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Priyanka Tariyal

Abstract- Using the interindustry input output tables of Indian economy obtained from World Input Output Database (Timmer et al., 2015) for the period 1995-2009, the study attempts to estimate the industry specific multipliers of Indian economy and further identifies the key industries with greatest output andemployment potential. The output and employment multipliers are analyzed after constituting a closed and open Leontief demand driven input output model. The open Leontief model gives type I multipliers of output and employment while closed Leontief model gives type II multipliers. These models are open and closed with respect to household sector. Thus, the study enables the comparative analysis of multiplier effects in terms of employment and output generation for each industry within the Indian economy. The results reveal that Agriculture, hunting, forestry and fishing output and employment , Food beverages and tobacco, Textiles and textile products, Retail trade, except of motor vehicles and motorcycles; repair of household goods, Private households with employed persons are important industries of Indian economy.

Keywords: key industries, input output analysis, interindustry tables, leontief model, output multiplier, employment multiplier, type i multiplier, type ii multiplier, world input output database (wiod), indian economy.

I. Introduction

In the midst of gloom in the global economy with consequential impact on India, highly output and job oriented industries can give positive results in terms of increasing economic growth as they could be considered as the ones creating demand and employment for other segments of the economy and thus acting as leaders of economic growth (ASSOCHAM, 2016). The Indian economy is continuously evolving towards higher value added activities and employment generation has become a key area of concern. Thus, it is crucial to examine the employment and output linkages between the sectors. Using the input output tables, this paper generates a detailed breakdown of how a change in final demand in an industry creates output and employment within that industry and further effects production and employment in overall economy. The importance of a sector with respect to economic growth and development can be measured by determining the output and employment effects of that sector on the whole economy. But, the growth in gross domestic product does not always have the expected positive impact on employment (Ernst and Sarabia, 2008). Also, if the highly linkage sectors in terms of output are dependent on capital intensive intermediate products then, the policy thrust on boosting such sectors will not accomplish employment generating goals (Bhattacharya and Rajeev, 2014). Thus it is crucial to understand which sectors would have increased employment. Thus, the present study investigates the industry specific multipliers by using a symmetric input output tables of Indian economy with greatest output and employment potential. Using an interindustry approach in open as well as closed input output framework, enables us to measure not only the direct and indirect flows of output and job creation but also output andemployment changes attributable to induced effects of interindustry connections.

Input output framework can be used to measure the significance of a sector in terms of its contribution to output and employment through economic impact or multiplier analysis that is the impact of a change in the sectoral final demand on production and employment and backward and forward linkage indices (Valadkhani, 2003). The multiplier analysis rests upon the difference between the initial effect of an exogenous change and total effects of that change. The open input output model with respect to household gives direct and indirect effects while closed input output model with respect to households gives direct, indirect and induced effects (Miller and Blaire, 2009). The extensive literature on input output analysis where most of the studies focusing on measuring linkages and multipliers to identify strategically important sectors of the economy, witnesses methodological improvements such as the direct linkages measured from the column sums of the technical coefficient matrix (Chenery and Watnabe, 1958) replaced with total linkages measured from column sums of the Leontief inverse matrix (Rasmussen,1956). Further, replacement of the row sums of the Leontief-inverse (Rasmussen, 1956) to measure forward linkages with the row sums of the Ghosh-inverse (Beyers, 1976; Jones, 1976).

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a) Objectives of the Study

The objective of the study is to identify the sectors with largest potential for employment and output generation in Indian economy. The specific objectives of the study are:

- Estimate the industry specific output multiplier effects of Indian economy in open and closed input output methodological framework and identify key industries output generating industries for Indian economy.
- Estimate the industry specific employment multiplier effects of Indian economy in open and closed input output methodological framework and identify key employment generating industries for Indian economy.
- Comparing the industry specific employment and output multipliersin open and closed model.

Following the introduction, section 2 deals data sources followed bymethodology in section 3. Section 4 discusses the results. The final section concludes the study.

II. Data Sources

The goal is to build an Input output model based on detailed accounting of interindustry activity in an Indian economy in order to obtain output and employment multiplier effects and backward and forward linkage indices, mainly within the production system. The main data source for this study is World Input Output Database (Timmer et al., 2015) which contains annual time series of input output dataset for 27 European Union (EU) countries and 13 other major countries in the world including India for the period from 1995 to 2009. This database enables us to trace development overtime for an economy through benchmarking to time series of output, value added, trade and consumption from national accounts statistics. The comparison of total output and employment multipliers effects and linkages analysis are facilitated with the help of two wide datasets obtained from WIOD.

- National Input Output tables (NIOT) in current dollars at purchaser's prices for 35 industries for Indian economy. The classification of industries is based on ISIC Rev 3.1.
- Socioeconomic accounts (SEA) provides time series data on Indian economy for number of persons engaged (employees plus self-employed) and labour compensation at sectoral level. This data is denominated in national currency at current prices and thus need to be put on a common basis for the NIOT which is done by using official exchange rates from IMF.

III. Methodology

The methodology undertaken in this study to accomplish the above mentioned objectives is as follows:

- In the beginning, Leontief (1936) demand driven model in open and closed input output frameworkis constructed that follows the methodology presented with Miller and Blaire (2009).
- Output and employment multipliers are obtained using open and closed Leontief input output model.

a) Leontief open model

I-O tables record sales by one producing sector to another and to the final users. The rows of the inter industry transactions table describe the distribution of an industry's output throughout the economy, while the columns describe the composition of inputs required by a particular industry to produce its output. The open input output model, describes the total amount of output induced by the requirement from all industries (direct and indirect effects) to produce output to satisfy the demand for an extra unit of output from an industry (McLennan,2006).

An input output framework with nindustries for an economy can be expressed as a system of linear equations by the following expressions:

$$X_i = \sum^{n}_{j=1} X_{ij} + Y_i, i = 1,2,3.... \quad (1)$$

where, X_{ij} is the output of sector i consumed by sector j, to alltypes of consumption and for final consumption denoted as Y_i. Further the proportion of each input to the output of sector j is denoted by

$$a_{Lij} = X_{ij}/X_j i,\ j = 1,n \quad (2)$$

a_{Lij} 's are called input or technical coefficientsand give the direct input requirement of the i_{th} sector for producing one unit of output of j_{th} sector excluding the indirect effects involved in production process.

Thus, abovementioned equation (1) can now be formulated with equation (2) as so called Leontief production function Equation (3):

$$X_i = \sum^{n}_{j=1} a_{L,ij} X_j + Y_i i = 1,n \quad (3)$$

where, X is endogenous and the column final demand, Y is exogenous.In matrix notation equation (3) can be written as

$$X = A_L X + F \quad (4)$$

where, A_L is the n x n coefficient matrix consisting of standardized elements of a_{Lij}, obtained by dividing each element of the column of the flow matrix by the total input of the buying sector. This equation is a fundamental equation of the open Leontief model.

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Further, equation (4) can be written as:

$$X = (I-A_L)^{-1} * Y \quad (5)$$

where, $(1-A_L)^{-1}$ known as Leontief Inverse or matrix multiplier, gives both direct and indirect requirements of inputs. While direct inputs are those purchased by the sector under consideration, indirect inputs are those purchased by all other sectors in which production has to adjust in order to supply inputs to specific sector.

b) Closed Leontief Model

The household sector receives wages for the work done in production process and spends some or all of this wage income on goods and services. Thus, it is necessary to include household consumption as a new column in the coefficient matrix and including the analogous income as an additional row. Household income is represented, as a proxy by total labour compensation defined as payment for labour services of wage employees and self-employed. The household income coefficient is nothing but the division of labour compensation by total output at basic prices, whereas, household consumption coefficient is obtained by dividing the private household consumption expenditure by total household consumption expenditure. The closed Leontief model for household augmented coefficient matrix would generate a Leontief inverse matrix of dimension (n+1) x (n+1).

$$X = (I_{n+1} - \tilde{A}_L)^{-1} * Y \quad (6)$$

Where, $(I_{n+1} - \tilde{A}_L)^{-1}$ is Leontief inverse matrix for closed Leontief model.

This closed Leontief model describes thedescribes the total amount of output induced by the requirement from all industries to produce output to satisfy the demand from an extra unit of output from an industry, and by the spending of the extra wages and salaries earned (from producing the additional output) by households (McLennan, 2006).

c) Multiplier analysis

Using the demand side input output model, output and employment multipliers are generated following the methodology given with Miller and Blaire (2009).

- *Output Multipliers*

The output multipliers for an industry *j*, is defined as the impact on the production of all industries of the economy due to increase in the final demand of industry *j* by one unit. This impact can be analyzed in terms of three effects. The direct effects are the production changes required to produce the product. This generates the further production changes in industries supplying the increased demand for intermediate goods and services known as indirect effects. Finally, the induced effects occur as households spend their additional income on final goods and services.

The direct and indirect effects of can be derived via summation of column elements of Leontief inverse matrix obtained from equation (5) of open model.

$$\text{Direct} + \text{indirect} = \sum_{i=1}^{n} (I-A_L)^{-1} = \text{Type I Output Multipliers} \quad (7)$$

Finally the direct, indirect and induced effects of output multiplier can be derived from the column sum of the Leontief inverse matrix from equation (6) closed model

$$\text{Direct} + \text{Indirect} + \text{Induced effects} = \sum_{i=1}^{n+1} (I_{n+1} - \tilde{A}_L)^{-1} = \text{Type II Output Multipliers} \quad (8)$$

- *Employment Multiplier*

The employment multiplier of industry j, is the employment generated in all the industries due to increase in the final demand of industry j by one unit. The study takes into account, the direct and indirect employment change in industry j indicated by input output model plus the induced changes in employment resulting from household sector. The first step to calculate employment multiplier is to obtain the fixed labour coefficients for each industry.

$$e_{ij} = L_j/X_j e_j = e_{ij} \text{ if } i = j \quad (9)$$

where, L_j is number of persons engaged (wage employees plus self-employed) and X_j is gross output of industry *j*.

(14)

The direct plus indirect multiplier effects matrix can be obtained by multiplying labour coefficient, e_{ij} for each industry and Leontief inverse matrix from equation (5) of open Leontief model.

$$E(j) = e_{ij} * (I-A_L)^{-1} = L_{ij} \quad (10)$$

Thus, the column sum of the matrix gives the direct and indirect employment changes in industry j due to change in its final demand.

$$\text{Direct plus indirect effects} = \sum_{i=1}^{n} L_{ij} = \text{Type 1 Employment Multipliers} \quad (11)$$

Finally, the direct, indirect as well as induced multiplier effects matrix of industry j can be obtained by multiplyinglabour coefficient, e_{ij} with Leontief inverse of closed Leontief model from equation (6)

$$E(j) = e_{ij*} (I_{n+1} - \tilde{A}_L)^{-1} = L^*_{ij} \quad (12)$$

Similarly, the columnsum of the matrix give total employment multiplier effectsof industry j.

$$\text{Direct} + \text{Indirect} + \text{Induced effects} = \sum_{i=1}^{n} L_{ij}^* = \text{Type II Employment Multipliers} \quad (13)$$

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IV. Results and Discussion

a) Results of output multipliers from open and closed model

The type I and type II output multipliers for all 35 industriesfor all the years are given in appendix table A and the table below shows top 10 industries with highest type I and type II multipliers. From both the tables, results reveal that type II output multipliers for all the industries are greater than type I output multipliers as the former contains the induced effects generated by household sector through payments for labour services and associated spending on goods produced by various sectors.

Food, Beverages and Tobacco, Textiles and Textile Products, Leather, Leather and Footwear, Rubber and Plastics, Machinery, Nec, have high type I output multipliers for all the years and the multiplier value of each industry contain only the direct and indirect requirement from all the sectors needed to supply to satisfy unit increase in final demand of an industry. Thus, type I output multiplier value of 2.24 for Food, Beverages and Tobacco, implies that every unit increase of final demand for this sector, through direct and indirect effects, theadditional demand created for output in other sectors in 2.24 unit.

Basic Metals and Fabricated Metal have only low type I output multiplier in 2006 and for the rest of the period under study has high type I output multiplier. Transport equipment retained the position in the list of high type I output multipliers till 2002, is nowhere seen till 2009.

Table 1: Industries with highest Type I and Type II Output multipliers

S.No	Sectors	1995		1996		1997		1998		1999		2000		2001		2002	
		Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II
3	Food, Beverages and Tobacco	√ (2.24)	√ (4.43)	√ (2.21)	√ (4.38)	√ (2.21)	√ (4.34)	√ (2.21)	√ (4.23)	√ (2.17)	√ (4.03)	√ (2.21)	√ (4.16)	√ (2.22)	√ (4.28)	√(2.27)	√ (4.33)
4	Textiles and Textile Products	√ (2.27)	√ (4.34)	√ (2.20)	√ (4.27)	√ (2.28)	√ (4.35)	√ (2.22)	√ (4.26)	√ (2.20)	√ (4.11)	√ (2.19)	√ (4.23)	√ (2.19)	√ (4.31)	√ (2.16)	√ (4.20)
5	Leather, Leather and Footwear	√ (2.31)	√ (4.43)	√ (2.30)	√ (4.39)	√ (2.34)	√ (4.48)	√ (2.28)	√ (4.41)	√ (2.23)	√ (4.24)	√ (2.18)	√ (4.31)	√ (2.15)	√ (4.37)	√ (2.09)	√ (4.24)
6	Wood and Products of Wood and Cork		√ (4.13)				√ (4.17)		√ (4.10)		√ (3.85)		√ (3.98)		√ (4.02)		√ (3.99)
7	Pulp, Paper, Paper , Printing and Publishing	√ (2.27)		√ (2.25)		√ (2.31)		√ (2.27)		√ (2.17)		√ (2.16)		√ (2.17)		√ (2.17)	
9	Chemicals and Chemical Products	√ (2.18)				√ (2.27)		√ (2.18)		√ (2.11)		√ (2.13)		√ (2.17)		√ (2.14)	
10	Rubber and Plastics	√ (2.39)		√ (2.35)		√ (2.34)		√ (2.38)		√ (2.28)		√ (2.31)		√ (2.32)		√ (2.33)	√ (3.93)
12	Basic Metals and Fabricated Metal	√ (2.36)		√ (2.29)		√ (2.34)		√ (2.23)		√ (2.12)		√ (2.11)				√ (2.09)	
13	Machinery, Nec	√ (2.32)		√ (2.28)		√ (2.31)		√ (2.25)		√ (2.15)		√ (2.15)		√ (2.13)		√ (2.15)	
14	Electrical and Optical Equipment											√ (2.11)		√ (2.11)		√ (2.05)	
15	Transport Equipment	√ (2.49)		√ (2.45)		√ (2.49)		√ (2.43)		√ (2.37)		√ (2.37)		√ (2.36)		√ (2.35)	
16	Manufacturing, Nec; Recycling	√ (2.52)	√ (4.18)	√ (2.49)	√ (4.13)	√ (2.49)		√ (2.40)		√ (2.16)				√ (2.10)			
18	Construction		√ (4.25)		√ (4.27)		√ (4.35)		√ (4.29)		√ (3.99)		√ (3.97)		√ (4.05)		√ (3.98)
21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods				√ (4.26)		√ (4.24)		√ (4.32)		√ (4.14)		√ (4.20)		√ (4.30)		√ (4.29)
22	Hotels and Restaurants																
30	Renting of M&Eq and Other Business Activities		√ (4.46)		√ (4.60)		√ (4.59)		√ (4.58)		√ (3.96)		√ (3.99)		√ (4.05)		√ (4.00)
31	Public Admin and Defence; Compulsory Social Security		√ (5.19)		√ (5.25)		√ (5.33)		√ (5.39)		√ (5.04)		√ (4.96)		√ (5.06)		√ (5.06
32	Education																
33	Health and Social Work		√ (4.14)		√ (4.22)		√ (4.29)		√ (4.28)		√ (4.09)		√ (4.03)		√ (4.00)		
34	Other Community, Social and Personal Services		√ (4.59)		√ (4.66)		√ (4.80)		√ (4.94)		√ (4.75)		√ (4.61)		√ (4.53)		√ (4.38)

Note: Symbol √' indicates the sector has high values of type I or Type II output multipliers in particular year
The values in brackets (..) indicates the type I and Type II output multipliers in particular year for a particular sector.
Contd……

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Table 1: Industries with highest Type I and Type II Output multipliers

S.no	Sectors	2003		2004		2005		2006		2007		2008		2009	
		Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II
1	Agriculture, Hunting, Forestry and Fishing	√(2.31)	√ (4.23)	√(2.28)	√ (3.91)	√ (2.24)	√ (3.72)	√ (2.22)	√ (3.64)	√ (2.23)	√ (3.55)	√ (2.25)	√ (3.70)	√ (2.24)	√ (3.81)
2	Mining and Quarrying	√ (2.19)	√ (4.09)	√ (2.16)	√ (3.76)	√ (2.14)	√ (3.68)	√ (2.18)	√ (3.62)	√ (2.17)	√ (3.60)	√ (2.15)	√ (3.70)	√ (2.17)	√ (3.84)
3	Food, Beverages and Tobacco	√ (2.14)	√ (4.06)	√ (2.12)	√ (3.81)	√ (2.15)	√ (3.78)	√ (2.14)	√ (3.74)	√ (2.19)	√ (3.70)	√ (2.16)	√ (3.80)	√ (2.19)	√ (3.94)
4	Textiles and Textile Products		√ (3.78)				√ (3.42)		√ (3.43)		√ (3.34)		√ (3.54)		√ (3.81)
5	Leather, Leather and Footwear	√ (2.23)		√ (2.20)	√ (3.43)	√ (2.17)	√ (3.37)	√ (2.14)	√ (3.32)	√ (2.17)	√ (3.27)	√ (2.16)	√ (3.38)	√ (2.20)	√ (3.65)
6	Wood and Products of Wood and														
7	Pulp, Paper, Paper , Printing and Publishing	√ (2.19)		√ (2.15)		√ (2.13)		√ (2.08)		√ (2.08)		√ (2.06)		√ (2.06)	
8	Coke, Refined Petroleum and Nuclear Fuel	√ (2.40)	√ (3.95)	√ (2.36)	√ (3.62)	√ (2.32)	√ (3.49)	√ (2.26)	√ (3.44)	√ (2.26)	√ (3.31)	√ (2.24)	√ (3.37)	√ (2.34)	√ (3.66)
9	Chemicals and Chemical Products														
10	Rubber and Plastics	√ (2.14)		√ (2.10)		√ (2.14)		√ (2.13)		√ (2.14)		√ (2.20)		√ (2.19)	
11	Other Non-Metallic Mineral	√ (2.18)		√ (2.12)		√ (2.10)		√ (2.05)		√ (2.07)		√ (2.12)		√ (2.11)	
12	Basic Metals and Fabricated Metal	√ (2.09)		√ (2.06)		√ (2.07)				√ (2.03)		√ (2.10)		√ (2.09)	
13	Machinery, Nec	√ (2.38)		√ (2.30)		√ (2.14)		√ (2.10)		√ (2.10)		√ (2.13)		√ (2.12)	
15	Transport Equipment							√ (1.99)							
16	Manufacturing, Nec; Recycling		√ (3.99)		√ (3.61)		√ (3.54)		√ (3.42)		√ (3.31)		√ (3.47)		√ (3.66)
19	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel		√ (4.23)		√ (3.12)		√ (3.69)		√ (3.61)		√ (3.53)		√ (3.74)		√ (3.83)
20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles				√ (2.52)										√ (3.43)
28	Financial Intermediation		√ (3.76)												
29	Real Estate Activities		√ (4.82)		√ (4.32)		√ (4.18)		√ (4.17)		√ (3.97)		√(3.76)		√ (3.49)
32	Education		√ (4.11)		√ (3.53)		√ (3.39)		√ (3.30)		√ (3.33)		√ ()3.14)		

Note: Symbol √' marks the sector having high values of type I or Type II output multipliers in particular year and the values in brackets (..) indicates the type I and Type II output multipliers values in particular year for a particular sector

Type II output multipliers which contains induced effects generated by the wage and salary earners as they spent the extra income on commodities produced by all industries. Food, Beverages and Tobacco has high type II output multipliers for all the years under study. The value 4.43 for the same implies that every unit increase in final demand of this sector, through direct, indirect and induced effects, the additional demand created for output in other sectors in 4.43 unit. Textiles and Textile Products and Leather, Leather and Footwear have high type II output multiplier for all the years except in 2004 and 2003 respectively. The sectors that occupy the highest ranking in type II output multipliers till 2002 are, Renting of M & Eq and Other Business Activities, Public Admin and Defence; Compulsory Social Security and Other Community, Social and Personal Services. Whereas, Agriculture, Hunting, Forestry and Fishing Mining and Quarrying that have low type II output multiplier till 2002, post this period are among the top 10 industries with highest type II output multipliers.

Finally, Pulp, Paper, Paper, Printing and Publishing, Chemicals and Chemical Products, Basic Metals and Fabricated Metal, Machinery, Nec, and Transport Equipment are those industries that have high type I output multipliers but low values of type II multipliers. Thus the key industries for Indian economy in terms of output generation are Food, Beverages and Tobacco for the entire period under study.

b) Results of Employment multipliers from open and closed model

The type I and type II employment multipliers for all 35 industries for all the years are given in appendix table B and the table below shows industries with highest type I and type II employment multipliers. From both the tables, results reveal that type II employment multipliers are greater than type I multipliers for all the industries.

The type I employment multiplier for Agriculture, Hunting, Forestry and Fishing is 2.34, implies due to unit

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increase in the final demand of the sector, the employment generated by the direct and indirect effects on production in all the industries. Whereas, type II employment multiplier for the same industry of value 4.23, implies due to unit increase in the final demand of the sector, the employment generated by the direct indirect and induced effects on production in all the industries.

Agriculture, Hunting, Forestry and Fishing, Food, Beverages and Tobacco, Textiles and Textile Products, Wood and Products of Wood and Cork, Hotels and Restaurants and Private Households with Employed Persons have high values of type I and type II employment multipliers for most of the years under study. Thus, these sectors are the key employment generating sectors of Indian economy.

Table 2: Industries with highest Type I and Type II Employment multipliers

S.No	Sectors	1995		1996		1997		1998		1999		2000		2001		2002	
		Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II
1	Agriculture, Hunting, Forestry and Fishing	√(2.34)	√(4.23)	√(2.23)	√(4.23)	√(2.14)	√(3.74)	√(2.13)	√(3.57)	√(2.03)	√(3.29)	√(2.17)	√(3.45)	√(2.16)		√(2.13)	√(3.48)
3	Food, Beverages and Tobacco	√(1.45)	√(2.97)	√(1.42)	√(2.97)	√(1.31)	√(2.64)	√(1.30)	√(2.57)	√(1.25)	√(2.37)	√(1.30)	√(2.48)	√(1.32)	√(4.28)	√(1.22)	√(2.36)
4	Textiles and Textile Products										√(1.91)		√(2.00)		√(4.31)		√(1.93)
5	Leather, Leather and Footwear												√(1.90)		√(4.37)		√(1.89)
6	Wood and Products of Wood and Cork	√(1.14)	√(2.56)	√(1.16)	√(2.56)	√(1.06)	√(2.36)	√(1.01)	√(2.28)	√(1.15)	√(2.34)	√(1.25)	√(2.52)	√(1.44)	√(4.02)	√(1.65)	√(2.84)
18	Construction														√(4.05)		
19	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel								√(1.68)								
21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods		√(2.68)		√(2.68)		√(2.56)		√(2.69)		√(2.49)		√(2.52)		√(4.30)		√(2.36)
22	Hotels and Restaurants	√(1.23)	√(2.57)	√(1.17)	√(2.57)	√(1.10)	√(2.25)	√(1.10)	√(2.20)	√(1.06)	√(2.04)	√(1.10)	√(2.13)	√(1.11)		√(1.04)	√2.08)
30	Renting of M&Eq and Other Business Activities		√(2.45)		√(2.45)		√(2.24)		√(2.24)						√(4.05)		
31	Public Admin and Defence; Compulsory Social Security		√(3.48)		√(3.48)		√(3.13)		√(3.13)		√(2.77)		√(2.71)		√(5.06)		√(2.54)
32	Education		√(2.40)		√(2.40)		√(2.13)				√(1.90)						
33	Health and Social Work														√(4.00)		
34	Other Community, Social and Personal Services	√(1.02)	√(3.00)		√(3.00)		√(2.88)		√(3.04)		√(2.92)		√(2.85)		√4.53)		√(2.58)
35	Private Households with Employed Persons	√(2.90)	√(4.41)	√(2.64)	√(4.41)	√(2.32)	√(3.72)	√(2.12)	√(3.55)	√(1.86)	√(3.13)	√(2.34)	√(3.60)	√(2.84)		√(3.22)	√(4.37)

Note: Symbol '√' marks the sector having high values of type I or Type II employment multipliers in particular year and the values in brackets (..) indicates the type I and Type II employment multipliers in particular year for a particular sector.

Contd….

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Table 2: Industries with highest Type I and Type II Employment multipliers

S.No	Sectors	2003		2004		2005		2006		2007		2008		2009	
		Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II
1	Agriculture, Hunting, Forestry and Fishing	√ (1.93)	√ (3.06)	√ (1.82)	√ (2.77)	√ (1.61)	√ (2.36)	√ (2.14)	√ (2.18	√ (1.13)	√ (1.60)	√ (1.06)	√ (1.53)	√ (1.03)	√ (1.53)
3	Food, Beverages and Tobacco	√ (1.13)	√ (2.12)	√ (1.02)	√ (1.79)		√ (1.52)	√ (1.34)	√ (1.89)						
4	Textiles and Textile Products		√ (1.76)		√ (1.45)		√ (1.26)	√ (1.11)							
5	Leather, Leather and Footwear		√ (1.75)		√ (1.45)		√ (1.27)	√ (1.16)	√ (1.77)						
6	Wood and Products of Wood and Cork	√ (1.53)	√ (2.53)	√ (1.49)	√ (2.25)	√ (1.33)	√ (2.03)	√ (1.70)	√ (2.36)		√ (1.18)		√ (1.21)		√ (1.6)
18	Construction														
19	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel								√ (1.70)						
21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods		√ (2.16)		√ (1.78)		√ (1.51)	√ (1.32)	√ (2.25)		√ (1.01)				√ (1.00)
22	Hotels and Restaurants		√ (1.91)		√ (1.60)		√ (1.34)	√ (1.19)	√ (1.73)						
30	Renting of M&Eq and Other Business Activities														
31	Public Admin and Defence; Compulsory Social Security		√ (2.22)		√ (1.78)		√ (1.53)	√ (1.39)	√ (2.61)		√ (1.01)	√ (.10)			
32	Education														
33	Health and Social Work														
34	Other Community, Social and Personal Services		√ (2.24)				√ (1.49)	√ (1.31)	√ (2.11)		√ (1.04)				
35	Private Households with Employed Persons	√ (3.33)	√ (4.32)	√ (3.29)		√ (2.98)	√ (3.59)	√ (3.31)	√ (3.85	√ (2.46)	√ (2.89)	√ (2.35)	√ (2.75)	√ (2.24)	√ (2.62)

Note: Symbol '√' marks the sector having high values of type I or Type II employment multipliers in particular year and the values in brackets (..) indicates the type I and Type II employment multipliers in particular year for a particular sector

Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods, Renting of M & Eq and Other Business Activities, Other Community, Social and Personal Services are those industries that have only high Type II employment multipliers.

c) *Comparison of employment and output multipliers in open and closed model*

While, comparing the employment and output multipliers in open and closed model it has been found that although agriculture witnesses high output multipliers only after 2002 but it has always remained as employment generating sector from the beginning as evident from high Type I and Type II employment multipliers.

Another, important industry which is Food, Beverages and Tobacco which throughout the period of study holds high values for output and employment multipliers starts losing out in terms of employment generating effects during 2007-2009.Hotels and Restaurants is the only industry which could not make it to the list of highest output multipliers but occupies one in case of employment multipliers for most of the years under study. Whereas, Education sector show contrary results to itself with high employment multipliers during period 1995-2001 and high output multiplier for period 2003-2009.

V. Conclusion

In this paper an attempt has been made to study the industry specific multipliers for the period 1995-2009 by using interindustry input output tableobtained from WIOD, so that important output and employment generating sectors in the Indian economy could be identified. The output and employment multipliers (Type I) obtained through open input output frame work enables us to study the direct and indirect effects of production and employment on overall economy. While Type II multipliers of output and employment obtained through closed input output framework, in addition to aforementioned effects gives induced effects generated due to household sector. The results from multipliers analysis reveal that Food, Beverages and Tobacco, Textiles and Textile Products, Leather, Leather and Footwear, Rubber and Plastics, Machinery, Nec, have high type I output multipliers. Whereas, Food, Beverages and Tobacco has high type II output multipliers for all the years under study. Agriculture, Hunting, Forestry and Fishing, Food, Beverages and Tobacco, Textiles and Textile Products, Wood and Products of Wood and Cork, Hotels and Restaurants and Private Households with Employed Persons have high values of type I and type II employment multipliers for most of the years under study. The comparative analysis of both employment and output multipliers reveals that not all those sectors that appear to have high output multiplying effect are equally efficient in terms of employment generation. The common key industries in terms of both output and employment generation for all or substantial part of the period of study are Agriculture, hunting, forestry and

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fishing output and employment , Food beverages and tobacco, Textiles and textile products, Retail trade, except of motor vehicles and motorcycles; repair of household goods, Private households with employed persons. The limitation of study lies in the inadequacy of multiplier analysis to identify key industries of Indian economy. Thus, policymakers should focus on those industries that not only induce production in other sectors of the economy but also lead to job creation and these key sectors must be identified in open and closed input output framework.

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22. Appendix Table A: Output Multipliers: Type I and Type II

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S.No	Sectors	1995		1996		1997		1998		1999		2000		2001		2002	
		Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II
1	Agriculture, Hunting, Forestry and Fishing	1.37	4.07	1.33	3.97	1.35	3.91	1.33	3.63	1.34	3.41	1.35	3.47	1.35	3.63	1.37	3.80
2	Mining and Quarrying	1.45	3.38	1.44	3.26	1.40	3.29	1.35	3.24	1.32	3.19	1.35	3.33	1.38	3.15	1.33	2.87
3	Food, Beverages and Tobacco	2.24	4.43	2.21	4.38	2.21	4.34	2.21	4.23	2.17	4.03	2.21	4.16	2.22	4.28	2.27	4.33
4	Textiles and Textile Products	2.27	4.34	2.20	4.27	2.28	4.35	2.22	4.26	2.20	4.11	2.19	4.23	2.19	4.31	2.16	4.20
5	Leather, Leather and Footwear	2.31	4.43	2.30	4.39	2.34	4.48	2.28	4.41	2.23	4.24	2.18	4.31	2.15	4.37	2.09	4.24
6	Wood and Products of Wood and Cork	2.08	4.13	2.06	4.13	2.09	4.17	2.08	4.10	1.89	3.85	1.88	3.98	1.85	4.02	1.85	3.99
7	Pulp, Paper, Paper , Printing and Publishing	2.27	3.80	2.25	3.78	2.31	3.91	2.27	3.87	2.17	3.68	2.16	3.75	2.17	3.82	2.17	3.77
8	Coke, Refined Petroleum and Nuclear Fuel	1.94	3.14	1.88	3.03	1.82	2.90	1.82	2.92	1.47	2.08	1.37	1.86	1.57	2.27	1.54	2.15
9	Chemicals and Chemical Products	2.18	3.62	2.17	3.60	2.27	3.76	2.18	3.62	2.11	3.38	2.13	3.42	2.17	3.52	2.14	3.39
10	Rubber and Plastics	2.39	4.04	2.35	3.99	2.34	3.98	2.38	4.03	2.28	3.77	2.31	3.89	2.32	3.98	2.33	3.93
11	Other Non-Metallic Mineral	1.94	3.57	1.88	3.47	1.94	3.59	1.92	3.59	1.83	3.33	1.84	3.42	1.93	3.58	1.91	3.44
12	Basic Metals and Fabricated Metal	2.36	3.93	2.29	3.86	2.34	3.92	2.23	3.79	2.12	3.55	2.11	3.59	2.10	3.56	2.09	3.44
13	Machinery, Nec	2.32	4.03	2.28	3.96	2.31	4.03	2.25	3.91	2.15	3.73	2.15	3.82	2.13	3.82	2.15	3.73
14	Electrical and Optical Equipment	1.91	3.71	1.88	3.63	1.92	3.65	1.80	3.57	2.10	3.55	2.11	3.65	2.11	3.68	2.05	3.55
15	Transport Equipment	2.49	3.95	2.45	3.91	2.49	3.97	2.43	3.91	2.37	3.70	2.37	3.75	2.36	3.74	2.35	3.64
16	Manufacturing, Nec; Recycling	2.52	4.18	2.49	4.13	2.49	4.15	2.40	4.00	2.16	3.64	2.10	3.65	2.10	3.66	1.97	3.38
17	Electricity, Gas and Water Supply	2.08	3.57	2.06	3.67	2.06	3.67	2.06	3.61	2.01	3.62	2.00	3.61	2.03	3.66	2.01	3.50
18	Construction	1.96	4.25	1.94	4.27	1.96	4.35	1.93	4.29	1.87	3.99	1.87	3.97	1.90	4.05	1.89	3.98
19	Motor Vehicles and Motorcycles; Retail Sale of Fuel	1.33	3.06	1.31	3.00	1.29	2.89	1.26	2.82	1.25	2.69	1.25	2.88	1.26	3.10	1.00	2.70
20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	1.33	2.68	1.31	2.61	1.29	2.53	1.26	2.47	1.25	2.32	1.25	2.43	1.26	2.55	1.25	2.62
21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	1.33	4.11	1.31	4.26	1.29	4.24	1.26	4.32	1.25	4.14	1.25	4.20	1.26	4.30	1.25	4.29
22	Hotels and Restaurants	1.97	3.89	1.89	3.80	1.91	3.77	1.90	3.65	1.89	3.50	1.93	3.64	1.93	3.77	1.95	3.83
23	Inland Transport	1.90	3.87	1.90	3.92	1.92	3.96	1.93	4.00	1.85	3.57	1.86	3.51	1.92	3.61	1.90	3.47
24	Water Transport	1.61	3.81	1.60	3.88	1.61	3.92	1.60	3.97	1.60	3.58	1.63	3.59	1.67	3.66	1.67	3.53
25	Air Transport	1.84	3.81	1.82	3.86	1.83	3.90	1.83	3.94	1.78	3.55	1.80	3.53	1.85	3.62	1.81	3.46
26	Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies	1.70	3.81	1.68	3.87	1.69	3.91	1.69	3.96	1.67	3.62	1.71	3.67	1.76	3.79	1.78	3.73
27	Post and Telecommunications	1.24	2.79	1.23	2.77	1.21	2.95	1.22	3.00	1.27	2.95	1.33	3.16	1.31	3.13	1.32	3.50
28	Financial Intermediation	1.28	3.28	1.29	3.32	1.32	3.32	1.33	3.34	1.33	3.07	1.34	3.33	1.34	3.20	1.35	3.12
29	Real Estate Activities	1.14	2.46	1.14	2.52	1.15	2.54	1.14	2.54	1.12	2.38	1.13	2.30	1.13	2.31	1.14	2.31
30	Renting of M&Eq and Other Business Activities	1.57	4.46	1.56	4.60	1.59	4.59	1.57	4.58	1.50	3.96	1.51	3.99	1.53	4.05	1.52	4.00
31	Public Admin and Defence; Compulsory Social Security	1.00	5.19	1.00	5.25	1.00	5.33	1.00	5.39	1.00	5.04	1.00	4.96	1.00	5.06	1.00	5.06
32	Education	1.19	3.71	1.19	3.76	1.20	3.77	1.20	3.81	1.18	3.61	1.18	3.58	1.18	3.59	1.17	3.56
33	Health and Social Work	1.92	4.14	1.96	4.22	2.05	4.29	2.04	4.28	1.96	4.09	1.89	4.03	1.82	4.00	1.70	3.86
34	Other Community, Social and Personal Services	1.75	4.59	1.70	4.66	1.68	4.80	1.61	4.94	1.49	4.75	1.45	4.61	1.43	4.53	1.36	4.38
35	Private Households with Employed Persons	1.75	3.92	1.70	3.91	1.68	3.92	1.61	3.89	1.48	3.58	1.45	3.53	1.43	3.55	1.36	3.44

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S.No	Sectors	2003		2004		2005		2006		2007		2008		2009	
		Type I	Type II	Type I	Type II	Type I	Type II	Type II	Type I	Type II	Type I	Type I	Type II	Type I	Type II
1	Agriculture, Hunting, Forestry and Fishing	1.38	3.58	1.37	3.37	1.36	3.14	1.35	3.06	1.33	2.95	1.32	3.09	1.33	3.21
2	Mining and Quarrying	1.40	2.92	1.35	2.56	1.37	2.42	1.35	2.32	1.37	2.23	1.37	2.35	1.36	2.46
3	Food, Beverages and Tobacco	2.31	4.23	2.28	3.91	2.24	3.72	2.22	3.64	2.23	3.55	2.25	3.70	2.24	3.81
4	Textiles and Textile Products	2.19	4.09	2.16	3.76	2.14	3.68	2.18	3.62	2.17	3.60	2.15	3.70	2.17	3.84
5	Leather, Leather and Footwear	2.14	4.16	2.12	3.81	2.15	3.78	2.14	3.74	2.19	3.70	2.16	3.80	2.19	3.94
6	Wood and Products of Wood and Cork	1.84	3.78	1.78	3.38	1.77	3.42	1.74	3.43	1.75	3.34	1.76	3.54	1.80	3.81
7	Pulp, Paper, Paper , Printing and Publishing	2.23	3.74	2.20	3.43	2.17	3.37	2.14	3.32	2.17	3.27	2.16	3.38	2.20	3.65
8	Coke, Refined Petroleum and Nuclear Fuel	1.62	2.28	1.61	2.20	1.67	2.27	1.59	2.24	1.65	2.19	1.62	2.19	1.84	2.78
9	Chemicals and Chemical Products	2.19	3.41	2.15	3.13	2.13	3.03	2.08	2.97	2.08	2.86	2.06	2.90	2.06	3.06
10	Rubber and Plastics	2.40	3.95	2.36	3.62	2.32	3.49	2.26	3.44	2.26	3.31	2.24	3.37	2.34	3.66
11	Other Non-Metallic Mineral	2.02	3.53	1.99	3.18	1.98	3.14	1.93	3.09	1.95	2.98	1.98	3.15	1.99	3.35
12	Basic Metals and Fabricated Metal	2.14	3.39	2.10	3.09	2.14	3.07	2.13	3.01	2.14	2.92	2.20	3.09	2.19	3.20
13	Machinery, Nec	2.18	3.64	2.12	3.26	2.10	3.17	2.05	3.10	2.07	2.99	2.12	3.17	2.11	3.36
14	Electrical and Optical Equipment	2.09	3.47	2.06	3.14	2.07	3.09	1.00	3.01	2.03	2.90	2.10	3.10	2.09	3.18
15	Transport Equipment	2.38	3.58	2.30	3.27	2.14	3.05	2.10	3.00	2.10	2.90	2.13	3.02	2.12	3.09
16	Manufacturing, Nec; Recycling	1.91	3.14	1.66	2.54	1.54	2.30	1.66	2.27	1.68	2.49	1.55	2.31	1.47	2.20
17	Electricity, Gas and Water Supply	2.04	3.48	2.01	3.25	2.01	3.15	1.99	3.14	2.01	3.07	1.97	3.17	2.00	3.31
18	Construction	1.96	3.99	1.93	3.61	1.92	3.54	1.89	3.42	1.91	3.31	1.96	3.47	1.97	3.66
19	Repair of Motor Vehicles and Motorcycles; Retail	1.26	3.32	1.23	3.12	1.21	2.90	1.19	2.89	1.18	2.85	1.16	3.02	1.16	2.83
20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	1.26	2.66	1.23	2.52	1.21	2.33	1.19	2.31	1.18	2.26	1.16	2.35	1.16	2.42
21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	1.26	4.23	1.23	3.87	1.21	3.69	1.19	3.61	1.18	3.53	1.16	3.74	1.16	3.83
22	Hotels and Restaurants	1.97	3.75	1.94	3.50	1.91	3.31	1.89	3.27	1.90	3.20	1.91	3.36	1.87	3.43
23	Inland Transport	1.92	3.39	1.89	3.09	1.88	3.02	1.86	2.94	1.87	2.86	1.87	2.93	1.92	3.16
24	Water Transport	1.70	3.36	1.67	3.04	1.64	2.96	1.61	2.86	1.61	2.75	1.61	2.84	1.64	3.00
25	Air Transport	1.82	3.30	1.72	2.91	1.66	2.77	1.69	2.69	1.70	2.70	1.63	2.67	1.61	2.79
26	Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies	1.82	3.59	1.79	3.26	1.78	3.18	1.74	3.07	1.75	2.95	1.76	3.07	1.77	3.23
27	Post and Telecommunications	1.34	3.19	1.31	2.96	1.41	2.94	1.36	2.89	1.43	2.86	1.48	3.05	1.43	3.05
28	Financial Intermediation	1.36	3.03	1.34	2.87	1.34	2.85	1.31	2.71	1.32	2.58	1.33	2.68	1.33	2.79
29	Real Estate Activities	1.15	2.26	1.15	2.07	1.15	1.98	1.14	1.91	1.14	1.83	1.14	1.85	1.14	1.90
30	Renting of M&Eq and Other Business Activities	1.53	3.76	1.46	3.21	1.42	2.98	1.35	2.86	1.36	2.62	1.38	2.67	1.39	2.72
31	Public Admin and Defence; Compulsory Social Security	1.00	4.82	1.00	4.32	1.00	4.18	1.00	4.17	1.00	3.97	1.00	3.76	1.00	3.49
32	Education	1.17	3.40	1.16	3.05	1.15	2.91	1.14	2.86	1.14	2.82	1.14	2.91	1.14	2.94
33	Health and Social Work	1.61	3.69	1.38	2.98	1.56	3.18	1.52	3.11	1.52	3.00	1.48	3.05	1.50	3.14
34	Other Community, Social and Personal Services	1.32	4.11	1.24	3.53	1.20	3.39	1.22	3.30	1.17	3.33	1.14	3.41	1.12	3.38
35	Private Households with Employed Persons	1.32	3.24	1.24	2.81	1.20	2.64	1.22	2.59	1.17	2.61	1.14	2.63	1.12	2.58

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AppendixTable A: Output Multipliers: Type I and Type II

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Appendix Table B: Employment Multipliers: Type I and Type II

S.no	Sectors	1995		1996		1997		1998		1999		2000		2001		2002	
		Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II
1	Agriculture, Hunting, Forestry and Fishing	2.34	4.23	2.23	4.23	2.14	3.74	2.13	3.57	2.03	3.29	2.17	3.45	2.16	3.63	2.13	3.48
2	Mining and Quarrying	0.34	1.69	0.33	1.69	0.28	1.46	0.28	1.46	0.25	1.38	0.24	1.44	0.24	3.15	0.19	1.05
3	Food, Beverages and Tobacco	1.45	2.97	1.42	2.97	1.31	2.64	1.30	2.57	1.25	2.37	1.30	2.48	1.32	4.28	1.22	2.36
4	Textiles and Textile Products	0.90	2.35	0.86	2.35	0.81	2.10	0.82	2.10	0.75	1.91	0.76	2.00	0.83	4.31	0.80	1.93
5	Leather, Leather and Footwear	0.62	2.10	0.62	2.10	0.56	1.90	0.55	1.89	0.55	1.77	0.62	1.90	0.68	4.37	0.70	1.89
6	Wood and Products of Wood and Cork	1.14	2.56	1.16	2.56	1.06	2.36	1.01	2.28	1.15	2.34	1.25	2.52	1.44	4.02	1.65	2.84
7	Pulp, Paper, Paper , Printing and Publishing	0.45	1.52	0.47	1.52	0.48	1.48	0.48	1.49	0.47	1.39	0.50	1.46	0.52	3.82	0.50	1.39
8	Coke, Refined Petroleum and Nuclear Fuel	0.25	1.09	0.23	1.09	0.20	0.87	0.21	0.90	0.11	0.48	0.08	0.38	0.12	2.27	0.10	0.44
9	Chemicals and Chemical Products	0.46	1.46	0.45	1.46	0.44	1.37	0.42	1.33	0.37	1.13	0.35	1.13	0.35	3.52	0.31	1.01
10	Rubber and Plastics	0.61	1.76	0.60	1.76	0.55	1.58	0.58	1.62	0.53	1.43	0.50	1.46	0.49	3.98	0.46	1.35
11	Other Non-Metallic Mineral	0.52	1.66	0.50	1.66	0.51	1.54	0.54	1.59	0.46	1.37	0.48	1.43	0.51	3.58	0.50	1.35
12	Basic Metals and Fabricated Metal	0.31	1.40	0.31	1.40	0.31	1.29	0.32	1.30	0.30	1.16	0.29	1.19	0.30	3.56	0.27	1.02
13	Machinery, Nec	0.33	1.52	0.32	1.52	0.32	1.39	0.30	1.34	0.29	1.24	0.29	1.30	0.31	3.82	0.28	1.16
14	Electrical and Optical Equipment	0.28	1.54	0.30	1.54	0.30	1.38	0.31	1.42	0.30	1.18	0.28	1.21	0.27	3.68	0.26	1.09
15	Transport Equipment	0.29	1.30	0.29	1.30	0.28	1.21	0.29	1.22	0.26	1.07	0.26	1.09	0.26	3.74	0.25	0.96
16	Manufacturing, Nec; Recycling	0.49	1.65	0.50	1.65	0.44	1.48	0.44	1.45	0.45	1.35	0.48	1.42	0.49	3.66	0.48	1.26
17	Electricity, Gas and Water Supply	0.27	1.30	0.26	1.30	0.24	1.24	0.23	1.21	0.21	1.19	0.20	1.18	0.21	3.66	0.18	1.01
18	Construction	0.59	2.19	0.60	2.19	0.54	2.03	0.55	2.03	0.49	1.78	0.50	1.77	0.54	4.05	0.51	1.67
19	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel	0.66	1.87	0.67	1.87	0.65	1.65	0.70	1.68	0.68	1.55	0.67	1.66	0.66	3.10	0.56	1.50
20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	0.27	1.21	0.26	1.21	0.23	1.01	0.23	0.99	0.21	0.86	0.21	0.93	0.21	2.55	0.20	0.96
21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	0.74	2.68	0.75	2.68	0.72	2.56	0.77	2.69	0.74	2.49	0.73	2.52	0.73	4.30	0.67	2.36
22	Hotels and Restaurants	1.23	2.57	1.17	2.57	1.10	2.25	1.10	2.20	1.06	2.04	1.10	2.13	1.11	3.77	1.04	2.08
23	Inland Transport	0.47	1.84	0.46	1.84	0.43	1.70	0.44	1.74	0.40	1.44	0.39	1.39	0.42	3.61	0.39	1.26
24	Water Transport	0.38	1.91	0.36	1.91	0.33	1.78	0.33	1.81	0.29	1.50	0.27	1.46	0.30	3.66	0.31	1.34
25	Air Transport	0.26	1.63	0.25	1.63	0.23	1.52	0.23	1.56	0.21	1.28	0.21	1.26	0.23	3.62	0.21	1.13
26	Other Supporting and Auxiliary Transport Activities; Activities of	0.30	1.77	0.29	1.77	0.28	1.67	0.29	1.71	0.27	1.45	0.27	1.46	0.28	3.79	0.28	1.36
27	Post and Telecommunications	0.24	1.33	0.24	1.33	0.22	1.31	0.22	1.34	0.23	1.25	0.23	1.34	0.23	3.13	0.25	1.46
28	Financial Intermediation	0.18	1.58	0.18	1.58	0.17	1.41	0.17	1.42	0.14	1.20	0.15	1.35	0.14	3.20	0.13	1.11
29	Real Estate Activities	0.05	0.97	0.05	0.97	0.04	0.91	0.04	0.92	0.04	0.80	0.04	0.75	0.05	2.31	0.05	0.70
30	Renting of M&Eq and Other Business Activities	0.44	2.45	0.42	2.45	0.37	2.24	0.35	2.24	0.30	1.79	0.28	1.78	0.27	4.05	0.25	1.63
31	Public Admin and Defence; Compulsory Social Security	0.56	3.48	0.52	3.48	0.43	3.13	0.38	3.13	0.33	2.77	0.32	2.71	0.31	5.06	0.29	2.54
32	Education	0.64	2.40	0.59	2.40	0.52	2.13	0.48	2.13	0.43	1.90	0.44	1.89	0.47	3.59	0.47	1.79
33	Health and Social Work	0.49	2.03	0.46	2.03	0.44	1.84	0.42	1.82	0.39	1.68	0.39	1.68	0.40	4.00	0.38	1.58
34	Other Community, Social and Personal Services	1.02	3.00	0.91	3.00	0.93	2.88	0.96	3.04	0.94	2.92	0.94	2.85	0.94	4.53	0.90	2.58
35	Private Households with Employed Persons	2.90	4.41	2.64	4.41	2.32	3.72	2.12	3.55	1.86	3.13	2.34	3.60	2.84	3.55	3.22	4.37

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Appendix Table B: Employment Multipliers: Type I and Type II

S.no	Sectors	2003		2004		2005		2006		2007		2008		2009	
		Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II	Type I	Type II
1	Agriculture, Hunting, Forestry and Fishing	1.93	3.06	1.82	2.77	1.61	2.36	2.14	2.81	1.13	1.60	1.06	1.53	1.03	1.53
2	Mining and Quarrying	0.19	0.97	0.16	0.73	0.14	0.58	0.49	0.86	0.09	0.35	0.09	0.36	0.10	0.38
3	Food, Beverages and Tobacco	1.13	2.12	1.02	1.79	0.89	1.52	1.34	1.89	0.60	0.99	0.56	0.94	0.55	0.96
4	Textiles and Textile Products	0.78	1.76	0.70	1.45	0.61	1.26	1.11	1.67	0.46	0.88	0.45	0.86	0.45	0.89
5	Leather, Leather and Footwear	0.72	1.75	0.65	1.45	0.58	1.27	1.16	1.77	0.42	0.86	0.41	0.85	0.41	0.87
6	Wood and Products of Wood and Cork	1.53	2.53	1.49	2.25	1.33	2.03	1.70	2.36	0.71	1.18	0.73	1.21	0.73	1.26
7	Pulp, Paper, Paper , Printing and Publishing	0.47	1.25	0.41	0.99	0.35	0.86	0.76	1.21	0.25	0.57	0.24	0.57	0.27	0.64
8	Coke, Refined Petroleum and Nuclear Fuel	0.11	0.45	0.10	0.38	0.10	0.35	0.31	0.54	0.07	0.23	0.06	0.22	0.10	0.32
9	Chemicals and Chemical Products	0.30	0.93	0.25	0.71	0.21	0.59	0.51	0.84	0.14	0.37	0.13	0.35	0.14	0.39
10	Rubber and Plastics	0.44	1.24	0.37	0.97	0.31	0.81	0.70	1.14	0.20	0.51	0.18	0.48	0.20	0.53
11	Other Non-Metallic Mineral	0.49	1.27	0.43	1.00	0.37	0.86	0.73	1.16	0.23	0.53	0.23	0.54	0.24	0.58
12	Basic Metals and Fabricated Metal	0.24	0.89	0.19	0.66	0.17	0.56	0.48	0.82	0.11	0.34	0.10	0.34	0.11	0.36
13	Machinery, Nec	0.26	1.01	0.21	0.76	0.18	0.63	0.54	0.93	0.12	0.39	0.11	0.40	0.12	0.44
14	Electrical and Optical Equipment	0.24	0.95	0.19	0.70	0.16	0.59	0.50	0.97	0.11	0.36	0.11	0.37	0.11	0.40
15	Transport Equipment	0.23	0.85	0.20	0.66	0.17	0.56	0.48	0.81	0.12	0.36	0.12	0.36	0.12	0.37
16	Manufacturing, Nec; Recycling	0.43	1.06	0.31	0.72	0.24	0.56	0.48	0.74	0.18	0.42	0.15	0.36	0.13	0.31
17	Electricity, Gas and Water Supply	0.18	0.92	0.15	0.73	0.12	0.61	0.55	0.99	0.09	0.40	0.08	0.40	0.09	0.42
18	Construction	0.45	1.49	0.37	1.16	0.32	1.00	0.86	1.44	0.22	0.63	0.21	0.62	0.22	0.66
19	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel	0.58	1.64	0.49	1.38	0.44	1.15	1.05	1.70	0.34	0.83	0.32	0.82	0.32	0.80
20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	0.20	0.92	0.17	0.78	0.14	0.62	0.55	0.98	0.10	0.42	0.10	0.42	0.11	0.44
21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	0.63	2.16	0.54	1.78	0.46	1.51	1.32	2.25	0.31	1.01	0.29	0.99	0.30	1.00
22	Hotels and Restaurants	0.99	1.91	0.86	1.60	0.74	1.34	1.19	1.73	0.50	0.89	0.48	0.87	0.48	0.89
23	Inland Transport	0.36	1.11	0.31	0.87	0.27	0.75	0.64	1.06	0.19	0.48	0.18	0.46	0.19	0.50
24	Water Transport	0.24	1.10	0.19	0.84	0.17	0.73	0.63	1.11	0.13	0.47	0.13	0.46	0.14	0.49
25	Air Transport	0.19	0.95	0.15	0.71	0.12	0.59	0.50	0.90	0.09	0.39	0.09	0.36	0.09	0.39
26	Other Supporting and Auxiliary Transport Activities; Activities of	0.26	1.18	0.23	0.92	0.20	0.79	0.67	1.18	0.14	0.50	0.14	0.49	0.14	0.52
27	Post and Telecommunications	0.22	1.17	0.19	0.97	0.18	0.83	0.74	1.31	0.14	0.56	0.14	0.56	0.14	0.57
28	Financial Intermediation	0.12	0.99	0.11	0.83	0.10	0.74	0.62	1.15	0.07	0.44	0.07	0.43	0.07	0.46
29	Real Estate Activities	0.05	0.62	0.04	0.48	0.04	0.39	0.33	0.62	0.03	0.23	0.03	0.21	0.03	0.23
30	Renting of M&Eq and Other Business Activities	0.24	1.38	0.20	1.02	0.16	0.82	0.69	1.25	0.11	0.48	0.10	0.45	0.10	0.45
31	Public Admin and Defence; Compulsory Social Security	0.25	2.22	0.21	1.78	0.18	1.53	1.39	2.61	0.13	1.01	0.10	0.84	0.08	0.74
32	Education	0.43	1.58	0.39	1.29	0.33	1.08	0.97	1.63	0.26	0.75	0.23	0.70	0.22	0.70
33	Health and Social Work	0.35	1.42	0.26	1.01	0.26	0.95	0.84	1.45	0.19	0.63	0.18	0.60	0.18	0.61
34	Other Community, Social and Personal Services	0.80	2.24	0.68	1.76	0.57	1.49	1.31	2.11	0.40	1.04	0.35	0.96	0.31	0.91
35	Private Households with Employed Persons	3.33	4.32	3.29	4.03	2.98	3.59	3.31	3.85	2.46	2.89	2.35	2.75	2.24	2.62

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