Where are the Jobs? Estimating Skill-Based Employment Linkages across Sectors for the Indian Economy: An Input-Output Analysis

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OUTLINE

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MOTIVATION

- Skilling India initiative
- Supply side approach: skill training – skill mismatch
- Demand side approach: sectors that demand different types of skilled employment
- 24 priority sectors identified by NSDC in its National Policy for Skill Development and Entrepreneurship (2015)
- Direct and indirect employment creation
- Traditionally skills has been measured by general education
  - Data Gaps

Contribution to Literature and Policy

- Integrating different strands of policy recommendations
- Defining Skills
  - Previous Literature: General Education
  - Contribution: General, formal vocational and technical
- Usually, links to within-sector employment
  - Contribution – within and outside sectors
- No acknowledgement of higher skilled workers

Objective

- Which sector is creating the most jobs?
- What type of employment are being created in each sector? Which skill level?
- Identification of sectors: potential to generate different types of employment directly and indirectly

METHODOLOGY

SKILLS ILLUSTRATION

CONSTRUCTION SECTOR SKILL COUNCIL

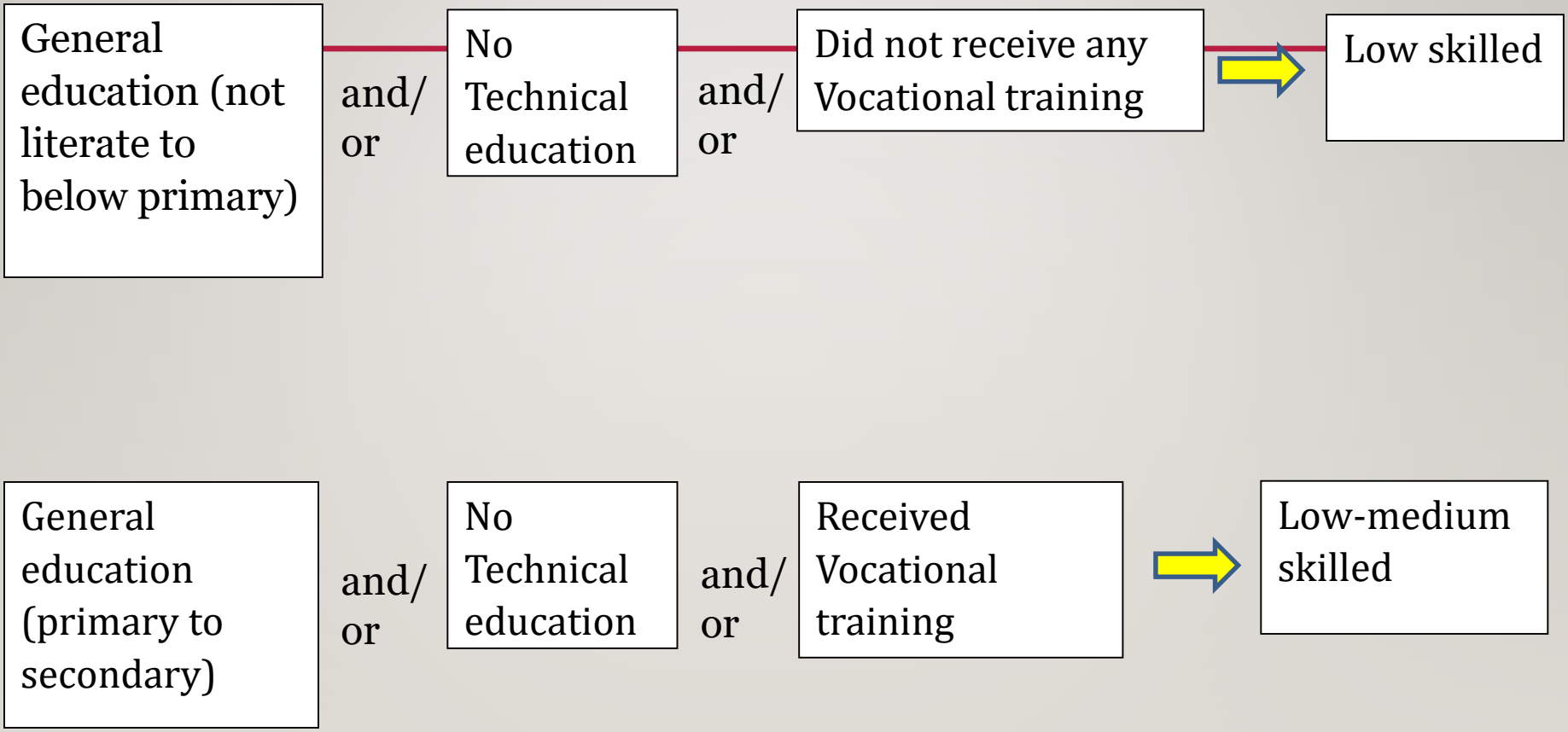
Program Name	**Mason Tilling**
Level	**4.0**
Qualification Pack Name and Reference Id.	CON/N0103
Version No.	1.0
Version Update	30-12-2015
Pre-requisites to Training	**Preferably 5th Standard**
Experience (Assumed, though not mentioned)	Minimum experience of 1 year of Level 3

IT SECTOR SKILL COUNCIL

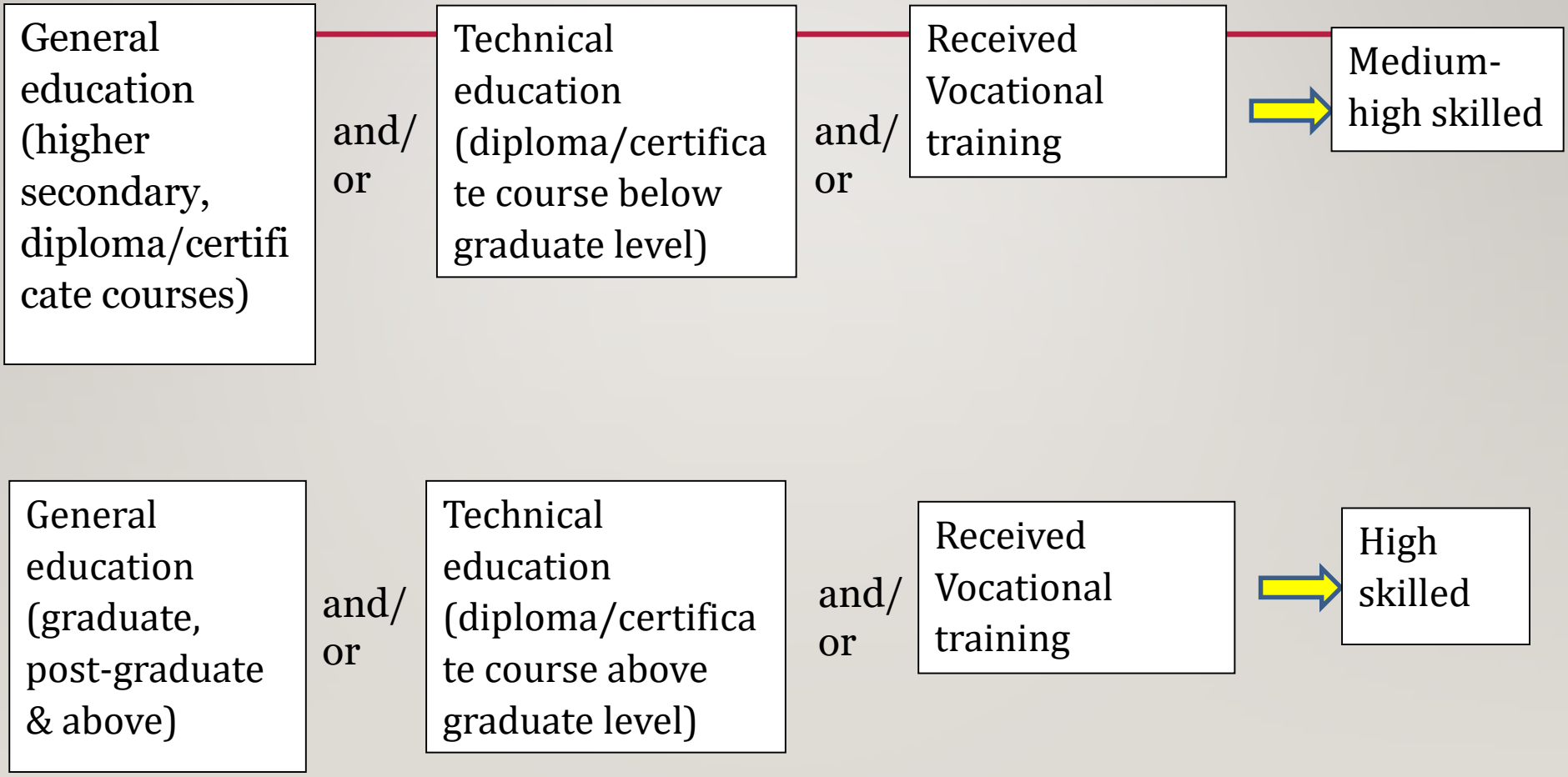
Job Role	**Domestic IT Helpdesk Attendant**
Level	**4.0**
Code	SSC/Q110
Minimum Education Qualification	**12**
Maximum Education Qualification	Masters Degree in any Discipline
Experience	0-1 year of work experience/internship in a related area

Source: Partial Adaptations from Construction Skill Council and IT Sector Skill Councils

Defining Skills



Defining Skills



1st Step: Combining General and Technical Education

General Education	Technical Education				
	No technical education	Technical degree in different subjects	Diploma in different subjects (below graduate)	Diploma in different subjects (above graduate)	Missing Cases
Not literate	Low skill	Cases do not exist			Low skill
Literate without formal schooling					
TLC					
Others					
Literate: below primary					
Primary	Low-medium skill				Low-medium skill
Middle					
Secondary					
Higher secondary	Medium-high skill				Medium-high skill
Diploma/certificate course					
Graduate	High skill				
Post-graduate & above					
Missing Cases	Low skill	Low-medium skill	Medium-high skill	High skill	Missing cases

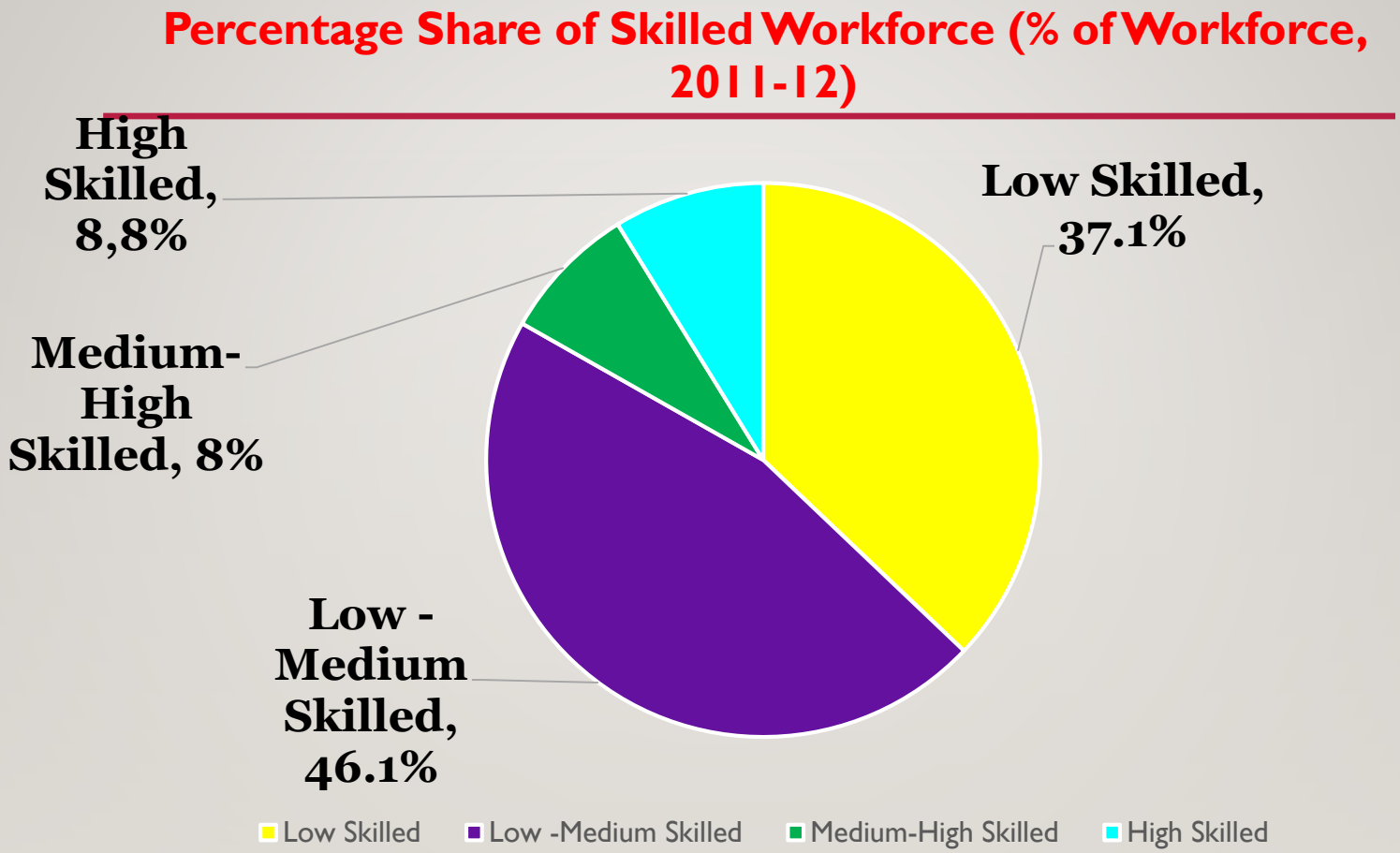
Source: Conceptualised by Authors

2nd Step: General and Technical Education and Vocational Education

Combination of General and Technical education	Vocational education			
	Formal vocational training	Non-formal vocational training	Did not receive any vocational training	Missing cases
Low skilled	Low-medium skill		Low skill	
Low-medium skilled				
Medium-high skilled	Medium-high skill			
High skilled	High skill			
Missing cases	Medium-high skill	Low-medium skill	Low skill	Missing cases

Source: Conceptualised by Authors

Only 16.8% of the workforce are either Medium-High or High-Skilled i.e. 70 million employed

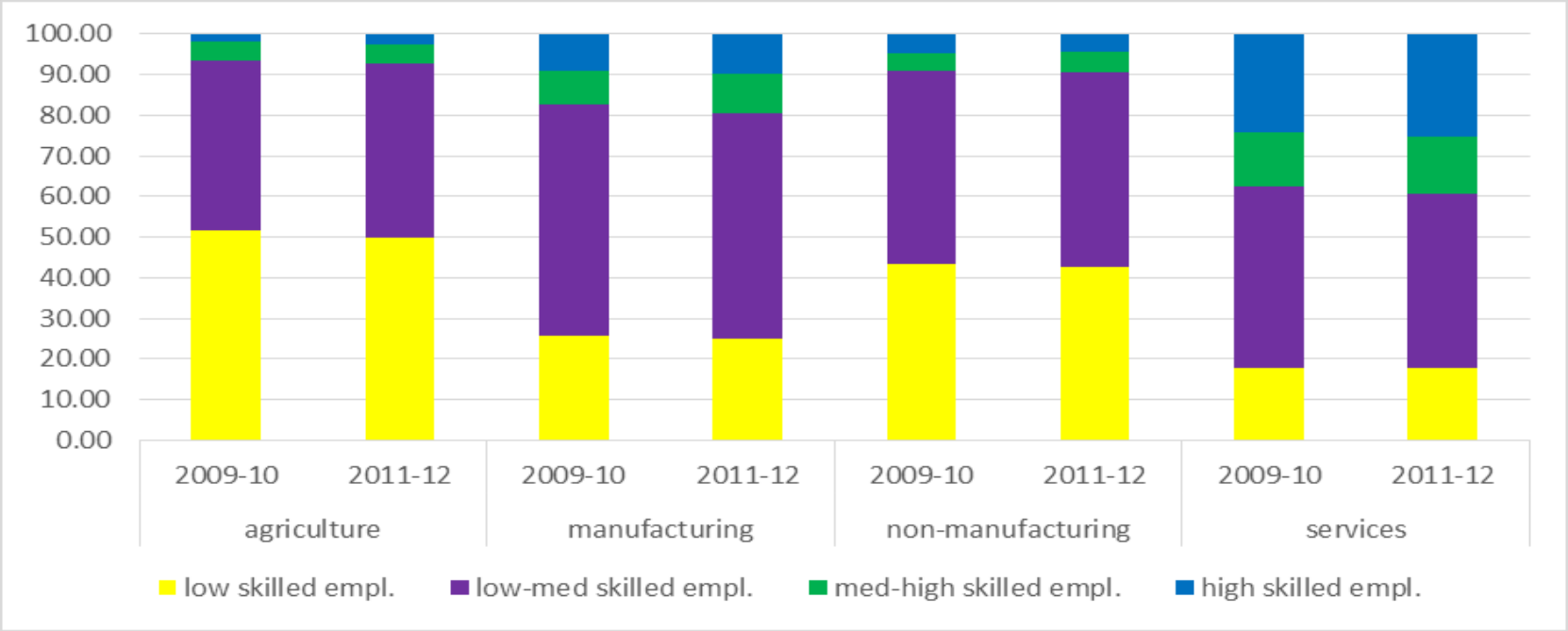


Source: Author's computation using 68th (2011-12) employment-unemployment survey by the National Sample Survey Office (NSSO, 2013)

DIRECT SKILLED EMPLOYMENT

Share of medium-high and high employment across sector is low..

Share of Employment by Skill Type in Broad Sectors of the Indian Economy (2009–10 and 2011–12)



Source: Author's computation using 68th (2011-12) employment-unemployment survey by the National Sample Survey Office (NSSO 2013).

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Within and Outside Sector Skilled Employment though Employment Linkage Effects

Employment Linkage Effects

Employment linkage effects: forward and backward (Bulmer-Thomas, 1982)

Backward employment linkage: how much employment in one sector can create jobs in other sectors, when final demand within that sector increases by unity.

Forward employment linkage: how much employment in one sector can create jobs within itself, when final demand from rest of the economy increases by unity.

METHODOLOGY

Incorporating different types of employment into an I-O model (Bulmer-Thomas, 1982)

<u>Assumption:</u> constant returns to scale

fixed employment coefficient : $E_i = L_i / X_i$ ------- (1), (i = 1,2,…,n) homogeneous labour
heterogeneity in labour force: different types of employment, $L_i = LS_i + LMS_i + MHS_i + HS_i$ --------- (2)

Fixed employment coefficient with respect to each type of employment:

Following the conventional I-O model: $X = (I - A)^{-1} F$ and juxtaposing that in those above labour equations with respect to different skill level,

Calculate Employment Forward as well as Backward linkages with respect to all four types of skill level

Data Sources

Input-Output table of India for the year 2009–10 published by the **Central Statistics Office (CSO)** and **Input-Output table for 2011** published by the **World Input-Output Database (WIOD)** (Timmer, 2012)

National Sample Survey Office (NSSO) 66th (2009-10) and 68th (2011-12) round of employment-unemployment survey

NIC 2008, 2004

Price and Quantum indices published by the **National Accounts Statistics 2011 and 2014**

Clubbing Sectors

- **I-O table for 2011 (World Input-Output Database, Timmer, 2012)**– 35 sectors
- **I-O table of India for 2009–10 (CSO) –** 130 sectors

Aggregated to 23 sectors – provides macro picture of the Indian economy consisting of the primary, manufacturing, non-manufacturing and services sector

Choosing sectors:

Map with - 24 priority sectors mentioned by National Policy for Skill Development & Entrepreneurship (2015)
- NIC (2008)

Concordance table of sectors in WIOD (2011), NIC (2008) and National Policy for Skill Development & Entrepreneurship (2015)

BACKWARD LINKAGE: OUTWARD SECTOR EMPLOYMENT (FOR 2009-10 & 2011-12)

Low skill	Low-med skill	Med-high skill	High skill
Agriculture	Agriculture	Wood & wood products	Other services
Wood & wood products	Wood & wood products	Paper products	Paper products
Food, beverages & tobacco	Textiles	Textiles	Communication
Hotels & restaurants	Food, beverages & tobacco	Other services	Financing, real estate & business activities
Leather products	Hotels & restaurants	Food, beverages & tobacco	Trade
Textiles	Leather products	Hotels & restaurants	Leather products
Construction	Construction	Trade	Wood & wood products

Note: ranking of the sectors in descending order
Source: Author's estimation using I-O table for India for 2011 using WIOD (Timmer, 2012)

SUMMARY OF RESULTS FROM EMPLOYMENT BACKWARD LINKAGE

- agriculture (as a whole except forestry & fishing) is creating all four types of employment in other sectors
- Among manufacturing, 'textiles' is creating above unitary employment at all types of skill level, however, 'food, beverages & tobacco' creates mostly low and low-medium skilled employment for both the years. And within 'textiles', especially 'cotton & jute textiles' are creating more employment in other sectors
- Services sector is mostly engaged in creating medium-high and high skilled jobs, especially 'other services', 'trade', 'financing' etc.
- However, some manufacturing sectors like 'paper products' mostly publishing activities create lot of medium-high and high skilled jobs outside the sectors.

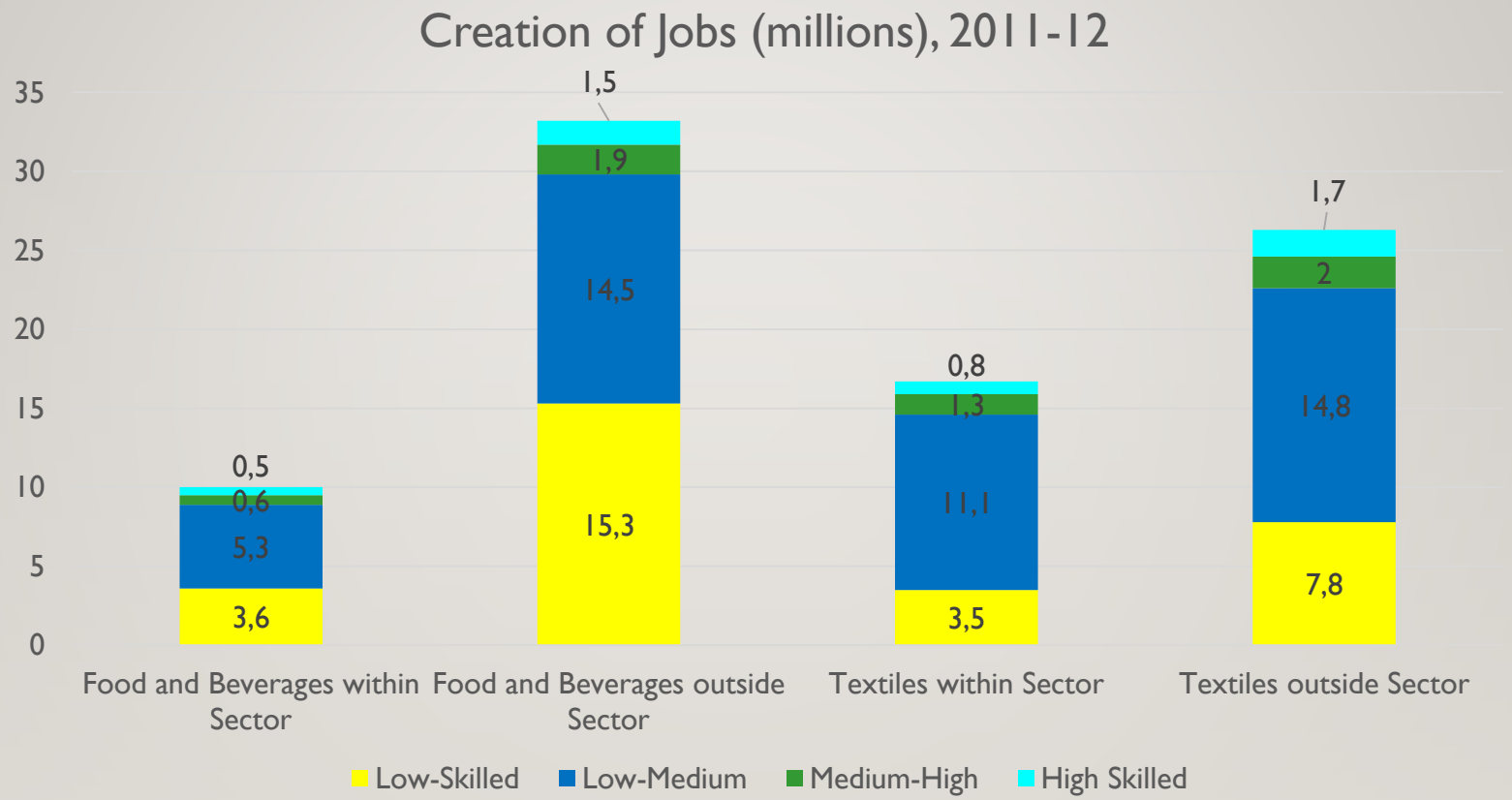
WITHIN SECTOR EMPLOYMENT: FORWARD LINKAGE (FOR 2009-10 & 2011-12)

Note: ranking of the sectors in descending order
Source: Author's estimation using I-O table for India for 2011 using WIOD (Timmer, 2012)

SUMMARY OF RESULTS FROM EMPLOYMENT FORWARD LINKAGE

- A new sector within non-manufacturing ('mining & quarrying') has come up to create within sector employment
- Other sectors like 'paper products' continue to create within sector medium-high and high skilled employment as well.
- Similar result is for the sectors like 'other services', 'textiles', 'financing', etc.

Some sectors are creating more indirect jobs than direct ones..



Source: Author's estimation using I-O table for India for 2011 using WIOD (Timmer, 2012)

Conclusions and Policy Implications

- Agriculture (as a whole except forestry & fishing) is creating all four types of employment in other sectors both inside and outside that sector
- Among manufacturing, 'textiles' is creating above unitary employment at all types of skill level indirectly, however, 'food, beverages & tobacco' creates mostly low and low-medium skilled employment for both the years. And within 'textiles', especially 'cotton & jute textiles' are creating more employment in other sectors
- Services sector is mostly engaged in creating medium-high and high skilled jobs, especially 'other services', 'trade', 'financing' etc. both directly and indirectly
- However, some manufacturing sectors like 'paper products' mostly publishing activities create lot of medium-high and high skilled jobs outside the sectors.
- Creates a basis for manufacturing vs services in terms of their employment creation in terms of different levels of skill

- Demand side approach to capture the direct as well as indirect employment creation by the sectors

Thank You