	-6.24	2.17	30.33	6.24	8.15	6.53	14.02	-8.17	14.10
<b>1979-80</b>	0.55	2.57	12.19	3.06	5.13	6.50	20.10	14.66	-2.06	27.89	-13.23
<b>1980-81</b>	1.03	7.45	-3.08	7.75	19.75	17.99	-11.25	2.46	9.83	8.65	12.44
<b>1981-82</b>	16.33	14.74	-9.75	3.04	-1.90	-0.63	-8.71	7.57	14.06	-17.03	-10.24
<b>1982-83</b>	16.49	11.54	3.47	6.68	38.17	10.44	59.65	18.79	11.25	0.96	-25.86
<b>1983-84</b>	5.30	-6.68	-1.67	3.99	-3.58	-5.13	0.58	8.59	-4.42	1.81	26.63
<b>1984-85</b>	10.44	7.04	6.50	3.02	19.77	8.55	24.09	0.77	0.74	16.89	11.15
<b>1985-86</b>	10.02	1.26	1.16	-5.00	18.79	-6.13	26.85	7.46	8.07	-13.66	9.48
<b>1986-87</b>	-1.51	3.85	-6.87	-6.24	4.07	1.86	17.21	12.55	13.48	17.69	-16.54
<b>1987-88</b>	4.64	0.51	27.20	13.94	-17.59	24.11	27.71	6.60	1.77	14.21	7.93
<b>1988-89</b>	15.08	11.10	0.08	7.56	51.73	2.14	19.28	4.85	15.61	7.24	16.71
<b>1989-90</b>	9.23	3.61	17.14	14.55	-3.30	12.67	24.19	15.46	14.36	2.93	-8.30
<b>1990-91</b>	8.21	10.73	3.22	11.11	-8.46	13.01	-4.16	-1.53	7.36	7.43	-14.13
<b>1991-92</b>	15.97	-2.16	0.01	-3.00	36.14	-6.22	10.32	0.54	-18.36	-1.64	4.86
<b>1992-93</b>	-2.65	17.71	-5.82	4.69	8.84	3.51	22.60	2.84	18.39	9.58	35.00
<b>1993-94</b>	-1.41	-6.31	19.62	4.53	-44.73	7.73	-9.99	27.03	10.13	6.92	26.29
<b>1994-95</b>	8.73	25.54	23.70	72.57	73.16	20.42	54.10	10.32	29.13	21.85	21.52
<b>1995-96</b>	16.05	14.97	30.44	30.67	1.56	12.47	10.94	20.64	40.25	23.58	28.11
<b>1996-97</b>	-0.32	-13.62	2.36	0.67	-8.76	-14.37	-3.18	-6.16	3.68	4.51	1.84
<b>1997-98</b>	10.29	26.32	12.95	-10.83	21.83	21.09	33.75	2.42	-7.28	-4.58	33.63
<b>1998-99</b>	-6.09	-11.70	0.93	17.66	-57.51	10.58	10.58	23.79	-7.77	-7.74	18.16
<b>1999-00</b>	27.57	11.53	-4.24	-1.93	10.03	2.94	-3.99	18.55	29.51	25.02	42.03
<b>2000-01</b>	-2.72	-6.67	8.50	-3.34	46.20	-14.44	5.09	-15.42	-7.76	-1.72	-39.44
<b>2001-02</b>	-2.04	1.89	-3.62	-6.39	16.71	6.46	-11.38	22.02	-1.20	13.75	46.85
<b>2002-03</b>	2.19	22.80	20.89	5.27	-6.20	12.60	43.15	2.67	33.87	4.05	-16.20
<b>2003-04</b>	5.12	19.63	14.85	12.57	21.29	3.91	-2.46	15.47	17.57	7.70	29.80
<b>2004-05</b>	27.19	39.15	0.86	22.36	-12.69	13.04	9.35	0.07	64.95	35.32	29.10
<b>2005-06</b>	2.54	2.50	20.19	20.96	28.12	39.06	10.09	-2.97	-21.45	13.80	21.66
<b>2006-07</b>	22.23	20.34	29.42	12.85	15.11	17.39	7.06	2.58	13.00	10.85	13.33
<b>2007-08</b>	20.42	7.62	24.47	22.11	3.43	-0.08	16.36	23.71	13.34	-8.76	10.29
<b>2008-09</b>	20.63	10.13	-1.60	12.80	-13.71	19.64	35.15	-35.41	2.91	13.05	-3.60
<b>2009-10</b>	-2.28	9.02	8.57	-4.05	16.38	10.08	23.16	5.15	26.20	10.98	-15.60
<b>2010-11</b>	9.90	21.90	32.23	22.61	11.88	21.42	1.08	22.90	20.94	28.93	39.73
<b>2011-12</b>	12.41	21.50	13.66	10.44	1.03	2.22	-16.92	6.74	22.17	9.25	27.18