Annexure 2.1: Periodic Labour Force Survey Data

The unit-level data from the Periodic Labour Force Survey (PLFS) was used for explaining the employment contribution of the selected sectors and sub-sectors. The PLFS is a representative survey of households (representative at the NSS region level) undertaken by the National Statistical Office (NSO) of the Ministry of Statistics & Programme Implementation, Government of India.[1] It captures the activity status of all the members of the households surveyed and enlists the industry that each member of the household is engaged in (as per the National Industrial Classification (NIC) 5–digit level). Thus, the number of workers in each industry is estimated from the survey by using the weight of each surveyed individual. Apart from the industry of engagement, other details about the workers like their education level (general, technical, and vocational), the quality of jobs like written job contracts, and access to social security benefits, are also captured in the survey. The PLFS is carried out between July of one year and June of next year. This is carried out on an annual basis. There are quarterly reports available too but they are available only for urban areas and were not used here in this work.

For estimating the workers and jobs at the NIC 5-digit level, usual status workers (usual principal status (UPS) and usual subsidiary status (USS)) provided by the PLFS are used.[2] Adding the estimated workers using the UPS numbers and the exclusively subsidiary workers (individuals who have no worker status in their UPS and worker status in their USS) gives the number of workers at NIC 5-digit levels.

Jobs, as opposed to workers, entails adding multiple workers into the National Sample Survey (NSS) definition of Usual Status workers (Usual Principal Status (UPS) and Usual Subsidiary Status (USS)). Multiple workers are those workers who have worker status in both UPS and USS. Adding the multiple workers to 'workers' gives the labour inputs or jobs in various NICs. The methodology for estimating the number of jobs/labour inputs is explained in Kolli, Sharma and Sinharay (2008).[3]

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[1] Ministry of Statistics and Programme Implementation (MoSPI): Periodic Labour Force Survey. https://www.mospi.gov.in/Periodic-Labour-Surveys.

[2] The concept of usual activity status refers to the activity status of a person during the last 365 days preceding the date of survey. The activity status on which a person spent a relatively longer time (183 days or more) in the year is called his/her UPS. Similarly, if a person has engaged in economic activity for a period of 30 days or more and less than 183 days during the last 365 days preceding the date of survey, it is called his/her usual subsidiary status (USS).

[3] Kolli, R., Sharma, S. and Sinharay, A. 2008. "Estimates of Workforce from the NSS-61st Round, 2004–05". *Journal of Income and Wealth,* 30(1): 34–58.

Annexure 2.2: Input-Output Analysis

A sector, apart from creating jobs within itself, also creates jobs in other sectors of the economy through its linkages with other sectors. Each sector creates jobs in other sectors of the economy through both backward (the sector using the output of other sectors as inputs in its production process) and forward (the output of the sector is used by other sectors as their inputs) linkages.

Estimation of employment multiplier uses the Input-Output methods put forward by Prof. Wassily Leontief. The Leontief input-output model is a quantitative economic model that shows how different sectors of an economy are interdependent through the backward and forward linkages. Each column of the Input-Output Matrix shows how a particular sector uses the outputs of other sectors as its inputs. Each row of the Input-Output Matrix shows how the output of a particular sector is used as inputs by other sectors (thus intermediate use share of output) and as final use (like consumption, capital formation and net exports) referred to as final demand.

The Ministry of Statistics and Programme Implementation (MoSPI), provides Supply-Use Tables (SUTs). The input-output table is to be derived from the supply-use tables. Analysis in the report uses the Input-Output (I-O) table for 2018–19 as estimated by Chaudhary, Pratap and Pohit (2024).[4]

The Leontief Inverse is an exhibition of the interlinkages among all the sectors in the economy. This is computed using the 64-sectors I-O table for 2018–19. Using the Leontief inverse matrix for 2018–19, various multipliers for subsequent years could be estimated by using respective numbers (labour-output ratio) for that particular year. One thing may be noted here is that while we are estimating multipliers for a later year (say 2022–23), we are assuming the technology (and thus interlinkages among sectors) to remain fixed at 2018–19 level. This is a limitation of the I-O analysis.

Output Multiplier

The Output multiplier for a sector is the output generated in the entire economy due to one unit of output generated in that particular sector. It is computed by adding the column of the Leontief Inverse matrix with regard to a sector.

Employment Multiplier

The output generation in all the sectors of the economy due to interlinkages among the sectors will lead to creation of jobs in each sector. One unit of output generation in a sector will lead to L/Y unit of direct jobs, where L/Y is the labour-output ratio for a sector. In this way, employment multiplier matrix can be generated by multiplying the Leontief inverse matrix with the labour-output (L/Y) matrix. For a 64-sector economy, the L/Y matrix will be a 64*64 matrix. This will be a matrix with only non-zero diagonal elements and all non-diagonal elements being zero. The diagonal elements give respective sectoral L/Y ratios. Multiplying the L/Y matrix with the Leontief inverse matrix, we get a 64*64 employment matrix, which gives the employment multiplier matrix for the 64 sectors. Column sum of the matrix gives the sectoral employment multiplier. Employment multiplier for a sector denotes the employment

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[4] Chaudhary, C., Pratap, D. and Pohit, S. 2024. “Estimation of SAM for India: An Application for India’s Energy Transition Targets”. *Margin: The Journal of Applied Economic Research*. 18(1–2), 74–133. https://doi.org/10.1177/00252921241284278. NCAER, New Delhi, India.

generation in the entire economy due to one unit of output generated in the said sector. The diagonal elements in each column gives the direct share of the employment multiplier (sector's own contribution to jobs) and sum of all non-diagonal elements in each column gives the indirect share of the employment multiplier (sector's indirect contribution to jobs).

Thus, total employment generated (entire economy) due to economic activities in a sector could be estimated as

> Total employment generated in the economy due to economic activities in sector A = Employment Multiplier of sector A* production of sector A

The direct jobs in a particular sector are estimated from the PLFS, as discussed in Annexure 2.1, and direct plus indirect jobs are estimated by using the I-O approach. From this, one can estimate number of jobs created in the economy by the economic activities in a particular sector per unit direct jobs in that sector.

Income (GVA) Multiplier

Output (Gross Value of Output or GVO) generation in a sector would lead to addition to Gross Value Added (GVA or Income) of the sector. If the total output of a sector is 'O' and total GVA of the sector is 'I', one unit of output increase will lead to increase in GVA by I/O, which is the GVA/GVO ratio. Thus, the GVA multiplier matrix is estimated by multiplying GVA/GVO ratio with the Leontief inverse matrix. Column sum of the GVA multiplier matrix gives the income or GVA multiplier for the sector. GVA multiplier for a sector can be denoted as total income generated in the entire economy due to one unit of output (or GVO) increase in the said sector.

Annexure 2.3: Alternative Sectors

S.No.	Sector	Sub-sector	Appears in all 4 top 25 lists of Multipliers and Shares	Sunrise Sector (mentioned in Union Budget 2022–23)	Sector Skill Council
1	Tertiary	Community, Social and Personal Services	4		
2	Tertiary	Education & Research	3		
	Tertiary	Other Business Services	3		
3	Tertiary	Land Transport	3		
4	Secondary	Manufacture of textiles + cotton ginning	3		Textile Sector Skill Council
5	Tertiary	Public Administration and Defence	2		
6	Tertiary	Ownership of dwellings	2		
7	Tertiary	Financial Services	2		BFSI
8	Secondary	Manufacture of Basic Iron and Steel + Casting of iron and steel	2		Indian Iron and Steel Sector Skill Council
9	Tertiary	Communication	4		Telecom Sector Skill Council
10	Tertiary	Medical and Health	3		Healthcare Sector Skill Council
11	Secondary	Manufacture of chemical and chemical products except pharmaceuticals, medicinal and botanical products	3		
12	Primary	Forestry and Logging	3		
13	Secondary	Manufacture of other non-metallic mineral products	2		
14	Secondary	Manufacture of coke and refined petroleum products	2		
15	Primary	Fishing & Aquaculture	2		ASCI
16	Secondary	Manufacture of Transport	1	Clean Mobility Systems	Automotive Skills Development Council (ASDC)
17	Secondary	Manufacture of machinery and equipments n.e.c.	1		
18	Secondary	Manufacture of pharmaceutical; medicinal chemicals and botanical products	1	Genomics and Pharmaceuticals, pharma	Life Sciences Sector Skill Development Council
19	Secondary	Manufacture of computer, electronic and optical products		Geospatial Systems and Drones	Electronics Sector Skill Council of India
20	Secondary	Manufacture of communication equipment		Semiconductor and its eco-system	Telecom Sector Skill Council
21	Tertiary	Air Transport		Space Economy	Aerospace and Aviation Sector Skill Council

Sources: NCAER Computations from Ministry of Statistics and Programme Implementation, Government of India. 2023. Periodic Labour Force Survey (PLFS), July 2021-June 2022. Document No.: DDI-IND-CSO-PLFS-2021-22. https://microdata.gov.in/nada43/index.php/catalog/165/study-description and Ministry of Statistics and Programme Implementation, Government of India. 2024. National Accounts. https://mospi.gov.in/data.

Annexure 2.4: Summary Tables of Sectors & Sub-sectors

Sector	***Share (2017-18 to 2022–23)***		***Multiplier (2021-22)***		***Rate of Growth over the last five years***	
	GVA (Average Share in GDP)	***Employment (as % of total)***	***GVA***	***Employment***	***GVA (2017-18 to 2022–23)***	***Employment (2018-19 to 2022–23)***
Primary	17	45	N.A.	N.A.	4.7	8.8
Agriculture (Crops)	9.5	40.3	1.0	95.0	3.2	6.1
Growing of cereals	N.A.	30.5	N.A.	N.A.	N.A.	4.7
Livestock	5	5.6	1	43.3	6.9	29
Raising of cattle and buffaloes	N.A.	2.7	N.A.	N.A.	N.A.	28.2
Secondary/Industry	25.7	26	N.A.	N.A.	4	6.8
Manufacturing	14.2	11.3	N.A.	N.A.	3.5	4.7
Manufacturing of Textiles plus cotton ginning	*1.3*	*1.1*	*1*	*28.4*	*7.1*	(–)2.0
Weaving of textiles	N.A.	0.3	N.A.	N.A.	N.A.	4.5
Manufacturing of Transport	1.5	0.3	0.9	13.2	2	7.2
Manufacture of motor vehicles	N.A.	0.05	N.A.	N.A.	N.A.	(–)3.9
Manufacture of parts and accessories for motor vehicle	N.A.	0.1	N.A.	N.A.	N.A.	16.4
Electricity Gas & Water Supply	2.4	0.5	N.A.	N.A.	6.1	4.2
Electricity	*1.8*	*0.3*	*1*	*10.6*	*4.7*	*1.4*
Electric power generation using solar energy	N.A.	0.01	N.A.	N.A.	N.A.	50.1
Electric power generation using other non-conventional sources	N.A.	0.01	N.A.	N.A.	N.A.	82.3
Tertiary/Services	48.6	27.6	NA	NA	5.1	4.6
Trade, hotels, transport, communication and services related to broadcasting	16.3	15.8	NA	NA	5.1	5.1
Trade	9.8	9.8	1.1	27.5	3.7	6.5

Sector	*Share (2017-18 to 2022–23)*		*Multiplier (2021-22)*		*Rate of Growth over the last five years*	
	GVA (Average Share in GDP)	*Employment (as % of total)*	*GVA*	*Employment*	*GVA (2017-18 to 2022–23)*	*Employment (2018-19 to 2022–23)*
Retail sale of food in specialised stores	NA	3.4	NA	NA	NA	9.4
Retail sale of clothing, footwear and leather articles in specialised stores	NA	0.8	NA	NA	NA	7.5
Maintenance and repair of motor vehicles	NA	0.4	NA	NA	NA	7.2
Computer related services	4.4	0.7	1	8.3	8.8	17.9
Computer programming activities	NA	0.3	NA	NA	NA	18.9

Sources: NCAER Computations from

1. Ministry of Statistics and Programme Implementation, Government of India. 2023. Periodic Labour Force Survey (PLFS), July 2021-June 2022. Document No.: DDI-IND-CSO-PLFS-2021-22. https://microdata.gov.in/nada43/index.php/catalog/165/study-description.
2. Ministry of Statistics and Programme Implementation, Government of India. 2024. National Accounts. https://mospi.gov.in/data.