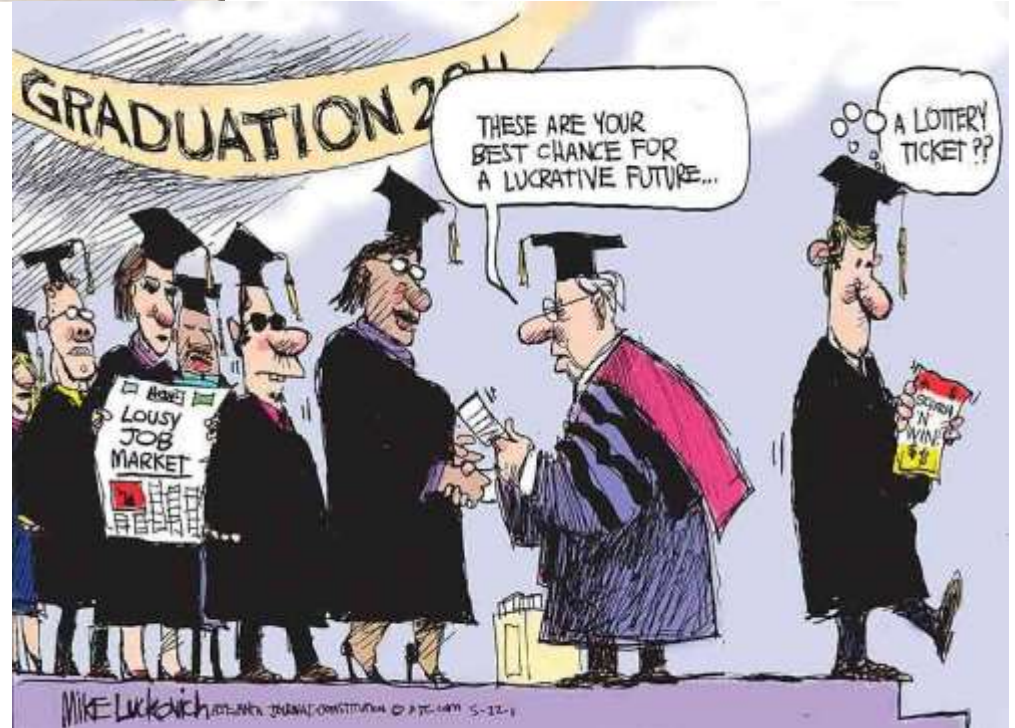
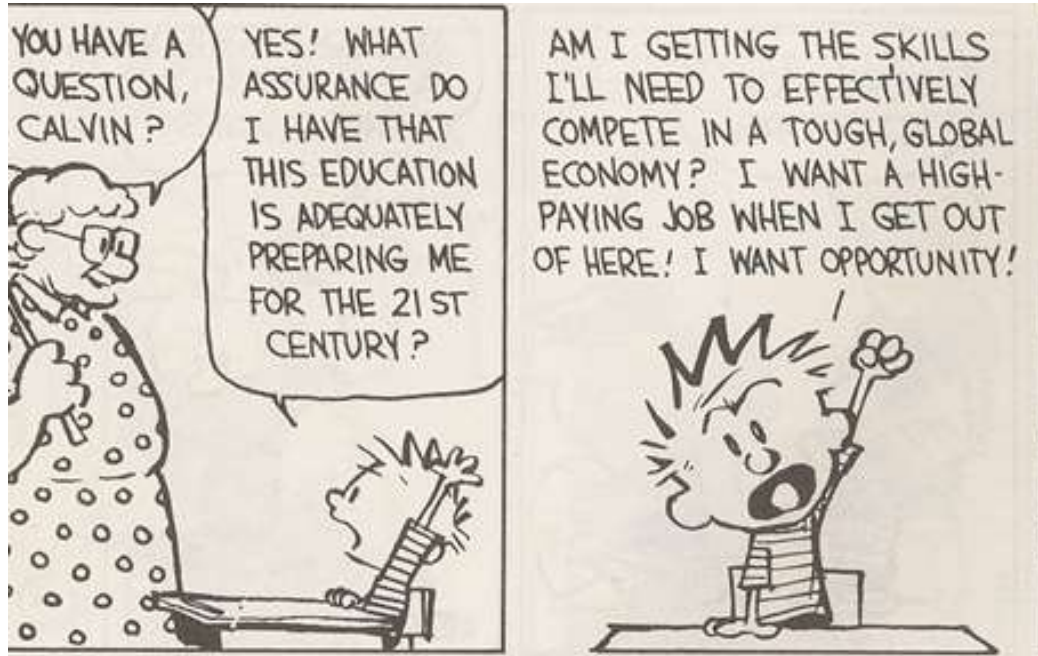


# **Skill Content Embodied in Jobs: An Exploration**

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**Jobs for Development: Creating Jobs in South Asia**  
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# **VIII<sup>th</sup> Five Year Plan (1992-97)**

Articulation of the Problem:  
Demand Side vs Supply Side

*“Demand for labour cannot always be created to suit the characteristics of labour supply. **Shortages and surpluses** are found to coexist in the labour market due to the **mismatch between skill** and other requirements of **new employment opportunities** and the **attributes of available workers**. This phenomenon is likely to be more marked in a situation of **rapidly changing technologies and work organization**. (N)ecessary to intervene on the supply side of the labour market with a view to **improving the employability of workers** in general, and promoting such **institutional structures and arrangements for training and skill upgradation** which could **speedily respond to rapidly changing requirements of productive activities, in particular**”*

# Changing Nature of Work

- Skill Biased Technical Change (Skilled vs Unskilled Workers), Automation Hypothesis (Routine and Non Routine Tasks)
- Fragmentation of Tasks
- *These issues were raised by Pankaj Vashist in his presentation yesterday.*
- *How many jobs are routine and non-routine? (Ex: ATM Security Guards)*
  - Journal of Economic Perspectives (Summer 2015): Automation and Labor Markets
    - Foreign Affairs (July/August 2015 Issue) Hi, Robot: Work and Life in the Age of Automation

# What Workers Make (NIC) & What Workers Do (NCO)

1. For each individual who is working we have his or her NIC3\*NCO3
2. Within a NIC which & how many jobs were lost between 2004-05 - 2009-10?
3. Within a NIC which & how many jobs were gained between 2004-05 - 2009-10?
4. Within a NIC which & how many jobs remained between 2004-05 - 2009-10?

NIC Description	NIC Code	No of New NCO (66)	No of Replaced NCO (61)	Commo n NCOs	% of new NCOs in total emp (66)	% of Replaced NCOs in total emp(61)
Manufacturing nec	369	11	14	29	2.88	13.31
<b>Manufacture of other textiles</b>	<b>172</b>	<b>17</b>	<b>14</b>	<b>23</b>	<b>11.88</b>	<b>2.92</b>
Repair of personal and household goods	526	14	9	26	3.33	2.82
Human health activities	851	19	12	35	5.28	1.70
Secondary/Senior Secondary education	802	14	9	31	1.36	0.33
<b>Manufacture of tobacco products</b>	<b>160</b>	<b>12</b>	<b>9</b>	<b>13</b>	<b>9.08</b>	<b>0.61</b>
Manufacture of non-metallic mineral products n.e.c.	269	14	12	38	3.35	0.61
Activities of pvt hhs as employers of domestic staff.	950	12	20	16	1.64	11.70
Manufacture of products of wood, cork, straw etc	202	13	11	25	6.98	11.49
Other service activities	930	22	9	33	5.18	0.99
Primary education	801	19	9	28	1.68	0.11
Restaurants, bars and canteens	552	12	12	22	2.73	0.40
Spinning, weaving and finishing of textiles.	171	11	15	35	4.20	3.72
<b>Manufacture of wearing apparel, except fur apparel</b>	<b>181</b>	<b>17</b>	<b>15</b>	<b>18</b>	<b>4.49</b>	<b>0.65</b>
Administration of the State	751	18	6	78	3.00	0.22
Other retail trade of new goods in specialized stores	523	22	6	36	1.78	0.19
Farming of animals	12	10	10	15	7.54	0.51
Other land transport	602	19	15	41	0.91	1.06
Retail sale of food, beverages and tobacco	522	20	23	37	1.24	0.41
Building of complete constructions or parts thereof	452	22	11	51	1.09	0.21

# Need to Make Sense of the Table

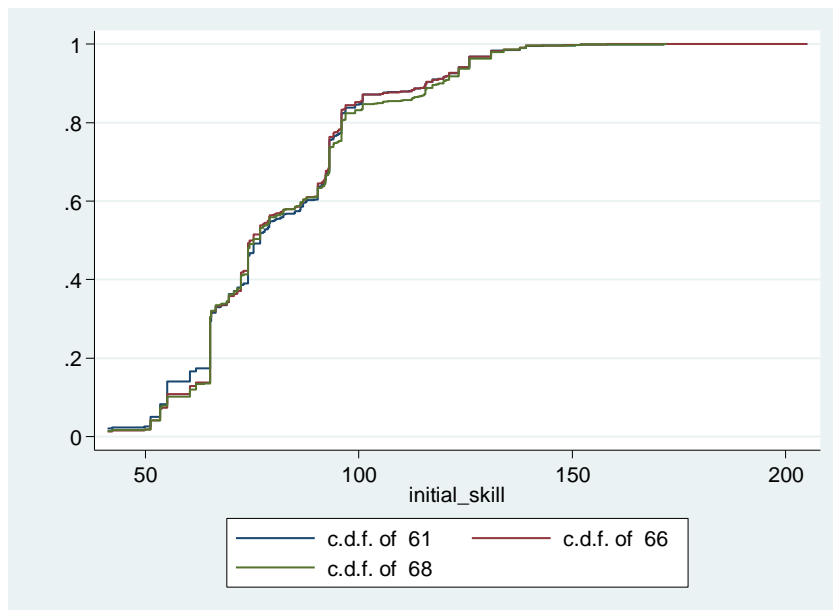
1. An Exploration Using Occupational Information Network, Developed by US Department of Labour
2. Based on inputs from employees and occupational analysts - describe each occupation in terms of several characteristics/variables
3. Abilities, Skills, Knowledge



Skill Index	Min	Max	Weighted mean		
			61	66	68
Cognitive	19.6	243.0	81.5	92.2	95.8
Psychomotor	2.2	143.9	54.4	55.1	53.1
Physical	0.0	101.7	31.6	32.9	31.2
Sensory	14.8	139.5	55.7	60.2	61.5
Basic Skills(content)	12.9	300.2	86.0	98.4	103.2
Basic Skills(process)	15.4	369.5	94.1	110.9	117.5
Social Skills	17.4	307.6	79.6	92.2	97.7
Problem Solving	15.9	482.2	83.6	111.9	120.4
Technical Skills	0.4	114.8	25.5	26.5	26.6
Systems Skills	9.4	509.8	62.5	92.7	102.4
Resource Management Skills	10.5	438.3	52.4	75.9	84.7

- Use **O-Net\*** to calculate different skills embodied in each occupation, Calculate skill level of all workers in a NCO as weighted mean of skills where the weight = proportion of workers in each NCO

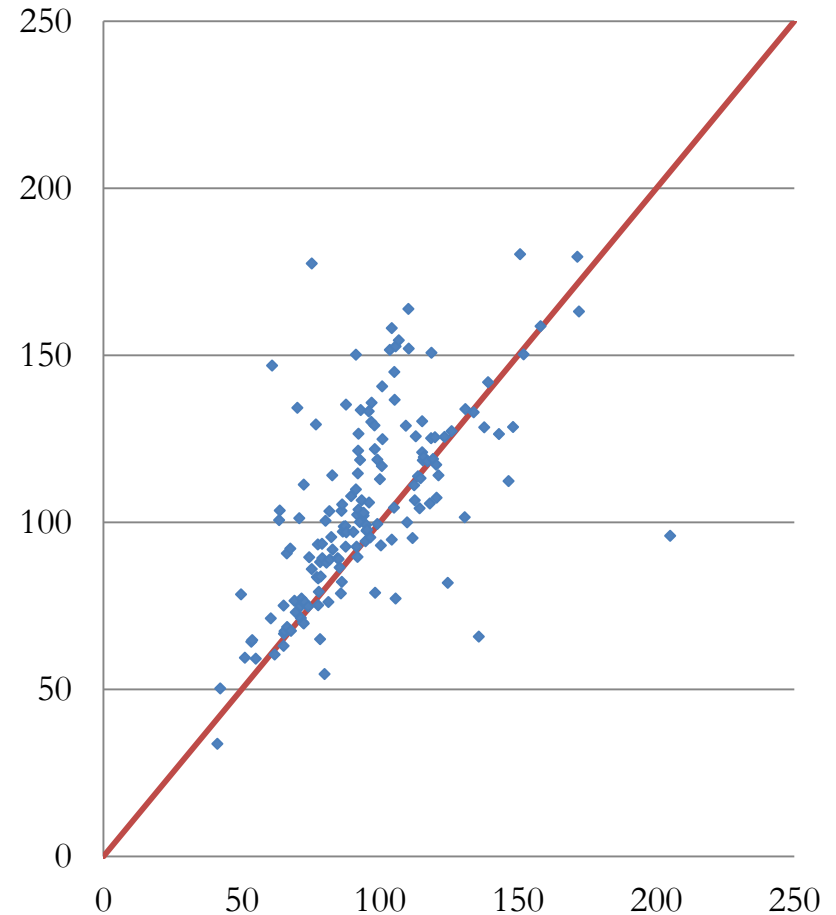
Calculate the skill embodied in each NIC, arrange the NIC in increasing order of skill in 2004-05 and plot the cdf



CDFs overlap

Careful: Case of Self Employed

Skill within industries  
X (Y)-axis: Cognitive Skill Index of Industry in 2004-05 (2009-10)



# **Addressing Reservations about Using O-Net**

# Overlay O-Net & Census 2001 data on 409 Non-Farm Occupations

- Model district level change in number of workers and population growth (2001-2011) as a function of initial distribution (2001) of skills
- Distribution of educational attainment is not statistically significant
- District level Index of Cognitive Skill is statistically significant

*- Ishwarya Balasubramanian (2015)*

*Local Skill Concentrations and District Employment Growth:  
A Spatial Simultaneous Equation Approach for India*

## Concluding Remarks

- Not sure we all agree on what skills mean, what are routine tasks. Need to address how we will work out skill embodied in each NCO and hence each NIC
- Is there a need for mapping of NCO to Tasks / Skills – exercise specific to South Asia? Would this help in making sense of what is happening in job market?
- The statistical system also needs to respond to the changing nature of work and hence data collected in the surveys

# Recap

1. Village ► Urban, Non Farm Employment, *Articulation of the Problem*: Demand Side vs Supply Side
2. What Workers Make (NIC) & What Workers Do (NCO)
3. Human Capital (Education) Vs Skill Embodied in the NCO (O-Net)
4. Overlaying O-Net on NSSO Data: NSSO's Employment and Unemployment Survey
5. Quantify how the skill component of workers has changed across NICs
6. District Employment Growth (Census of India 2001-11) and Initial Distribution of Skills
7. Epilogue: Let us agree on what skills mean, collect better data, do we need to construct a O-Net specific to South Asia

*Sorry for the inconvenience*



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MILLS ROAD



If Rome was  
built in a day  
we would have  
used the same  
contractor

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NOW  
ONLY





Cognitive Abilities		Physical Abilities
Oral Comprehension	Category Flexibility	Static Strength
Written Comprehension	Mathematical Reasoning	Explosive Strength
Oral Expression	Number Facility	Dynamic Strength
Written Expression	Memorization	Trunk Strength
Fluency of Ideas	Speed of Closure	Stamina
Originality	Flexibility of Closure	Extent Flexibility
Problem Sensitivity	Perceptual Speed	Dynamic Flexibility
Deductive Reasoning	Spatial Orientation	Gross Body Coordination
Inductive Reasoning	Visualization	Gross Body Equilibrium
Information Ordering	Selective Attention	
	Time Sharing	