



TECHNOLOGY, JOBS AND WELFARE OUTCOMES: SELECTED RESULTS FROM SOUTH ASIA

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BACKGROUND AND MOTIVATION

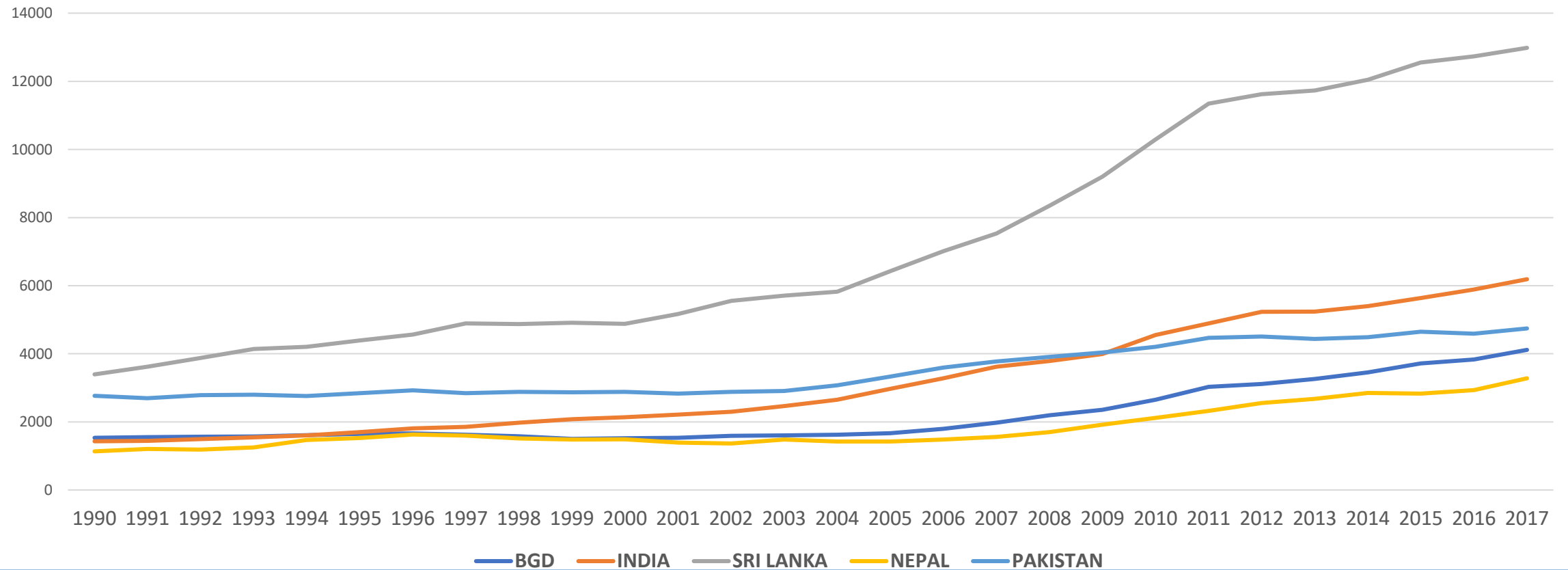
- We know a lot about job and wage polarisation and the effects of routine biased technological change in developed countries.
- We know surprisingly little about developing countries.
- Has the experience of developing countries been different that developed countries with respect to job polarisation and the changing task content of jobs?
- And what are the implications for inequality?
- We present emerging evidence from South Asia.

OUTLINE OF MY PRESENTATION

- The Good Jobs Challenge in South Asia
- Technology and Earnings Inequality: the Indian Experience
- Technology and Earnings Inequality: the Bangladesh Experience

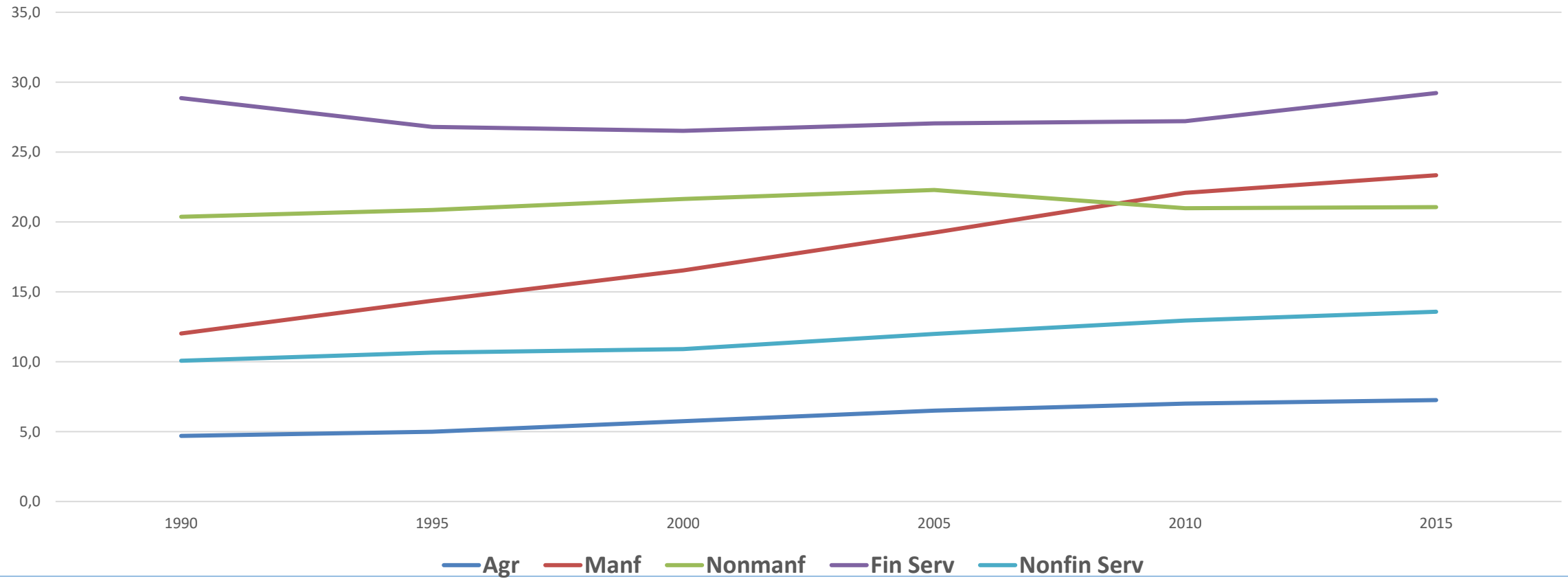
PER CAPITA INCOMES IN SOUTH ASIA

GDP PER CAPITA, PPP US DOLLARS



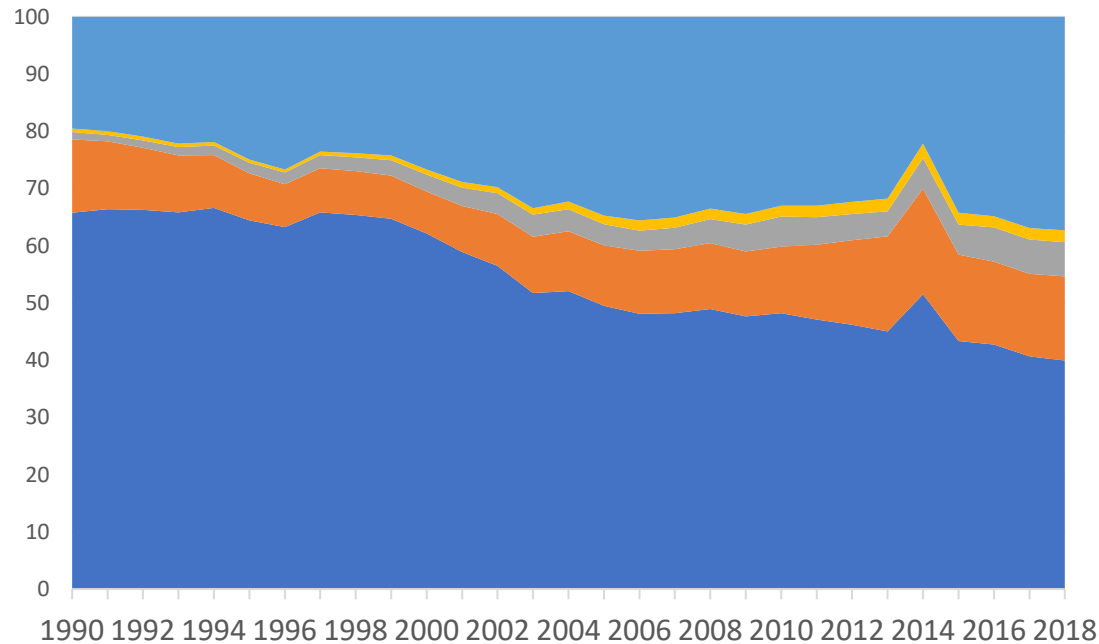
Labour Productivity differs a great deal across sectors (source: ETD)

Labour Productivity, All Countries



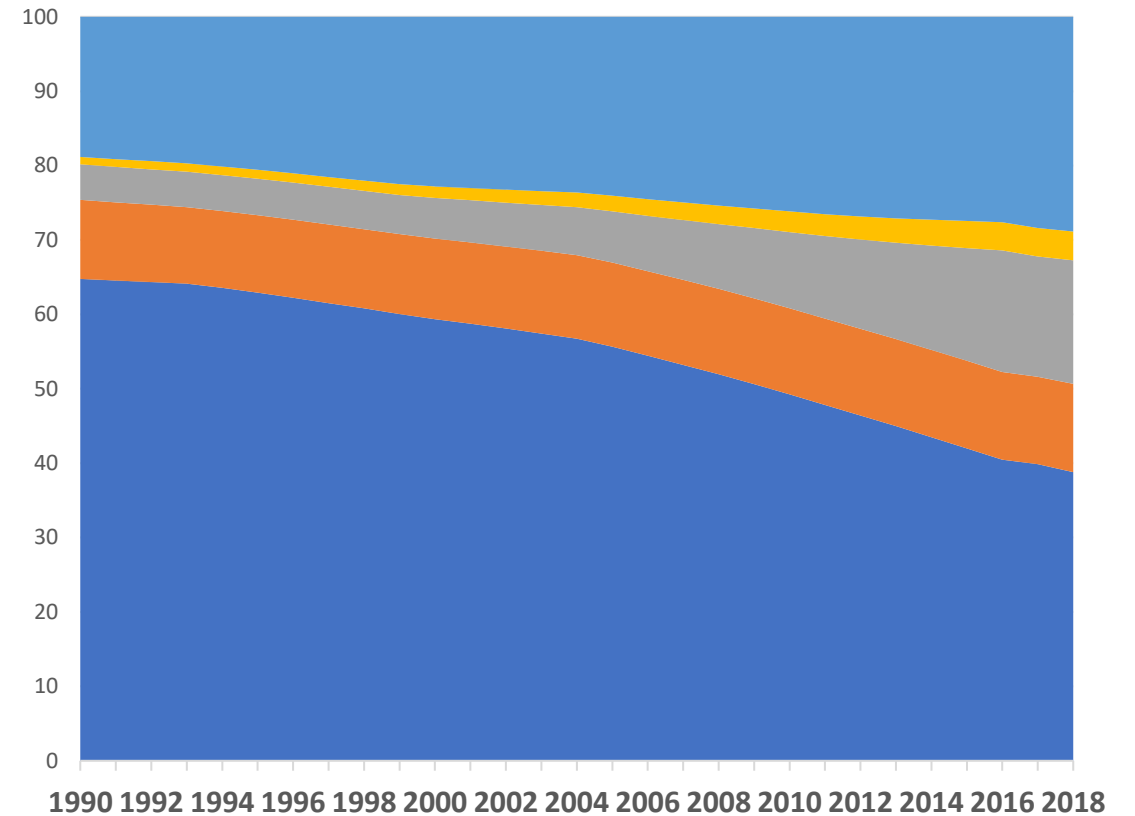
THE GOOD JOBS CHALLENGE IN SOUTH ASIA -1

BANGLADESH EMPL SHARES



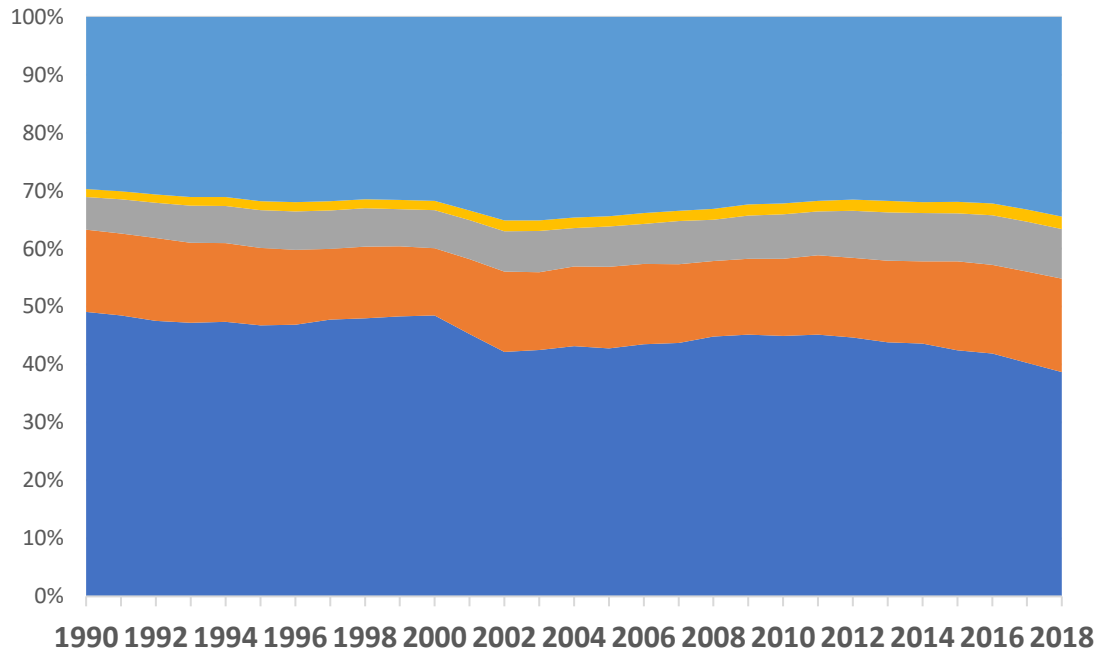
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INDIA EMP SHARES

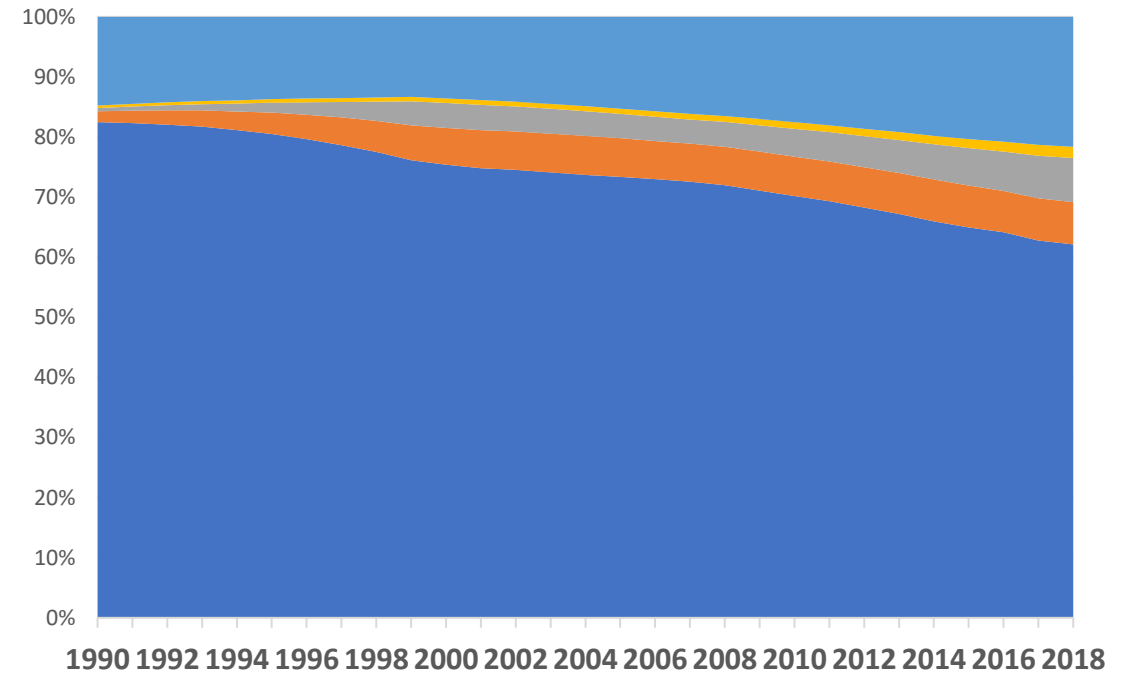


THE GOOD JOBS CHALLENGE IN SOUTH ASIA -2

PAKISTAN EMP SHARES



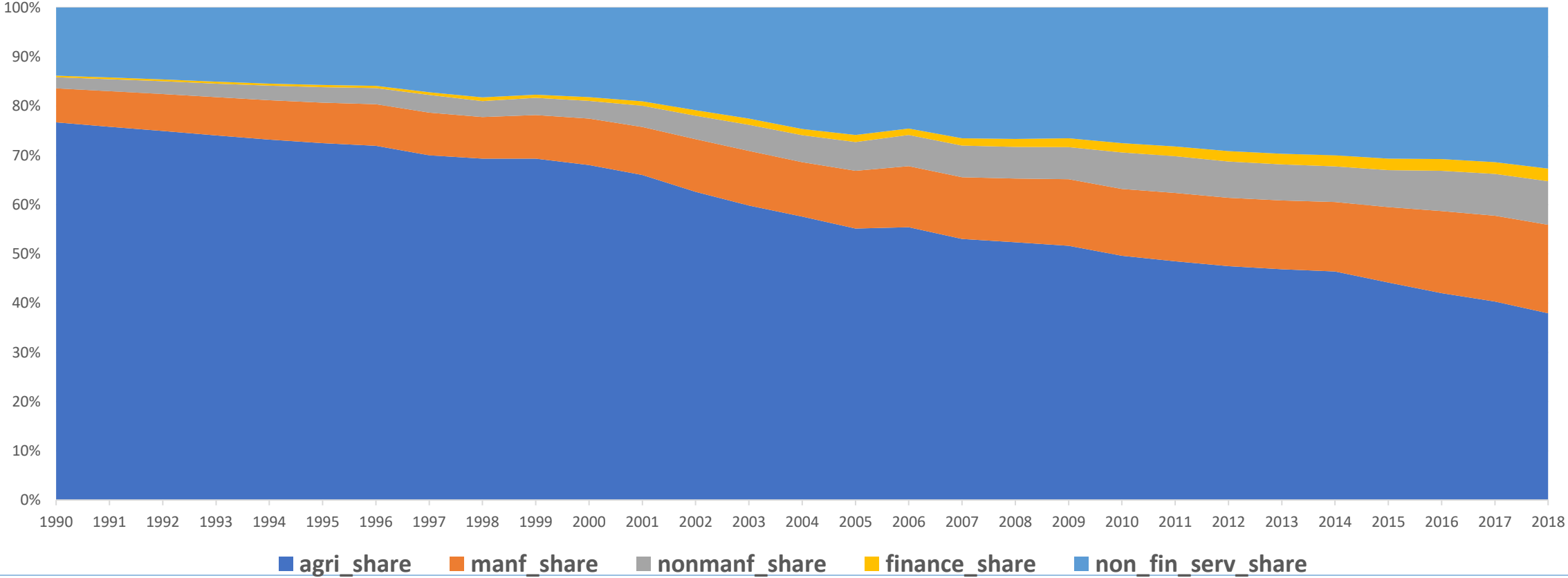
NEPAL EMP SHARES



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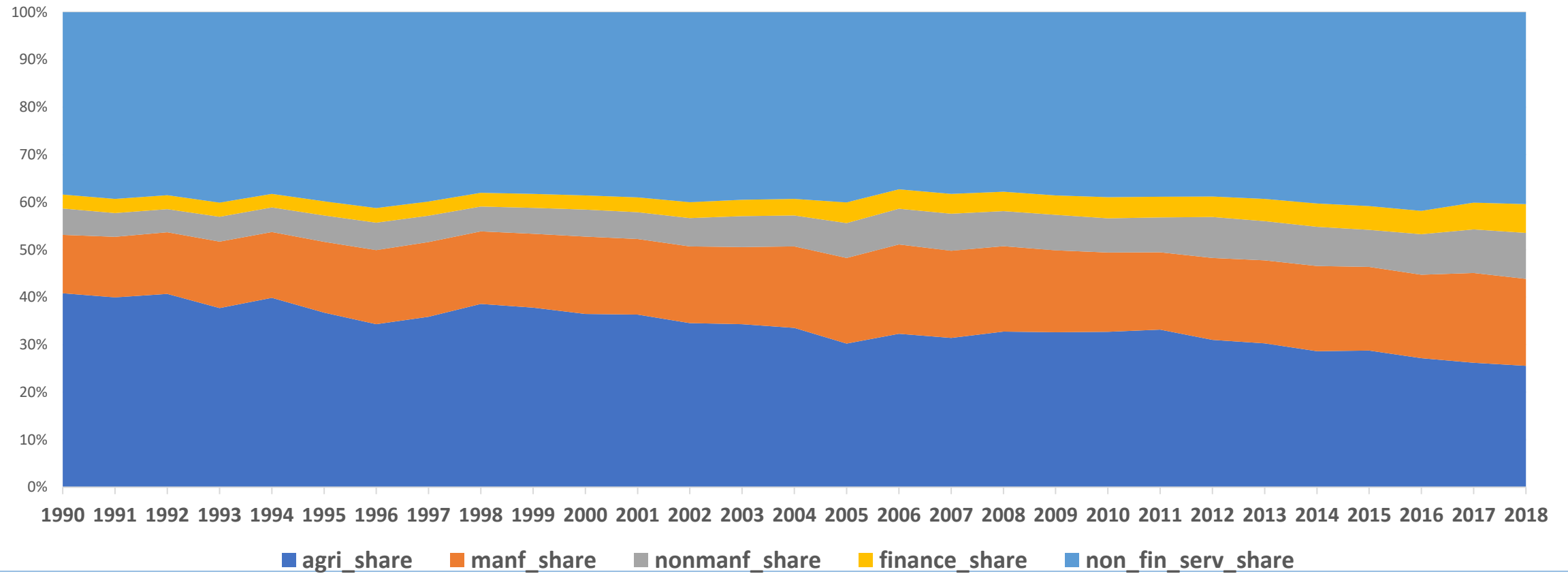
A CONTRAST: VIETNAM

VIETNAM EMP SHARES



THE GOOD JOBS CHALLENGE IN SOUTH ASIA -3

SRI LANKA EMP SHARES



Technology and Earnings Inequality

- What has happened to earnings inequality in South Asia?
- What role does routine biased technological change play in explaining earnings inequality?
- We present evidence for two South Asian countries: India and Bangladesh

UNU-WIDER Project: The Changing Nature of Work and Inequality

- In 2019, UNU-WIDER launched a project – *The Changing Nature of Work and Inequality* – to examine the effect of routine-biased technological change on earnings inequalities in eleven major developing countries and emerging economies, located throughout Africa, Asia, and Latin America. Please see <https://www.wider.unu.edu/project/changing-nature-work-and->



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Inequality and Labour Market Changes in India

(source: S. Khurana and K. Mahajan, Evolution of Wage Inequality in India, WIDER WP 2020/167)

Facts	Measure	2004 (base value)	2004-2011	2011-17
Earnings Inequality decline	Change Gini (Earnings)	0.504	-0.001	-0.06
Job Polarization occurred	High skilled (ISCO 1-3)	20	5	3
	Mid skilled (ISCO 4-5,7-8)	63	-7	-4
	Low skilled (ISCO 6+9)	17	3	1
Decline in Routine Jobs	O*NET	0.45	0.06	-0.08
	Country-specific	0.44	-0.03	-0.01

Job Polarization

Dependent Variable -->	Change in Log(Employment Share)		Change in Log (Mean wage)	
	2004-11	2011-17	2004-11	2011-17
ln wage (t-1)	-1.060 (2.338)	-3.310*** (1.143)	-1.590 (1.042)	1.347*** (0.395)
Sq (ln wage (t-1))	0.077 (0.146)	0.208*** (0.071)	0.089 (0.066)	-0.097*** (0.025)
Constant	3.342 (9.336)	13.029*** (4.611)	7.100* (4.094)	-4.577*** (1.581)
Observations	101	106	101	106
R-squared	0.020	0.069	0.265	0.639
Adj. R-squared	-8.47e-05	0.0504	0.250	0.632
F test	0.351	0.0114	0.00142	0

- Rise in employment share of IT services and other managerial jobs at the upper end and of construction and services like retail at the lower end

Routine Task Intensity (RTI)

Dependent Variable -->	Change in Log(Employment Share)		Change in Log (Mean wage)	
	2004-11	2011-17	2004-11	2011-17
RTI (t-1)	-0.593** (0.262)	-0.251** (0.092)	0.182** (0.075)	0.364*** (0.067)
Sq (RTI (t-1))	0.735** (0.290)	0.314* (0.164)	-0.069 (0.113)	-0.211*** (0.072)
Constant	-0.069 (0.078)	-0.041 (0.049)	0.147*** (0.033)	-0.068** (0.025)
Observations	26	26	26	26
R-squared	0.127	0.267	0.643	0.140
Adj. R-squared	0.0509	0.203	0.612	0.0654
F test	0.0384	0.00882	1.05e-05	0.0915

RIF Decomposition of Inequality

- Role played by RTI of occupations in shaping inequality, control for other competing factors
- Change in Inequality =

Composition effect (changes in the distribution of worker characteristics)

+

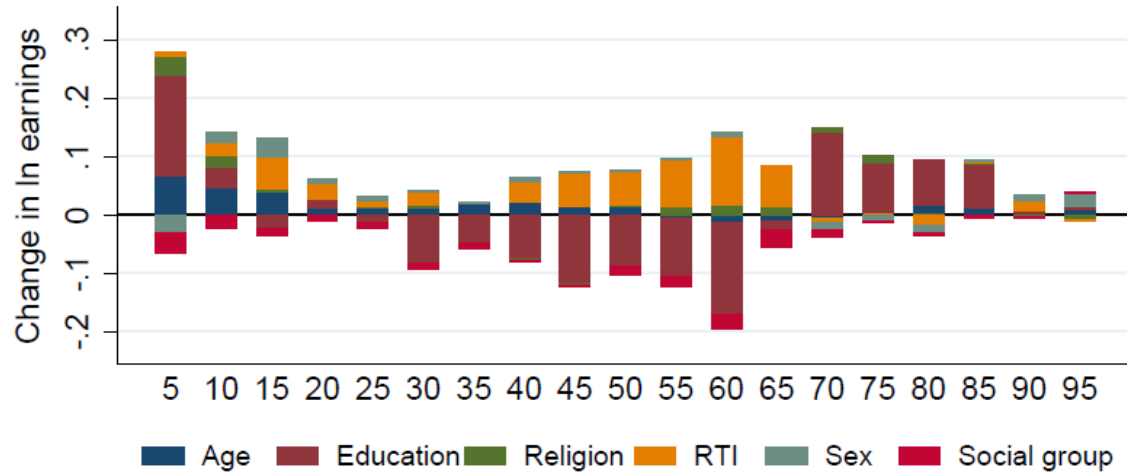
Earnings structure effect (changes in the remuneration to these characteristics)

RIF Decomposition of Inequality: Key Drivers

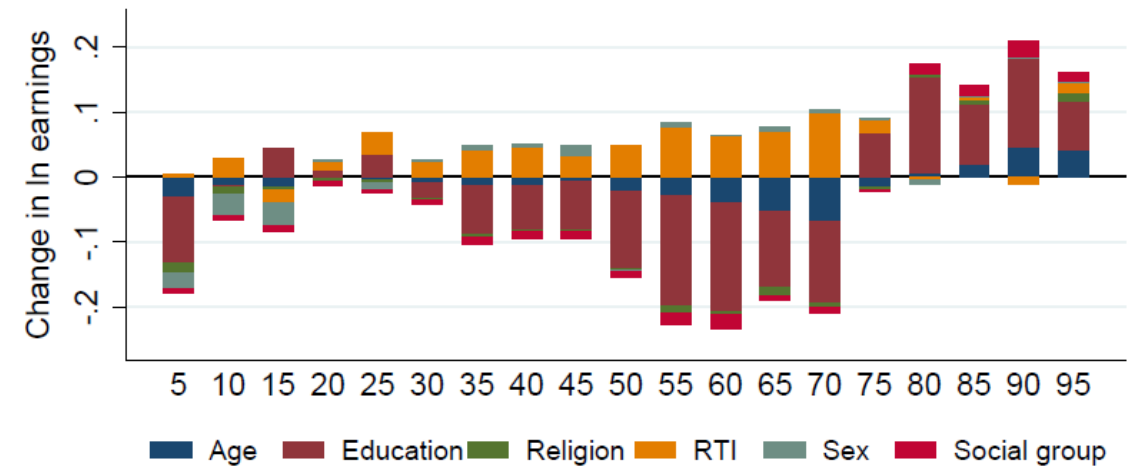
	2004-2011	2011-2017
Change in Gini	-0.001	-0.059
Composition	-0.001	0.002
Earnings Structure	0.000	-0.061

Detailed Earnings Structure across Quantiles

2004 - 2011



2011 - 2017



Change in Workforce structure not playing much role in explaining wage inequality decline

Main Findings: India

- **Wage Inequality:** Declining: 2004-17 (more so 2011-17)
- **Factors:**
 - Job polarization occurred without earnings polarization
 - Decomposition:
 - Small composition of workforce effects
 - Changes in returns to attributes (earnings structure) matter: but largely the increase remains unexplained even for earnings structure
 - Returns to education (disequalizing),
 - Returns to RTI (equalizing)
 - Preliminary findings: Institutional factors like demand vs supply of workers and changes in minimum wage matter
- **Implications:** Jobs requiring routine tasks have declined (largest decline 2004-11) and there is evidence of job polarization in urban India – but these have not contributed to a rise in wage earnings inequality

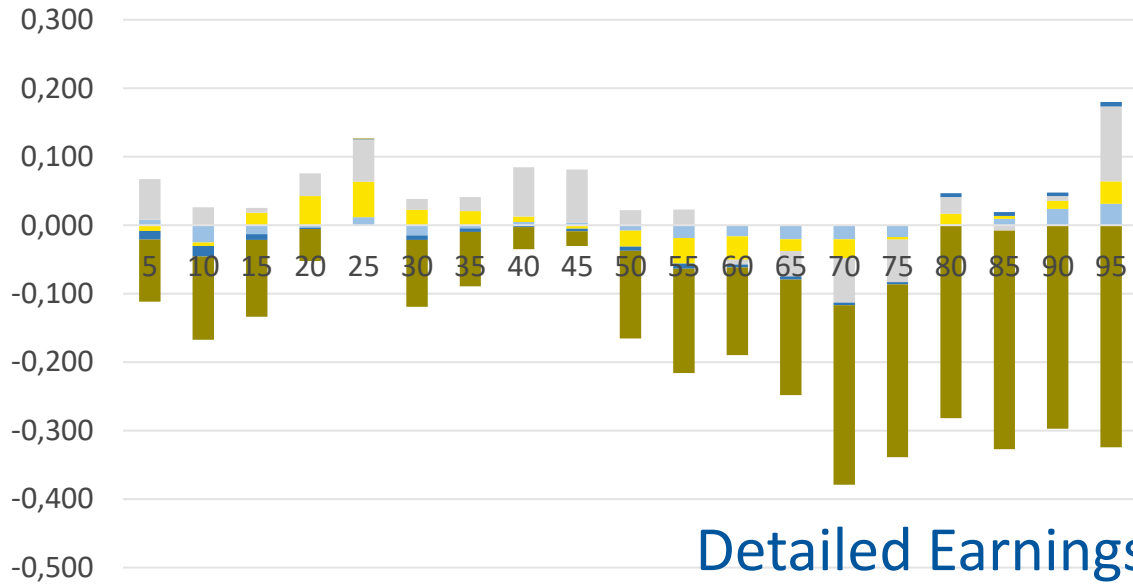
Inequality and Labour Market Changes in Bangladesh

source: S.H.Bidisha et al., Earnings Inequality and the Nature of Work: Evidence from the LFS Data of Bangladesh, WIDER WP 2021/7

Key Indicators	2005-10	2010-16/17	2005-16/17
Inequality	static	↓	↓
Share of Workers: High skill	small ↑	↑	↑
Mid skill	small ↓	↑	↑
Low skill	small ↑	↓	↓
Trends in Earnings High skill	↑	↑	↑
Mid skill	↑	small ↑	small ↑
Low skill	↑	small ↑	↑
Education Premium	↑	↑	↑
Polarization (regression): Employment	yes	no	no
Earnings	yes	yes	yes
RTI	small ↑	↓	↓

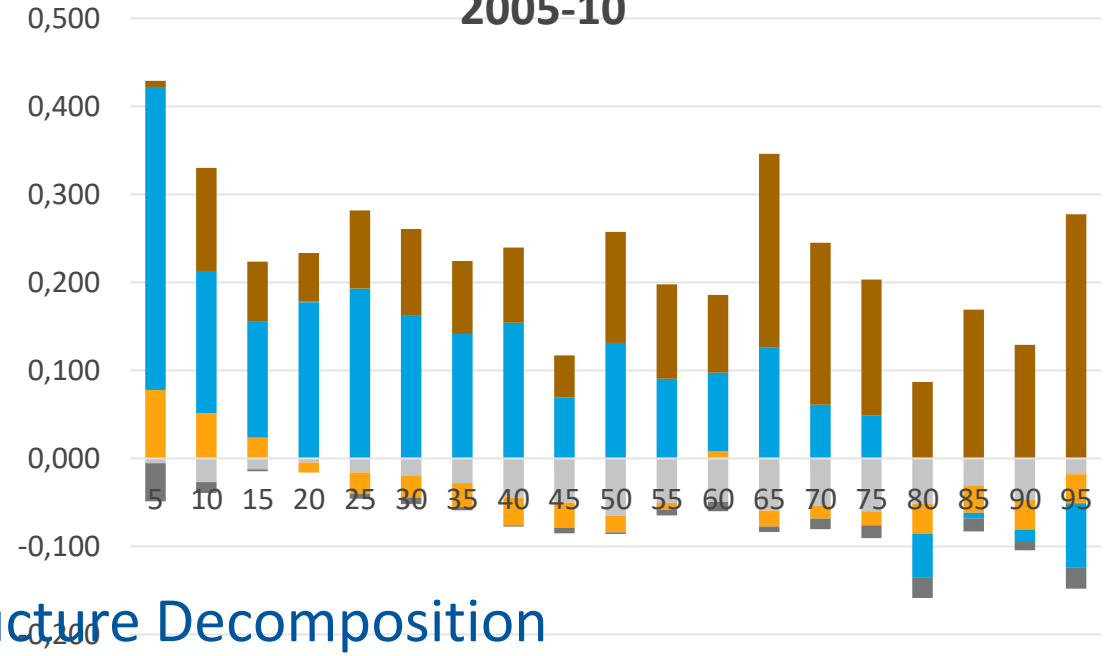
RIF Decomposition

2010-16/17



age sex education religion rti

2005-10



age sex education religion rti

Detailed Earnings Structure Decomposition

	2005-10	2010-16/17
Gini change	-0.007	-0.002
Composition	0.001	0.002
Earnings Structure	-0.008	-0.004

Conclusions

- We see declining earnings inequality in Bangladesh and India in recent years
- Despite large transformation of the workforce, the role of compositional changes by occupation or education do not seem to explain inequality trends
- In most cases, trends in inequality are **primarily explained by changes in the earnings structure** instead.
- Traditional explaining factors of trends in earnings inequality (esp. changes in education premium) remain relevant in cases studied, with little evidence of job polarization or earnings associated with RTI playing a substantial role.
- Potential influence of other local factors like labour institutions (e.g. minimum wage).
- **SBTC still the key factor explaining earnings inequality, more than RBTC**

Measuring Routine Task Intensity (RTI)

The literature (Autor and Dorn 2009, 2013; Goos et al. 2014) has also proposed a composite measure of routine task intensity (RTI) which increases with the relative importance of routine tasks. To calculate the RTI of occupation i , we use the formula proposed by Hardy et al. (2018):

$$RTI_i = \ln \left(\frac{r_{cognitive,i} + r_{manual,i}}{2} \right) - \ln \left(\frac{nr_{analytical,i} + nr_{personal,i}}{2} \right), \quad (1)$$

where $r_{cognitive,i}$, $r_{manual,i}$, $nr_{analytical,i}$, and $nr_{personal,i}$ are the routine cognitive, routine manual, non-routine cognitive analytical, and non-routine cognitive personal task levels of occupation i , respectively.¹

Table 1: Survey task items from US PIAAC selected to calculate task content measures consistent with O*NET occupation task measures

Task content	Non-routine cognitive analytical	Non-routine cognitive interpersonal	Routine cognitive	Manual
Task items	Solving problems Reading news (at least once a month) Reading professional journals (at least once a month) Programming (any frequency)	Supervising others Making speeches or giving presentations (any frequency)	Changing order of tasks – reversed (not able) Filling out forms (at least once a month) Making speeches or giving presentations – reversed (never)	Physical tasks

Notes: the cut-offs for the 'yes' dummy are in parentheses. See Lewandowski et al. (2019) for more detail on the full wording of questions, the definitions of cut-offs, and the criteria for selecting task items.

Source: authors' illustration based on Lewandowski et al. (2019).

The GGDC/UNU-WIDER Economic Transformation Database (ETD), launched in Feb 2021

- The ETD provides time-series of employment and real and nominal value added by twelve sectors in fifty-one countries for the period 1990–2018.
- It includes twenty Asian, nine Latin American, four Middle East and North African (MENA), and eighteen sub-Saharan African countries/economies at varying levels of economic development.
- The ETD is constructed from an in-depth investigation of the availability and usability of statistical sources on a country-by-country basis.
- **The ETD is a new dataset; it is not an update of time series in an existing sectoral dataset.**
- Publicly available at websites UNU-WIDER & GGDC.
- *Also, see Kruse, H, E Mensah, K Sen and G de Vries (2021), “A manufacturing renaissance? Industrialization trends in the developing world”, World Institute for Development Economic Research (UNU-WIDER) Working Paper 2012/28.*

Content GGDC/UNU-WIDER Economic Transformation Database

Developing Asia (14)	Bangladesh, Cambodia, China, India, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam
Advanced Asia (6)	Hong Kong (China), Israel, Japan, Korea (Rep. of), Singapore, Chinese Taipei
Latin America (9)	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Peru
Middle East and North Africa (4)	Egypt, Morocco, Tunisia, Turkey
Sub-Saharan Africa (18)	Botswana, Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, Senegal, South Africa, Tanzania, Uganda, Zambia
Economic sectors (of total economy)	Brief description (ISIC rev. 4)
1.	Agriculture (A)
2.	Mining (B)
3.	Manufacturing (C)
4.	Utilities (D+E)
5.	Construction (F)
6.	Trade services (G + I)
7.	Transport services (H)
8.	Business services (J + M + N)
9.	Financial services (K)
10.	Real estate (L)
Time period (annual data)	1990 – 2018
Variables	Gross value added at constant (2015) prices (national currency in millions) Gross value added at current prices (national currency in millions) Persons employed (in thousands)



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