UNIVERSITÉ DE NEUCHÂTEL

Multidimensional Well-being:
Conceptual, Methodological, and Analytical Perspectives

MADHESWARAN SUBRAMANIAM, ISEC BANGALORE
CHRISTIAN SUTER, UNIVERSITY OF NEUCHÂTEL

OVERVIEW

Part I

- Aims and structure of the project
- Activities during the 2 project years
- Overview on scientific output of the project
- Difficulties encountered
- Future collaboration
- Overview on results

Part II

- Focus on results of the paper “Social Exclusion and Caste Discrimination in Public and Private Sectors in India”
- Social and policy impact

AIMS AND STRUCTURE OF THE PROJECT

- **Aims of the project**
  - Providing a more coherent and more sophisticated understanding of multidimensional well-being by employing a cross-cultural and multidisciplinary perspective
  - Joint scientific research output (conference presentation, working papers, 2-3 papers ready for submission to journals)
- **Three research axes**
  - Conceptualizing multidimensional well-being
  - Measuring and synthesizing multidimensional well-being
  - Analyzing in more detail specific aspects of multidimen. well-being in India and Switzerland (elderly, youth, poverty, social exclusion)
- **Three institutions involved (no previous collaboration)**
  - ISEC, Bangalore (4 researchers)
  - FORS, University of Lausanne (2 researchers)
  - Sociological Institute, University of Neuchâtel (4 researchers)
  - 2nd year: collaboration with R. Brüggemann (Berlin, stat. packages)

ACTIVITIES DURING THE 2 PROJECT YEARS

- **Six joint short visits**
  - Two in Switzerland (Lausanne, Neuchâtel)
  - Four in India (Bangalore, Delhi)
- **Purpose of joint visits**
  - Discussion ongoing research projects of the Swiss and Indian research groups
  - Discussing and defining topics of papers
  - Working on and drafting of joint papers
  - Joint revisions of common papers
  - Jointly organizing an international conference
- **Forms of Indo-Swiss collaboration**
  - Collaboration on within the framework of sub-groups (the authors/coauthors of the papers)
  - Common discussion of joint conference presentations
  - Common discussion of joint papers: concepts, first analyses, drafts and revisions
  - Combining the methodological strengths and experiences of the Indian and Swiss research groups (India: experts on AF approach; Switzerland: experience in CFA, recently POSET)
  - Working with data of the other country (Indian researcher: working with Swiss Household Panel Data; Swiss Researchers: working with the India District Level Household Survey)
  - Common organization of an international conference

SCIENTIFIC OUTPUT OF PROJECT (1)

- **Papers and articles published and drafted**
  - 2 articles published in peer-reviewed journals
    - "Exploring multidimensional well-being in Switzerland: Comparing Three Synthesizing Approaches," *Social Indicators Research* (2016, first online)
    - "Social Exclusion and Caste Discrimination in Public and Private Sectors in India: A Decomposition Analysis," *Indian Journal of Labour Economics* (2017, first online)
  - 1 chapter published in a peer-reviewed volume
    - "Application of Partial Order Theory to Multidimensional Poverty Analysis in Switzerland," (book chapter in: Partial Order Concepts in Applied Sciences, Springer, 2017)
  - 1 working paper finished
    - "Ranking Karnataka Districts by the Multidimensional Poverty Index (MPI) and by Applying Simple Elements of Partial Order Theory"
  - 1 contribution to a government report of India
    - "Youth Development Index and Report 2017" (2017, Ministry of Youth Affairs, Government of India)

SCIENTIFIC OUTPUT OF PROJECT (2)

- 3 papers started drafting (first drafts, but not yet finalized)
  - "Conceptualization and Measurement of Mulitidimensional Well-being"
  - "Living Arrangements of Elderly in India. Patterns and Well-being Implications
  - "Inequalities in Well-being in India: A Multi-dimensional Analysis"
- 9 presentations of papers at national and international conferences
- Organisation of a workshop on "Indian and Swiss perspectives on well-being, poverty and inequality" (University of Neuchâtel, June 2016)
- Organisation of an international conference on the "Middle Class in World Society" (ISEC, Bangalore, December 16-17)
  - 35 speakers from India, Switzerland, United States, Germany, Italy, China, South Africa, Mexico
  - Financed by the World Society Foundation (Zurich)

SCIENTIFIC OUTPUT OF PROJECT (3)

SCIENTIFIC OUTPUT OF PROJECT (4)

INVITED PANELISTS

Satish Deshpande, University of Delhi, Dehli, India
Darrick Hamilton, The New School, New York, USA
Surinder Singh Jodhka, Jawaharlal Nehru University, New Delhi, India
P.G. Jogdand, University of Mumbai, Mumbai, India
Jessica Peña, University of Maryland, USA
R. Balasubramaniam, Grassroots Research and Advocacy Movement, Mysore, India
Rakesh Kochhar, Pew Research Center, Washington, D.C., USA
Kris Marsh, University of Maryland, College Park, USA
D Narasimha Reddy, Institute for Human Development, New Delhi, India
Jessica S. Welburn, University of Iowa, Iowa City, USA
N. Jayaram, Tata Institute of Social Sciences, Mumbai, India
G. Haragopal, National Law School of India University, Bangalore, India
Li Chunling, Chinese Academy of Social Sciences, Beijing, China

DIFFICULTIES ENCOUNTERED

- **Difficulties linked to data availability**
  - No comparative Indo-Swiss data on well-being available
  - Solution: (1) focus on methodological aspects; (2) separate analyses and papers for the two countries
- **Difficulties linked to time resources available (and salaries)**
  - Not all (co)authors subgroups worked equally well. No resources available for salaries for PhD and postdocs/difficulties to link ongoing PhD research projects to joint Indo-Swiss paper projects caused delays in and abandonment of research work on some of our planned joint papers
- **Difficulties linked to financing**
  - Regarding visits: daily rates provided by the programme have been rather low and not sufficient; Solution: participating institutes covered a substantial part of these costs
  - Budget cut (on the Indian side): solutions: (1) extraordinary supplementary financing of the Indian part of one visit by the University of Neuchâtel; (2) linking project meetings to the seminars of the programme and to activities covered by third-party-funds (conference financed by the World Society Foundation)

FUTURE COLLABORATION

- **Finalizing of not yet finished drafts of joint papers**
  - Conceptualization and Measurement of Mulitidimensional Well-being"
  - Living Arrangements of Elderly in India. Patterns and Well-being Implications
  - Inequalities in Well-being in India: A Multi-dimensional Analysis
- **Preparing submissions of finalized papers to peer-reviewed journals (including revisions)**
  - Ranking Karnataka Districts by the Multidimensional Poverty Index (MPI) and by Applying Simple Elements of Partial Order Theory (to *Social Indicators Research*)
- **Work on joint book publication**
  - A conference volume based on 20 papers presented at the jointly organized international conference on the topic of the "Middle class in world society" will be published (financed by the World Society Foundation, Zurich)

OVERVIEW ON RESULTS: METHODOLOGICAL PAPER 1

- **Methodological paper 1:** Exploring multidimensional well-being in Switzerland (*Social Indicators Research* 2016)
- **Objective of the paper:** how to synthesize / how to aggregate?
  - comparison of three methodological (top-down) approaches to construct a synthetic multidimensional measure of well-being (using the same theoretical framework and one single data set), namely
    - (1) confirmatory factor analysis (CFA),
    - (2) the Alkire and Foster counting approach (AF),
    - (3) the POSET (partial order set theory) approach
- **Theoretical framework and data**
  - Swiss Social Report, domain: production & consumption of social goods
  - Four dimensions (educational and occupational positioning, employment situation, financial situation, work-life balance), measured by 12 indicators

OVERVIEW ON RESULTS: METHODOLOGICAL PAPER 1

- **Main results of methodological paper 1**
  - Similar results of the three methodologies: The different synthetic indicators are highly correlated
  - Limited overlap of the population identified as multidimensionally deprived (within and between) methodologies
  - Comparing AF and POSET shows substantial “in-between cases” of partially deprived (neither fully deprived nor well-off) of 10%-20%
  - Conclusion: Combining the three approaches and their strengths:
    - CFA: To test the consistency of the data and the theoretical framework
    - AF: Simple and immediately understandable; High communicative power regarding dissemination
    - POSET: Useful for prevention: identify the social groups which are at risk of multidimensional deprivation, i.e., those who are not (yet) deprived but may eventually become deprived

OVERVIEW ON RESULTS: METHODOLOGICAL PAPER 2

- **Methodological paper 2:** Application of Partial Order Theory to Multidimensional Poverty Analysis in Switzerland
- **Objective of the paper:** Analyzing multidimensional poverty in Switzerland based on ordinal indicators and applying Partial Order Theory
- **Poverty framework and data**
  - Comparing different models of multidimensional poverty based on four poverty dimensions: Education, monetary poverty, material deprivation, labor market precariousness
  - Swiss Household Panel Data 2013

OVERVIEW ON RESULTS: METHODOLOGICAL PAPER 2

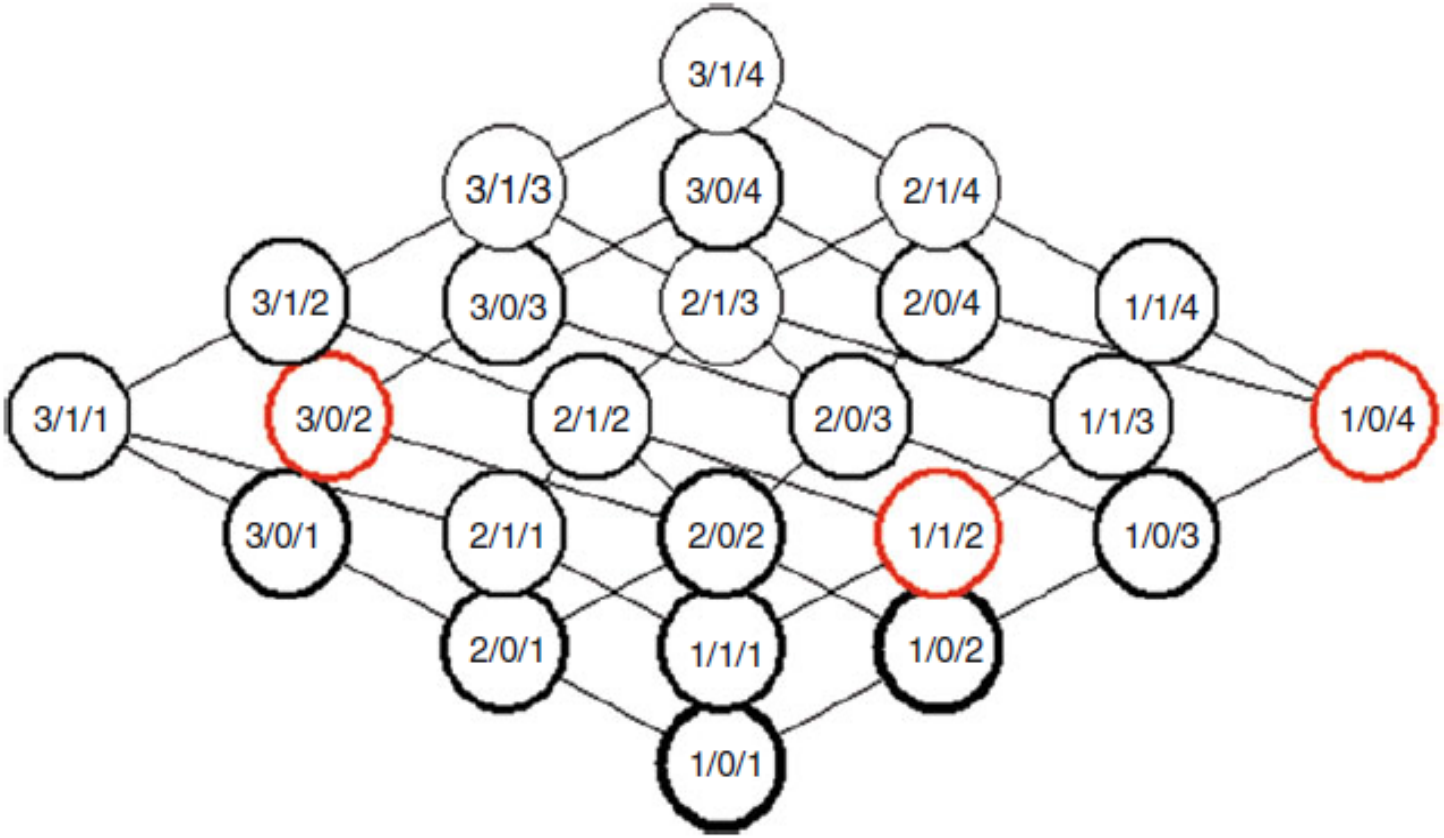


Fig. 1 Profiles (*red*: PARSEC deprived profiles); (*bold*: OPHI deprived profiles) of model 1 (core model) composed respectively by education, monetary poverty, and material deprivation indicators). Source: Authors' calculations in PARSEC

OVERVIEW ON RESULTS: METHODOLOGICAL PAPER 2

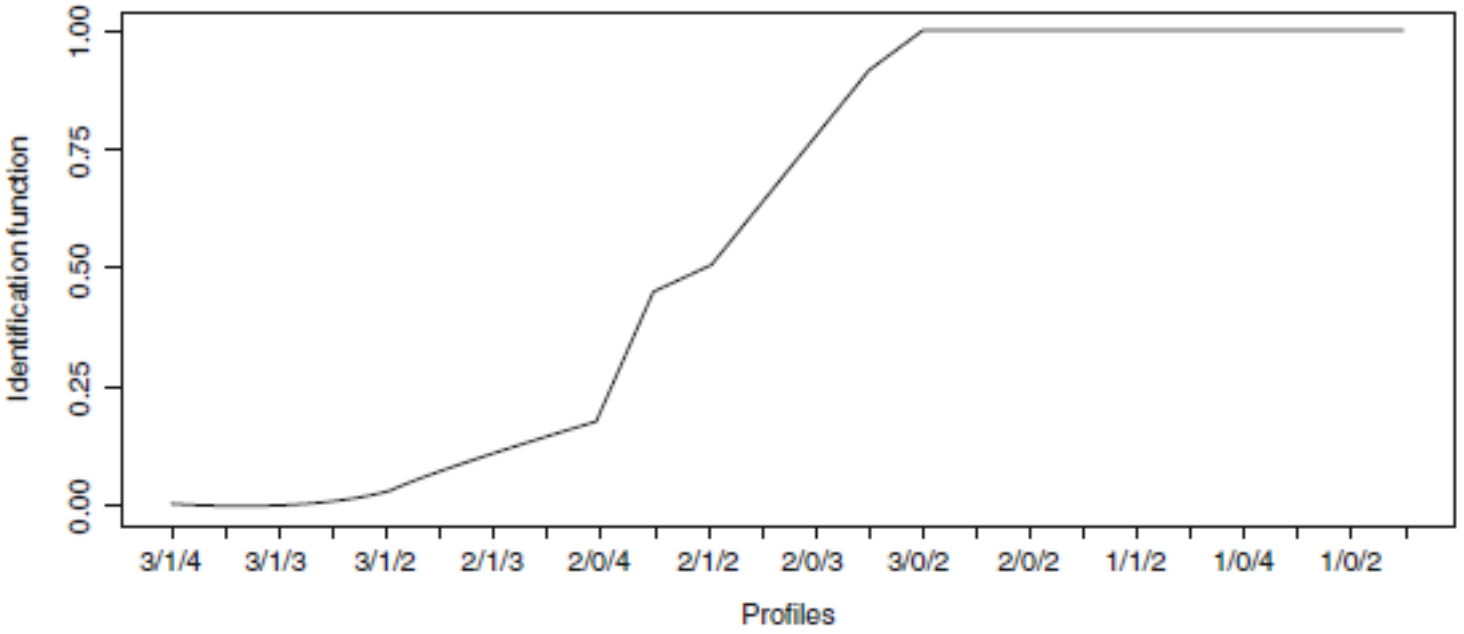


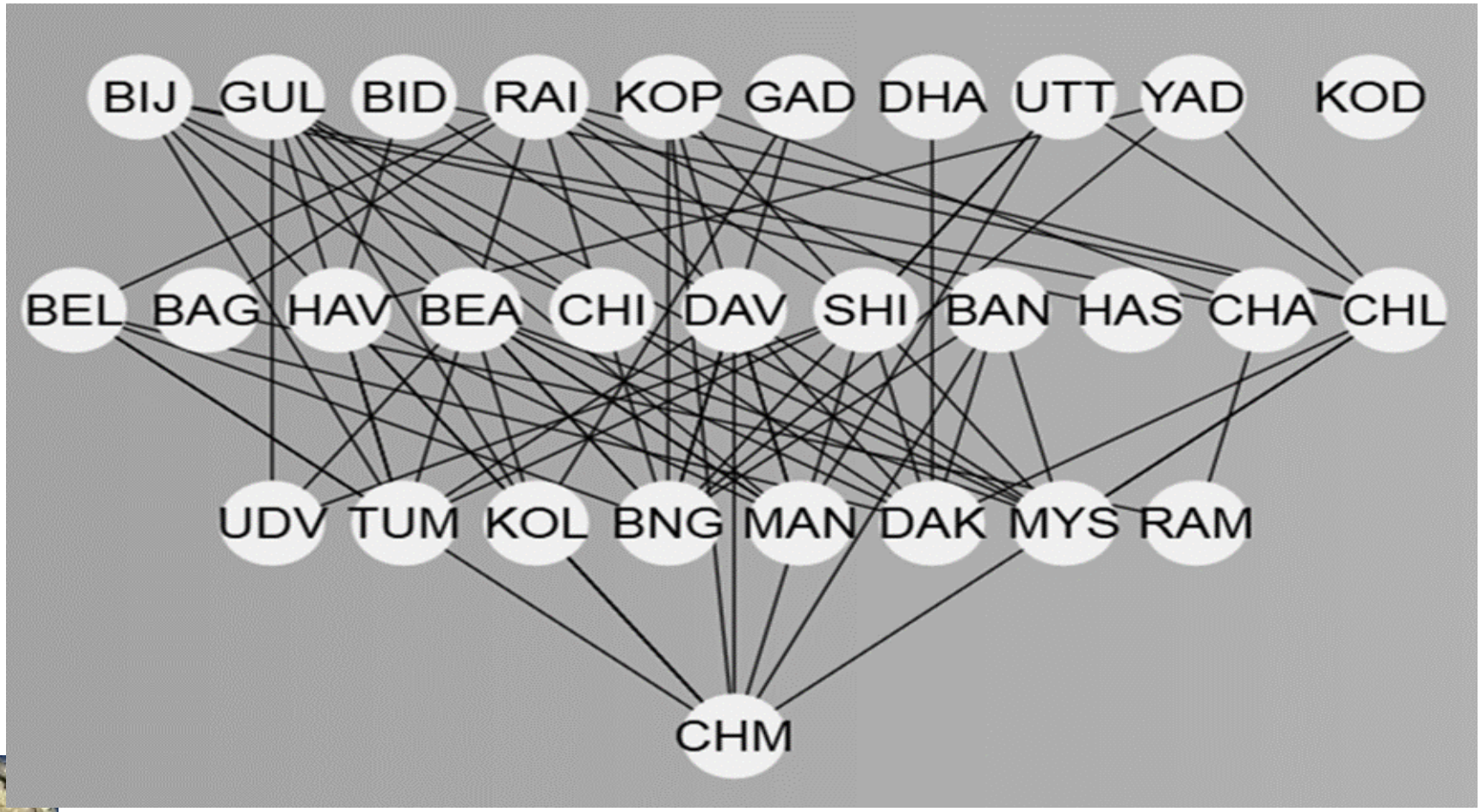
Fig. 2 Identification function (poverty degrees from 0 to 1 for each profile) for model 1 (core model). Source: Authors' calculations in PARSEC

- **Four poverty groups:**
  - Deprivation degree 0.00 to 0.10 : 71%
  - Deprivation degree 0.11 to 0.49 : 19%
  - Deprivation degree 0.50 to 0.99 : 4.5%
  - Deprivation degree 100: 5.5%

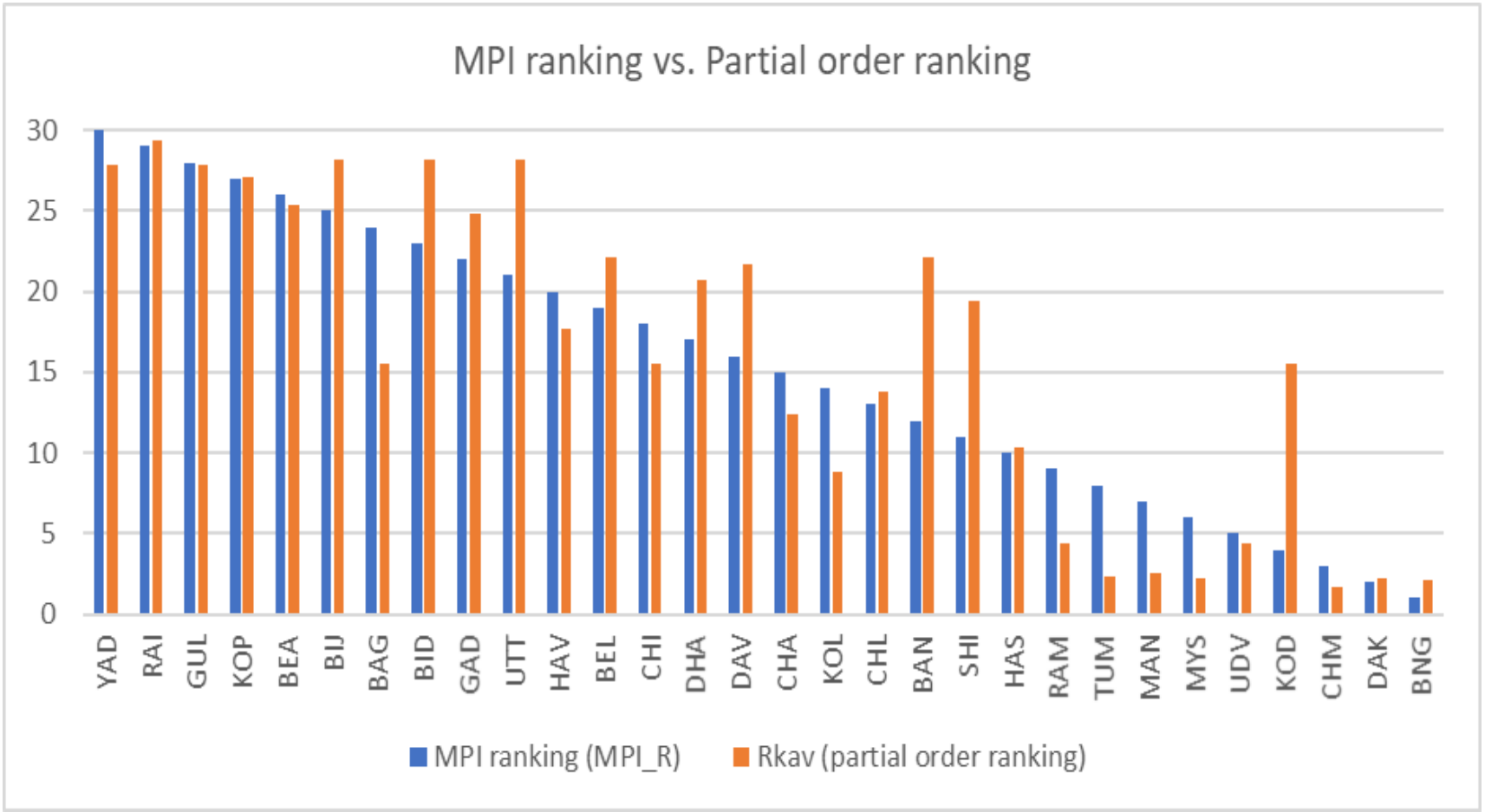
OVERVIEW ON RESULTS: METHODOLOGICAL PAPER 3

- **Methodological paper 3:** Ranking Karnataka Districts by the Multidimensional Poverty Index and by Partial Order Theory
- **Objective of the paper: How to rank ?**
  - Comparing the ranking of the 30 Karnataka districts based on the multidimensional poverty index (MPI) with partial order ranking
  - Exploring comparabilities and incomparabilities of the 30 districts regarding the 10 indicators of the MPI
- **Data and methods**
  - India District Level Household Survey 2012/13 for State of Karnataka
  - Alkire and Foster method: Multidimensional Poverty Index (MPI), based on 10 indicators (yrs of schooling, child enrolled, child mortality, nutrition, electricity, water, toilet, floor, cooking fuel, assets)
  - Partial order method and PyHasse software

OVERVIEW ON RESULTS: METHODOLOGICAL PAPER 3



PARTIAL ORDER RANKING



Unfair Advantage: Understanding Caste Discrimination in Urban India

S. Madheswaran
B.P.Vani
Smrutirekha Singhari

Institute for Social and Economic Change (ISEC)
Bangalore

Background:

- Two policy directions have emerged: “Economic Empowerment” and “Equal Opportunity” .
- Providing equal opportunity through instruments like reservations - considerable disagreement among private sector leaders.
- Reservation policy is confined to a tiny government sector and the vast private sector remained outside the purview of the reservation policy.
- In other countries, the affirmative action policy has been put into practice both for public and private sectors.
- Views have been expressed both in favour and against reservation in the private sector. Employers’ Associations have particularly opposed this move (Economic Times, 26 March 2004).

Theoretical Insights & Economic Implications of Discrimination

- Becker (1971) , Arrow (1972), Phelps (1972), Akerlof (1976, 1980) and Tzannatos (1987)
- Few economists have tried to grapple with the issue of caste-based economic exclusion and discrimination in India.
- Why the governments in developed and developing countries concern about economic discrimination? Is discrimination only an equity issue or it also involves economic costs to the society? Are the costs it imposes on the society more social and political than economic?
- Insights of mainstream economic theory of discrimination indicate –

➢ Economic discrimination, particularly market discrimination, do hamper economic growth

➢ Bring unequal income distribution and deprivation for discriminated groups

➢ Create potential situation for inter-group conflict (Birdsall & Sabot, 1991).

Contd…

- Discrimination also affects productivity by reducing the magnitude of investment in human capital by the discriminated group and the return on this investment (Birdsall & Sabot 1991).
- Close look at (Ambedkar's Memorandum)

➢ Southborough Committee (1919)

➢ Revision of Govenment of Indian Act 1919 (about ten year latter in May 1928)

➢ Second attempt was made to revise Government of India Act during 1930/31

➢ Simon Commission in May ,1928

➢ Final statement came in 1947 in the "State and Minorities –What are their rights and how to secure them in the Constitution of free India" at the time of framing of India's constitution

Contd…

- Ambedkar suggested multiple remedies, to be used in combination to ensure equal opportunity and to ensure fair access and participation to the untouchables in the social, political and economic process in the society .
- When the legal safeguards against the practice of caste discrimination were suggested both for private and public sector.

➢ Ambedkar writes: "Discrimination against citizens by government officers in public administration or by private employers in factories and commercial concerns on the grounds of race or creed or social status should be treated as offences." (State and Minorities, 1979, p. 396).

Contd….

- Insights from economic theories of caste system indicate that market discrimination is a typical case of market failure and brings huge economic inefficiency and adversely affect prospect for the economic growth.

- The policy implications of the theoretical views call for market interventions to over come market failure - both for promoting economic growth and ensuring fair access to the discriminated groups not only to employment but also to other market and non-market spheres.

Sources of Data

•The present study uses unit level data collected by National Sample Survey Organization (NSSO), India.

•The employment and unemployment surveys are conducted during 1983 (January 1983 to December 1983), 1993-94 (July 1993 to June 1994), 2004-05 (July 2004 to June 2005), 2011-12 (July 2011 to June 2012). These quinquennial rounds are referred as 38^{th} round, 50^{th} round, 61^{st} round, and 68^{th} round respectively.

•Human Capital Characteristics- Age , levels of education

•Demographic characteristics- gender, social group, religion, marital status, location (rural/ urban), region (north, south, east, and west);

•Job characteristics- industry, occupation (8 categories such as, administrative, professional, clerical, service, sales, farmer, production, elementary occupation), sector (Public/Private).

•Employment status- Regular, Casual, Self-employment, Unemployed.

•Wages

Methodology to Measure the Extent of Discrimination in the Labour Market

1. Single Equation Method
2. Blinder-Oaxaca Method
   - Blinder, A. S. (1973), Oaxaca, R. L. (1973)
3. Cotton, Neumark and Oaxaca/Ransom
   - Cotton, J. (1988) Neumark, D. (1988), Oaxaca, R. L and M. R.Ransom (1994)
4. Expanded Decomposition
   - Detailed decomposition analysis of occupational and wage discrimination integrating wage differential and Occupational segregation framework-Madheswaran and Attewell (2007); Thorat and Madheswaran (2006-Working paper).
5. Machado and Mata decomposition Technique (MACHADO J.A.F. and J. MATA, 2005; Melly, 2006)
6. Multivariate Decomposition for Nonlinear Response Model (Nielsen,1998; Powers, Yoshioka and Yun , 2011)

Decomposition Logic

Oaxaca and Blinder Method

GW= Endowment Difference + Unexplained difference.

First component also can be called as Explained Difference or personal characteristics difference or skill difference..

Second component is due to discrimination.

Blinder- Oaxaca (1973) Decomposition Method

- The gross wage differential can be defined as

$$G=\frac{Y_{Nsc}-Y_{sc}}{Y_{sc}}=\frac{Y_{Nsc}}{Y_{sc}}-1 \qquad (1)$$

- In the absence of labour market discrimination, the Non SC and SC wage differential would reflect pure productivity differences:

$$Q=\frac{Y^{0}_{Nsc}}{Y^{0}_{sc}}-1 \qquad (2)$$

- The market discrimination coefficient (D) is then defined as the proportionate difference between G+1 and Q+1

$$D=\frac{Y_{Nsc}/Y_{sc}-(Y_{Nsc}/Y_{sc})^{0}}{(Y_{Nsc}/Y_{sc})^{0}} \qquad (3)$$

- The logarithmic decomposition of the gross earnings differential

$$\ln(G+1)=\ln(D+1)+\ln(Q+1) \qquad (4)$$

BO Decomposition contd…

- This decomposition can be further applied within the framework of semi-logarithmic earnings equations (suggested by Mincer, 1974 based on Human capital theory) and estimated via OLS such that

$$\ln \bar{Y}_{Nsc} = \beta^{0}_{Nsc} + \sum \hat{\beta}_{Nsc} \bar{X}_{Nsc} + \varepsilon_{Nsc} \quad \text{(NonSC Wage Equation)} \qquad (5)$$

$$\ln \bar{Y}_{sc} = \beta^{0}_{sc} + \sum \hat{\beta}_{sc} \bar{X}_{sc} + \varepsilon_{sc} \quad \text{(SC Wage Equation)} \qquad (6)$$

- The gross wage differential in logarithmic term is given by

$$\ln(G+1) = \ln(\bar{Y}_{Nsc} / \bar{Y}_{sc})$$

$$= \sum \hat{\beta}_{Nsc} \bar{X}_{Nsc} - \sum \hat{\beta}_{sc} \bar{X}_{sc} \qquad (7)$$

- The hypothetical SC earnings function can be given as (if SCs are paid like NonSCs, how much they would have earned)

$$\ln \bar{Y}_{sc} = \sum \hat{\beta}_{Nsc} \bar{X}_{sc} \qquad (8)$$

BO Decomposition contd…

- Substituting equation (8) in equation (7) we get

$$\ln\bar{Y}_{Nsc} - \ln\bar{Y}_{sc} = \sum \hat{\beta}_{Nsc}(\bar{X}_{Nsc} - \bar{X}_{sc}) + \sum \bar{X}_{sc}(\hat{\beta}_{Nsc} - \hat{\beta}_{sc}) \qquad (9)$$

- Alternatively, the decomposition can also be done as

$$\ln\bar{Y}_{Nsc} - \ln\bar{Y}_{sc} = \sum \hat{\beta}_{sc}(\bar{X}_{Nsc} - \bar{X}_{sc}) + \sum \bar{X}_{Nsc}(\hat{\beta}_{Nsc} - \hat{\beta}_{sc}) \qquad (10)$$

Limitations:

1. Index number problem
2. The advantage of overcoming index number problem is to decompose the unexplained into overpayment (benefit of being forward castes in LM) and underpayment (Cost of being SC in LM)

Cotton/Neumark/ Oaxaca and Ransom Approach

1.Skill Difference

2.Unexplained Difference can be Decomposed as:

- Over Payment to Forward Caste
- Under Payment to SC

Cotton/Neumark/ Oaxaca and Ransom Approach

The logarithmic Wage Differential is written as

$$\ln\bar{Y}_{Nsc} - \ln\bar{Y}_{sc} = \sum \beta^{*}(\bar{X}_{Nsc} - \bar{X}_{sc}) + \sum \bar{X}_{Nsc}(\hat{\beta}_{Nsc} - \beta^{*}) + \sum \bar{X}_{sc}(\beta^{*} - \hat{\beta}_{sc}) \qquad (11)$$

To find out the true wage structure in the absence of discrimination

Cotton Method- $\beta^{*} = P_{Nsc}\hat{\beta}_{Nsc} + P_{sc}\hat{\beta}_{sc}$ (12)

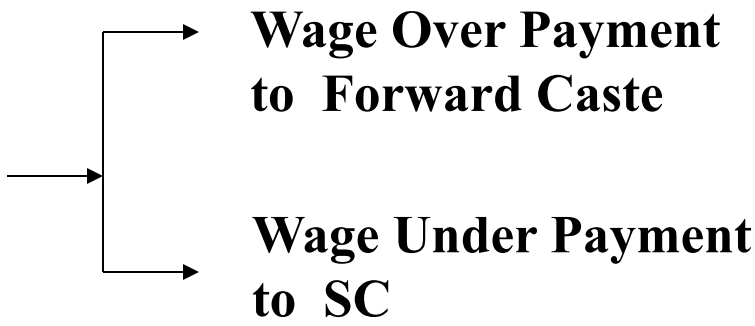
Oaxaca & Ransom Method- $\beta^{*} = \Omega\hat{\beta}_{Nsc} + (I-\Omega)\hat{\beta}_{sc}$ (13)

$$\Omega = (X'X)^{-1}(X_{Nsc}'X_{Nsc}) \qquad (14)$$

$$X'X = X_{Nsc}'X_{Nsc} + X_{sc}'X_{sc} \qquad (15)$$

Brown, Moon and Zoloth (1980) Decomposition Method and Expanded Decomposition (Madheswaran and Attewell, 2007)

1. Job Explained
2. Job Discrimination
3. Wage Explained
4. Wage Discrimination



Expanded Decomposition :

$$\ln(G+1) = \sum_i \tilde{\beta}_{iNSc}(\bar{X}_{iNSc})(P_{iNSc} - \hat{P}_{isc}) \quad \textbf{(Job Explained)}$$

$$+\sum_i \tilde{\beta}_{iNSc}(\bar{X}_{iNSc})(\hat{P}_{isc} - P_{isc}) \quad \textbf{(Job Discrimination)}$$

$$+\sum_i P_{isc}[\tilde{\beta}_i^{*}(\bar{X}_{iNSc} - \bar{X}_{isc})] \quad \textbf{(Wage Explained)}$$

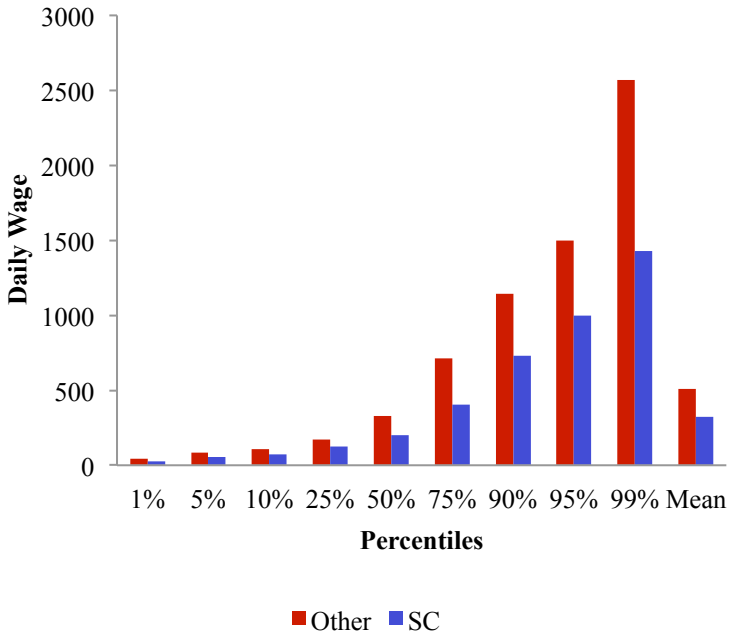
$$+\sum_i P_{isc}[\bar{X}_{iNSc}(\tilde{\beta}_{iNSc} - \tilde{\beta}_i^{*})] \quad \textbf{(Wage overpayment to NSC)}$$

$$+\sum_i P_{isc}[\bar{X}_{isc}(\tilde{\beta}_i^{*} - \tilde{\beta}_{isc})] \quad \textbf{(Wage underpayment to SC)}$$

Raw Wage Gap

- Simple comparison by percentile tell us that there is considerable heterogeneity
- Measuring pay gap at the mean of each distribution can produce misleading picture
- Mean pay gap can hide larger or smaller gaps between high-paid FC and SC or between low-paid FC and SC.
- The main interest of quantile regression over ordinary least squares is the possibility to estimate the marginal effect of a covariate (for example, caste) on log wage at various points of the wage distribution and not only at the mean.
- But these are only raw wage gaps. In order to find out how much of the observed raw wage gap can be explained by the differences in the returns to various characterizes, we next turn to the quantile regression analysis.

Fig 1: Raw Wage Gap by Caste in Regular Urban LM, 2011-12



4. Quantile Regression Technique

- Quantile regression is a technique for estimating the θ th quantile of a random variable conditional on covariates.

- In our application, the quantile regression model is used. It assumes that the θ *th* quantile of the conditional distribution of the log wage of worker "i" (lnWi) is a linear function of a vector of covariates X .

- *Xi* representing the individual characteristics. It can be written in the following manner:

$$Q_\theta(\ln W_i | X_i) = X_i \beta(\theta), \quad \theta \in [0,1]$$

- As shown by Koenker and Bassett (1978), the coefficient vector $\beta(\theta)$ is estimated as the solution to the following minimization problem:

$$\hat{\beta}(\theta) = \underset{\beta(\theta)}{\arg Min} \left\{ \sum_{i:\ln W_i \geq X_i \beta(\theta)} \theta \left| \ln W_i - X_i' \beta(\theta) \right| + \sum_{i:\ln W < X_i \beta(\theta)_i} (1-\theta) \left| \ln W_i - X_i' \beta(\theta) \right| \right\}$$

Machado-Mata (MM) Decomposition Method

The four steps of the MM procedure to generate a counterfactual log wage distribution are:

1. Generate a random sample of size n from a uniform distribution U[0,1] : $u_1, u_2 \ldots\ldots u_n$.

2. For Non-SC and SC separately, estimate n different quantile regression coefficients:

$$\left\{\hat{\beta}_{u_i}^{nsc}\right\}_i^n , \left\{\hat{\beta}_{u_i}^{sc}\right\}_i^n$$

3. Take a random sample with replacement of size n from the covariate distribution of Non SC and SC separately. Let this random sample be denoted by

$$\left\{x_i^{nsc}\right\}_{i=1}^n \quad \text{and} \quad \left\{x_i^{sc}\right\}_{i=1}^n .$$

4. The counterfactual distributions are estimated as

$$\left\{\ln \hat{W}_i^{0f} = x_i^{sc}\hat{\beta}_{u_i}^{nsc}\right\}_{i=1}^n \quad \text{or} \quad \left\{\ln \hat{W}_i^{0f} = x_i^{nsc}\hat{\beta}_{u_i}^{sc}\right\}_{i=1}^n .$$

Machado-Mata-Melly (MMM) Decomposition Method

At the θ^{th} quantile, the difference between the estimated unconditional quantile of log wage for Non-SC, $\hat{Q}_{nsc}(\theta)$, and the estimated unconditional quantile of log wage for scheduled castes, $\hat{Q}_{sc}(\theta)$, can be decomposed as,

$$\hat{Q}_{nsc}(\theta) - \hat{Q}_{sc}(\theta) = \underbrace{\left[\hat{Q}_{nsc}(\theta) - \hat{Q}_{cf}(\theta)\right]}_{\text{Effects of Characterstics}} + \underbrace{\left[\hat{Q}_{cf}(\theta) - \hat{Q}_{sc}(\theta)\right]}_{\text{Effects of Coefficients}}$$

Where $\hat{Q}_{cf}(\theta)$ is the estimated counterfactual unconditional quantile of log wage distribution for Scheduled Caste created using the coefficients of Non-SC.

Multivariate Decomposition for Nonlinear Response Model-Employment Discrimination (Nielsen,1998; Powers, Yoshioka and Yun , 2011)

- The log-likelihood function is:

$$l(\beta,\delta)=\sum_{i=1}^{N_{nsc}}\left\{y_{nsci}\ln F\left[x_{nsci}\beta\right]+(1-y_{nsci})\ln(1-F\left[x_{nsci}\beta\right])\right\}+$$

$$\sum_{i=1}^{N_{sc}}\left\{y_{sci}\ln F\left[x_{sci}(\beta+\delta)\right]+(1-y_{sci})\ln(1-F\left[x_{sci}(\beta+\delta)\right])\right\} \qquad (1)$$

- Define the following probabilities:

$$\bar{P}_{nsc}=\sum_{i=1}^{N_{nsc}}F\left[x_{nsci}\hat{\beta}\right]/N_{nsc}$$

$$\bar{P}_{sc}=\sum_{i=1}^{N_{sc}}F\left[x_{sci}(\hat{\beta}+\hat{\delta})\right]/N_{sc}$$

$$\bar{P}_{sc}^{0}=\sum_{i=1}^{N_{sc}}F\left[x_{sci}\hat{\beta}\right]/N_{sc}$$

- Where $\bar{P}_{nsc}$ and $\bar{P}_{sc}$ are the average probabilities that Y = 1 for Non SC and SC respectively, and $\bar{P}_{sc}^{0}$ is the average probability that Y=1 for SCs if they are treated like Non SCs.
- The log-odds ratios are linear in the parameters, and therefore, the Oaxaca-Blinder decomposition and the extension can be used directly.

$$\bar{P}_{nsc}-\bar{P}_{sc}=\underbrace{\{\bar{P}_{nsc}-\bar{P}_{sc}^{0}\}}_{\text{Endowment Difference}}+\underbrace{\{\bar{P}_{sc}^{0}-\bar{P}_{sc}\}}_{\text{Discrimination}}$$

Average Real Daily Wages in Regular Urban LM by Levels of Education, 2011-12 (Constant 2001-02 prices)

	Public Sector		Private Sector	
	SC	FC	SC	FC
Illiterate	122.65	191.46	68.01	78.10
Literate up to Bprim	170.41	207.61	81.75	88.41
Primary	176.58	274.54	84.48	96.01
Middle	202.19	228.37	87.29	109.56
Secondary	294.17	304.88	96.35	133.75
Higher Secondary	306.88	330.42	118.04	162.53
Diploma	348.65	365.61	179.26	233.90
Graduate and above	372.55	450.51	214.83	364.03
Total	274.88	394.12	113.02	207.92

Ratio of Wages Regular Urban LM by Levels of Education, 2011-12 (Constant 2001 prices)

	Public		Private	
	SC/FC	t-stat of MD	SC/FC	t-stat of MD
Illiterate	0.64	1.19	0.87	1.15
Literate up to Bprim	0.82	1.04	0.92	0.76
Primary	0.64	1.72	0.88	1.18
Middle	0.89	1.07	0.80	4.43*
Secondary	0.96	0.35	0.72	6.39*
Higher Secondary	0.93	0.96	0.73	3.45*
Diploma	0.95	0.51	0.77	1.92*
Graduate and above	0.83	3.79*	0.59	7.94*
Total	0.70	9.03*	0.54	14.65*

Construction of groups for decomposing inequality

Group	Description of specification	No. of worker groups
Group 1	1. Location (Rural and Urban), Gender (Male and Female) and Labour status (Regular and Casual) (2x2x2)	8
Group 2	1. Location, Gender and employment type and education (Low Education, Middle, Secondary and Graduate and above) (2x2x2x4)	32
Group 3	2. Location, Gender, employment type and social group (2x2x2x5)	40
Group 4	2. Location, Gender, employment type, Social group and Education (2x2x2x4x5)(Large Set)	160

Inequality Decomposition (Theil Index)

Group specification 1: Location, gender and labour status		
Description	**2004-05**	**2011-12**
Overall wage inequality	**0.445**	**0.438**
Within Group inequality	**0.296**	**0.320**
Contribution (%)	**66.46**	**73.04**
Between group inequality	**0.149**	**0.118**
Contribution (%)	**33.53**	**26.96**
Group specification 2: Location, Gender, Labour status and education.		
Description	**2004-05**	**2011-12**
Overall wage inequality	**0.4452**	**0.43816**
Within Group inequality	**0.215**	**0.2482**
Contribution (%)	**48.38**	**56.65**
Between group inequality	**0.230**	**0.190**
Contribution (%)	**51.62**	**43.35**
Group specification 3: Location, gender, labour status, and social group		
Description	**2004-05**	**2011-12**
Overall wage inequality	**0.445**	**0.438**
Within Group inequality	**0.277**	**0.302**
Contribution (%)	**62.25**	**68.99**
Between group inequality	**0.168**	**0.136**
Contribution (%)	**37.75**	**31.00**
Group specification 4: Location, gender, labour status, social group and educational levels		
Description	**2004-05**	**2011-12**
Overall wage inequality	**0.445**	**0.438**
Within Group inequality	**0.208**	**0.238**
Contribution (%)	**46.78**	**54.42**
Between group inequality	**0.237**	**0.200**
Contribution (%)	**53.22**	**45.59**

Empirical Evidence

SC/ST participation in industries as a percentage of the total population				
STATE	Industry Rank	SC/ST in industry*	SC/ST in population**	GAP
Tamilnadu	1	17.9	20	2.1
Maharashtra	2	5	19.1	14.1
Andhrapradesh	3	17.1	22.8	5.7
Gujarat	4	9	21.9	12.9
Uttar Pradesh	5	17	21.2	4.2
Punjab	6	21	28.9	7.9
Karnataka	7	8.9	22.8	13.9
Rajsthan	8	14	29.8	15.8
West Bengal	9	20	28.5	8.5
Kerala	10	14.2	10.94	(-) 3.26
Haryana	11	19	19.3	0.3
Madhya Pradesh	12	11	35.5	24.5
Delhi	13	15	16.9	1.9
Uttarakhand	17	22	20.9	(-) 1.1
Himachal Pradesh	21	12	28.7	16.7
Puducherry	23	13.2	16.2	3

Results of Blinder- Oaxaca Decomposition – FCs Vs SCs (Regular Urban LM), 1983 to 2011-12 (In Percentage) (TOTAL SAMPLE)

	1983	1993-94	2004-05	2011-12
Amount attributable:	31.4	22.3	11.8	3.2
- due to endowments (E):	27.5	17.8	28.3	28.7
- due to coefficients (C):	3.8	4.4	-16.5	-25.4
Shift coefficient (U):	-1.9	3	31.9	40.7
Raw differential (R) {E+C+U}:	29.5	25.3	43.7	43.9
Adjusted differential (D) {C+U}:	1.9	7.4	15.4	15.2
Endowments as % total (E/R):	93.4	70.7	64.8	65.3
Discrimination as % total (D/R):	6.6	29.3	35.2	34.7

Blinder-Oaxaca Decomposition Results: FCs Vs SCs- Public and Private Sector of Regular Urban LM (In percentage)

Components	1993-94		2004-05		2011-12	
	Public	Private	Public	Private	Public	Private
Raw wage Differentials	0.32	0.36	0.42	0.53	0.39	0.50
Explained (endowment)	0.28	0.26	0.29	0.36	0.30	0.34
Unexplained (treatment)	0.05	0.11	0.12	0.17	0.09	0.16
Explained Difference (%)	85.4	70.4	86.0	67.4	90.4	67.6
Unexplained Difference (%)	14.6	29.6	14.0	32.6	9.6	32.4

Reimers-Cotton-Neumark –Oaxaca and Ransom Approach- FC Vs SC (Regular Urban LM), 2012

Components	Reimers/Cotton (w=0.5)	Neumark/Oaxaca and Ransom (w = omega)	Oaxaca-Blinder Using FC means as weight (w=1)	Oaxaca-Blinder Using SC means as weight (w=0)
Raw Wage Differential	0.44 (0.0196)			
Endowment Difference (%)	60.5 (0.0152)	67.1 (0.0153)	65.3 (0.0154)	55.7 (0.0167)
Discrimination (%)	39.5 (0.0143)	32.9 (0.0125)	34.7 (0.0146)	44.3 (0.0158)
Overpayment to Forward Castes (%)	22.1 (0.0079)	8.6 (0.0033)	-	-
Underpayment to SCs (%)	17.4 (0.0073)	24.3 (0.0093)	-	-

Reimers-Cotton-Neumark –Oaxaca/Ransom Approach- FCs Vs SCs: Public and Private Sector of Regular Urban LM, 2011-12 (Percentages)

Components	Reimer/Cotton (w=0.5)	Oaxaca/Ransom Pooled method (w = omega)	Oaxaca-Blinder Using FC means as weight (w=1)	Oaxaca-Blinder Using SC means as weight (w=0)
Public Sector				
Explained/ Endowment Difference	76.5 (0.0196)	80.6 (0.0195)	75.8 (0.0209)	77.1 (0.0223)
Unexplained difference/Discrimination	23.5 (0.0222)	19.4 (0.0189)	24.2 (0.0236)	22.9 (0.0243)
Overpayment to FC	11.4 (0.0122)	5.3 (0.0053)	-	-
Underpayment to SC	12.1 (0.0117)	14.1 (0.0141)	-	-
Private Sector				
Explained/ Endowment Difference	59.8 (0.0146)	68.3 (0.0152)	67.6 (0.0158)	51.9 (0.0167)
Unexplained difference/Discrimination	40.2 (0.0178)	31.7 (0.0160)	32.4 (0.0182)	48.1 (0.0201)
Overpayment to FC	24.1 (0.0100)	8.1 (0.0041)	-	-
Underpayment to SC	16.2 (0.0091)	23.6 (0.0117)	-	-

Full Decomposition of Gross Earnings difference between SC and Forward Caste Workers in the Regular Urban LM: 2011-12

	Wage Explained	Wage Discrimination	Job Explained	Job Discrimination
Administrative	0.0038	0.0026	0.1915	0.0808
Professionals	0.0251	0.0156	0.7628	0.0790
Clerical	0.0126	-0.0009	0.1956	-0.0059
Service	0.0187	0.0111	-0.1334	-0.0389
Sales	0.0070	0.0080	-0.1023	0.1801
Production	0.0359	0.0205	-0.4282	0.2447
Elementary	0.0237	0.0032	-0.2920	-0.4724

Full Decomposition of Gross Earnings difference between SC and Forward Caste Workers in the Public Sector of Regular Urban LM: 2011-12

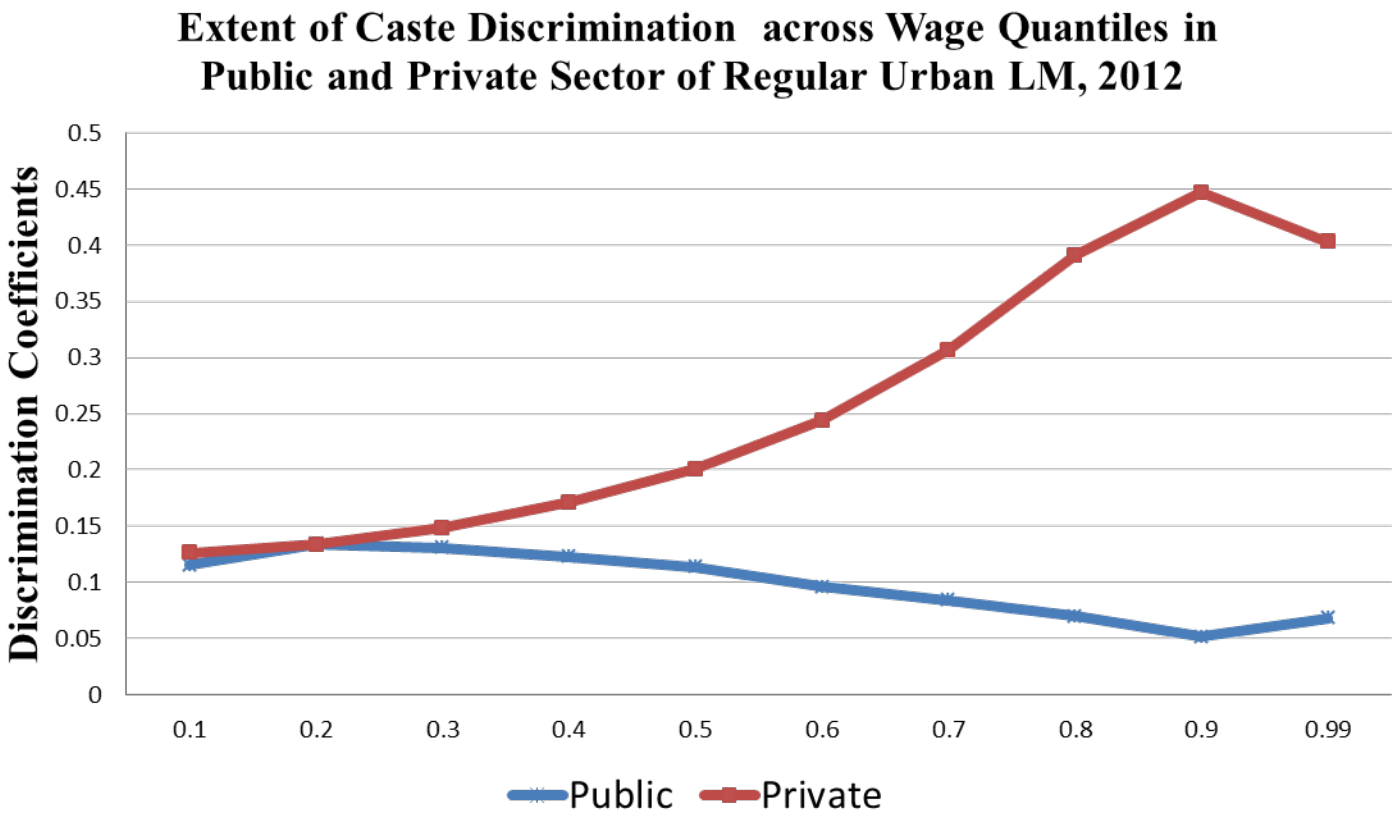
	Wage Explained	Wage Discrimination	Job Explained	Job Discrimination
Administrative &Professionals	0.0396	0.0202	0.9915	0.161
Clerical	0.0169	0.0043	0.1996	0.0743
Service & Sales	0.0161	0.015	-0.3156	0.1365
Production	0.0196	0.0075	-0.3745	0.2635
Elementary	0.041	0.0214	-0.3919	-0.5546

Full Decomposition of Gross Earnings difference between SC and Forward Caste Workers in the Private Sector of Regular Urban LM: 2011-12

	Wage Explained	Wage Discrimination	Job Explained	Job Discrimination
Administrative &Professionals	0.038	0.0375	0.8933	0.194
Clerical	0.005	0.0074	0.1258	0.0007
Service & Sales	0.0212	0.0246	-0.2199	0.1637
Production	0.0377	0.0424	-0.3736	0.1002
Elementary	0.0147	0.0374	-0.2591	-0.3956

MMM Decomposition Results across Quantiles: FCs Vs SCs - Regular Urban LM, 2004-05 & 2011-12

Components	10th	25th	50th	75th	90th	OLS
2005						
Raw Wage Differentials	0.43	0.43	0.48	0.43	0.41	0.44
endowment difference	0.28 (65.4)	0.25 (59.3)	0.25 (52.6)	0.24 (56.4)	0.22 (53.9)	0.28(64.8)
Discrimination	0.15 (34.6)	0.18 (40.7)	0.23 (47.4)	0.19 (43.6)	0.19 (46.1)	0.16(35.2)
2012						
Raw Wage Differentials	0.39	0.41	0.49	0.48	0.42	0.44
endowment difference	0.25 (65.2)	0.25 (61.5)	0.26 (52.4)	0.23 (48.4)	0.21 (49.6)	0.29(65.3)
Discrimination	0.14 (34.8)	0.16 (38.5)	0.23 (47.6)	0.25 (51.6)	0.21 (50.4)	0.15(34.7)


Extent of Caste Discrimination across Wage Quantiles in Public and Private Sector of Regular Urban LM, 2012
Discrimination Coefficients
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
0.99
Public
Private

Employment Discrimination in Labour Market in India (Non-Linear Decomposition Method) – Forward caste Vs SC, 2011-12

Components	Weight = omega)	Decomposition using FC means as weight (weight=1)	Decomposition using SC means as weight (weight=0)
Raw Differentials	0.039		
Skill Difference (Explained/ Endowment Difference)	0.011 (28.7)	0.006 (15.2)	0.009 (23.8)
Unexplained difference (Discrimination)	0.028 (71.3)	0.033(84.8)	0.029 (76.2)
Advantage to FC	0.010 (24.9)	-	-
Disadvantage to SC	0.018(46.4)	-	-

Employment Discrimination in Private Sector of Regular formal LM (Non-linear Decomposition Method) – Forward Caste Vs SC, 2011-12

Components	Weight = omega)	Decomposition using FC means as weight (weight=1)	Decomposition using SC means as weight (weight=0)
Raw Differentials	0.073		
Skill Difference	-0.025 (-33.9)	-0.036 (-49.1)	-0.038 (-51.6)
Unexplained difference (Discrimination)	0.098 (133.9)	0.109 (149.1)	0.111 (151.6)
Advantage to FC	0.023 (31.4)	-	-
Disadvantage to SC	0.075(102.5)	-	-

Comparison of Our Results with Other Studies

- Endowment is a necessary but not a sufficient condition for benefitting from participation in the labour market.
- Part of this exclusion takes place because the dissemination of information on jobs is often exclusionary.
- In the first major correspondence study in India, Thorat et al. (2007) revealed significant differences in call-backs between Hindu upper castes and the other two categories, such as Hindu Dalit and Muslims.
- These findings are confirmed by Siddique (2009) in a study of Chennai. She additionally tests for the interaction between caste and gender and finds that the lowest call-backs are received by Dalit women.
- There are studies of hiring practices which emphasize the role of networks and that of informal and personalised recruitment- where "who you know" is often more important than "what you know".

Contd….

- In a college-to-work study, Deshpande and Newman (2007) tracked a group of students from the three premier Indian universities in Delhi for two years - It turned out that employers were extremely conscious of the social identity of the applicant, all the while professing deep allegiance only to the "merit" of the candidate.
- Jodhka and Newman (2007), in an employer attitude survey, find that employers, including MNCs, universally use the language of merit. However, managers are blind to the unequal playing field which produces "merit". Commitment to merit is voiced alongside convictions that merit is distributed by caste and region.
- In the empirical study of the effects of Affirmative Action in the labor market, Deshpande and Weisskof (2011) focused on the Indian Railways to assess if Affirmative Action, i.e. the presence of SC-ST employees who have gained entry through quotas, has impacted productivity negatively. The study found no evidence whatsoever to support the claim of critics of affirmative action that increasing the proportion of SC and ST employees will adversely impact productivity or productivity growth.

Learning from Best Practices

- Two aspects of anti-discrimination/ affirmative action and other positive measures are in practice in many countries and relate to:

  (i) type of the economic sector or market for which the anti-discrimination and affirmative action measures are developed

  (ii) the methods or administrative procedures used in their application in practice for the private and public sectors.

- Most of these countries such as the USA, Northern Ireland, South Africa and Malaysia have mainly developed policies for religious, racial and ethnic minority groups for agriculture land, labour, capital and other markets and non-market transactions, covering multiple economic spheres.

- The word 'reservation' has become corrupt and has lot of political factors. Instead of ‘reservation in private sector', what must be said is that "any private must demonstrate that they share the social responsibility and consciously employ certain percentage of people from different social backgrounds". This is not 'reservation' but affirmative action on the part of the private companies.

- A big problem with the existing nature of implementation is that there is no monitoring, and there are no penalties for evading AA. Thus, the mere announcement of quotas is seen as sufficient, and very little attention is paid to outcomes.

Policy Suggestion

It is suggested that :

- An employment opportunity commission be constituted to review and ensure that the weaker sections find their representation at all levels.

- Make special provisions for higher education, responsive training and multi-skilling of the Tribals and Dalits so that they are able to compete with others for jobs.

- Empower national commissions for SCs and STs so that they work as pressure group on the government and the private sector for the right to participatory development.

- Finally, ensure nationwide debate on these issues and introduce necessary constitutional amendment to enact affirmative action at all levels in private sector.

Thank You