

Estimating Direct, Indirect, and Induced Employment from Highway Construction in India

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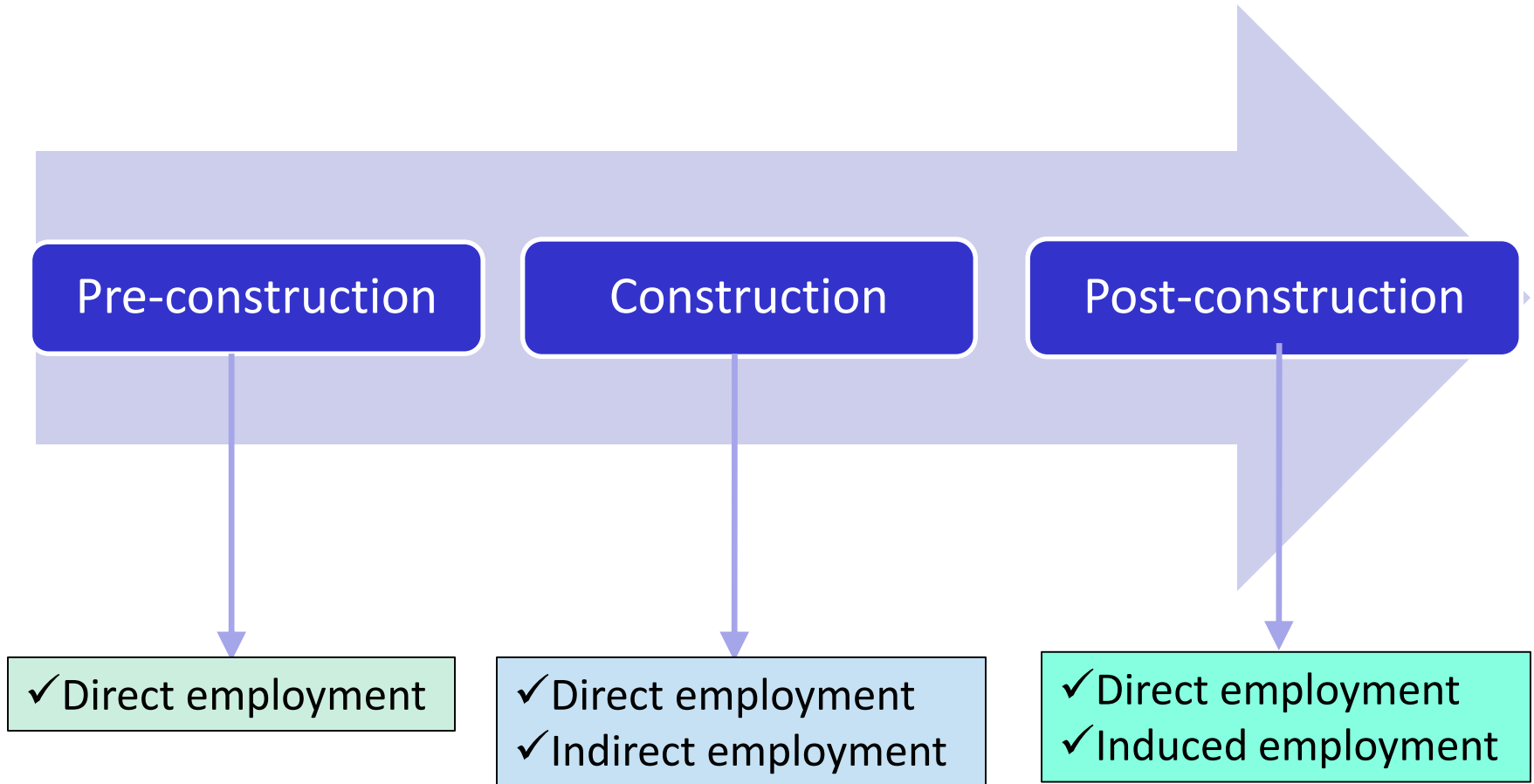
Objective

- **The objective** of this presentation is to estimate the employment created through highway construction
 - This study used data for from four projects in two states: UP and Maharashtra (in 2016)

The types of employment are:

- **Direct employment:** Managers, engineers, surveyors, supervisors, onsite workmen, machinery operators, specialists likewise
- **Indirect employment:** Vendors who supply materials and who carry out small-scale sub-contracting works like repair of existing structures etc
- **Induced employment:** Changes in employment due to the availability of highways
 - These include both direct (access to more jobs), or indirect (local small company hires more people since its products have larger reach)
 - Local businesses may expand, as the access to customers outside their locality improves due to highway construction

Phases in a Highway Construction



Data

1) Direct employment

- Data collection and employment estimation are easy
- Collected employment data from concessionaires and their contractors

2) Direct employment

- Collected information on vendors and suppliers to the main contractors
- Collected the employment data from them
- Prorated their employment numbers based on the proportion of supplies for the projects considered compared to their overall numbers

3) Induced employment

- Can not use the projects considered for direct and indirect employment as induced employment are generated only post-employment
- Data collected from four different projects in similar regions (as that of projects considered for direct and indirect employment estimates), completed ~7 years back (as of 2016)
- Conducted questionnaire surveys in establishments within 2 km of highway on both sides
- The most challenging estimation

Summary of Direct and Indirect Employment

Proj.	Len (km)	% Compl (as on Dec. 16)	Employment during				Total empl. (Man days as on Dec. 16)	Adj. total empl. (for 100% compl.) ^b	Adj. empl. per km of highway (for 100% compl.)
			Pre-constr.	Constr.		Post-constr. ^a			
				Direct	Indirect				
MH-1	138	80	127,480	2,566,674	2,905,654	21,080	5,620,888	6,988,970	50,645
MH-2	140	80	66,130	3,137,880	3,401,389	21,385	6,626,784	8,261,601	59,011
UP-1 ^c	160	100	119,420	2,122,314	6,389,168	24,440	8,655,342	8,655,342	54,096
UP-2	133	75	62,740	581,210	440,094	20,316	1,104,360	1,444,794	10,863

a - Do not include employment from toll operation and maintenance

b - Estimated using direct projection = $E_{\text{Pre-con}} + E_{\text{Post-con}} + (E_{\text{Con-Direct}} + E_{\text{con-Indirect}})/(\% \text{Comp}/100)$

c - Include employment generated from reconstruction of dismantled buildings

Indirect to Direct Employment Ratio

Project	Project cost (crore)	% Compl.	Construction (Man-days)		Indirect/Direct ratio
			Direct	Indirect	
MH-1	₹1,900	80	2,566,674	2,905,654	1.13
MH-2	₹1,984	80	3,137,880	3,401,389	1.08
UP-1	₹1,955	100	2,122,314	3,103,454	1.47
UP-2	₹400	75	581,210	440,094	0.75

- The weighted average (by project cost) indirect to direct employment ratio is **1.25** (ignoring UP-2 project)

Summary

- The estimates of direct and indirect employment are made using comprehensive survey data
- For projects in Maharashtra, the direct employment per lane km (excluding service lane) is **5,679** man-days
- By including a comparable project in UP, this number is **4,800** man-days
- The ratio of direct employment: indirect employment: induced employment can be taken as 1.00:1.25:11.70
- Terrain plays a significant role in deciding the level of employment generation in road construction projects
- More number of sub contractors leads to higher employment generation in highway projects
- Some employments are excluded in the estimates, including the ones from toll booth operations