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Sources of Regional Income Disparity in the Emerging Countries during the Globalisation Periods

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Objectives of the Study

- To examine the patterns of regional income to identify the main activities that are responsible for the regional income disparities.

- To identify the sources of regional growth imbalances

  [by decomposing the per capita income growth into employment rate, total factor productivity growth (TFPG) and capital intensity]

- To empirically evaluate the effect of globalisation on the regional income disparities by taking into account the spatial interactions.

- Time period: 1993-94 to 2010-11

Data Sources

- For Indian states the sectoral level employment data are estimated from the quinquennial survey of National Sample Surveys (NSS) and gross state domestic product (GSDP) at the base year 2004-05 is taken from Central Statistical Organisation (CSO)

- Other sources: Annual reports of University Grant Commission and Secretariat of Industrial Assistance (SIA).

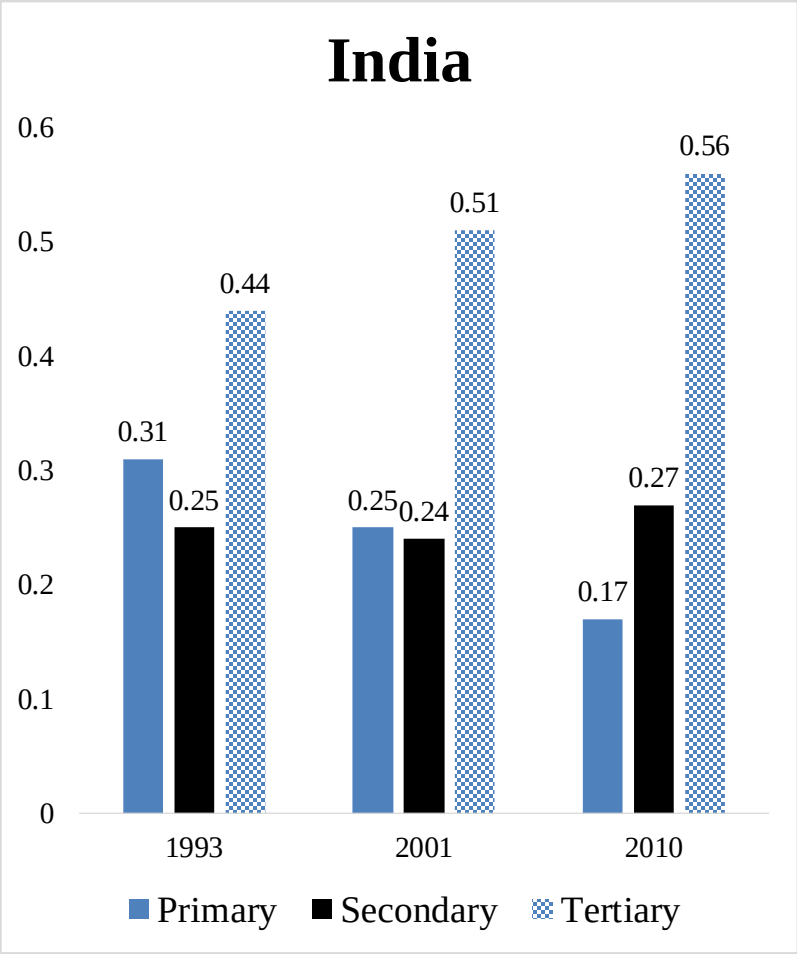
- The sectoral level provincial data on labour and income for China are taken from National Bureau of Statistics of China (NBSC).

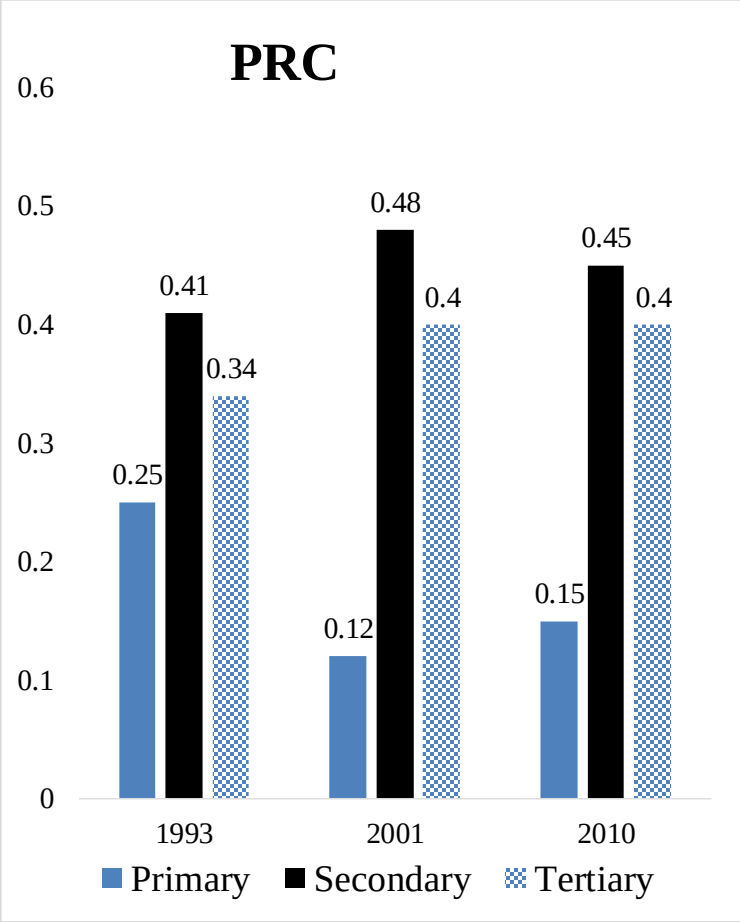
- Classifying the entire economy into three sectors, primary, secondary and tertiary

- Asian Productivity Organisation (APO) for the national level employment, income and labour income.

Regional Disparity in Income

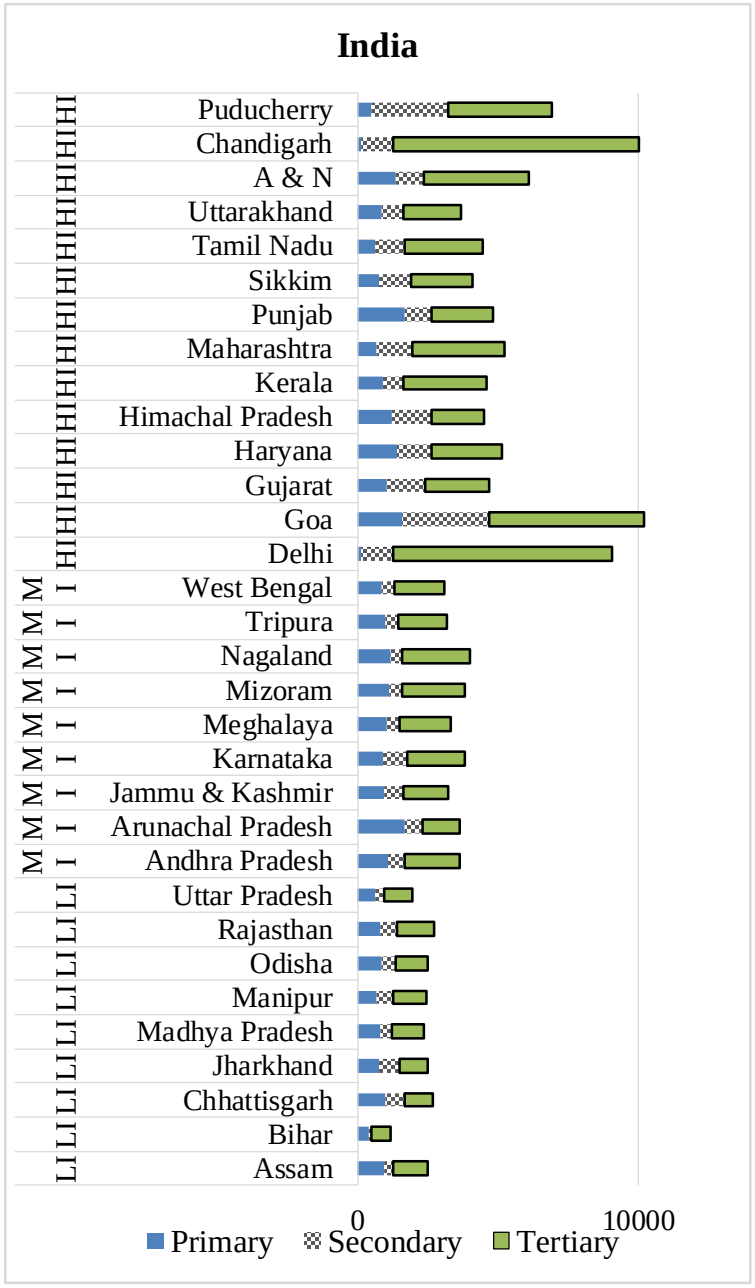
Fig 1: Sectoral Income (%)

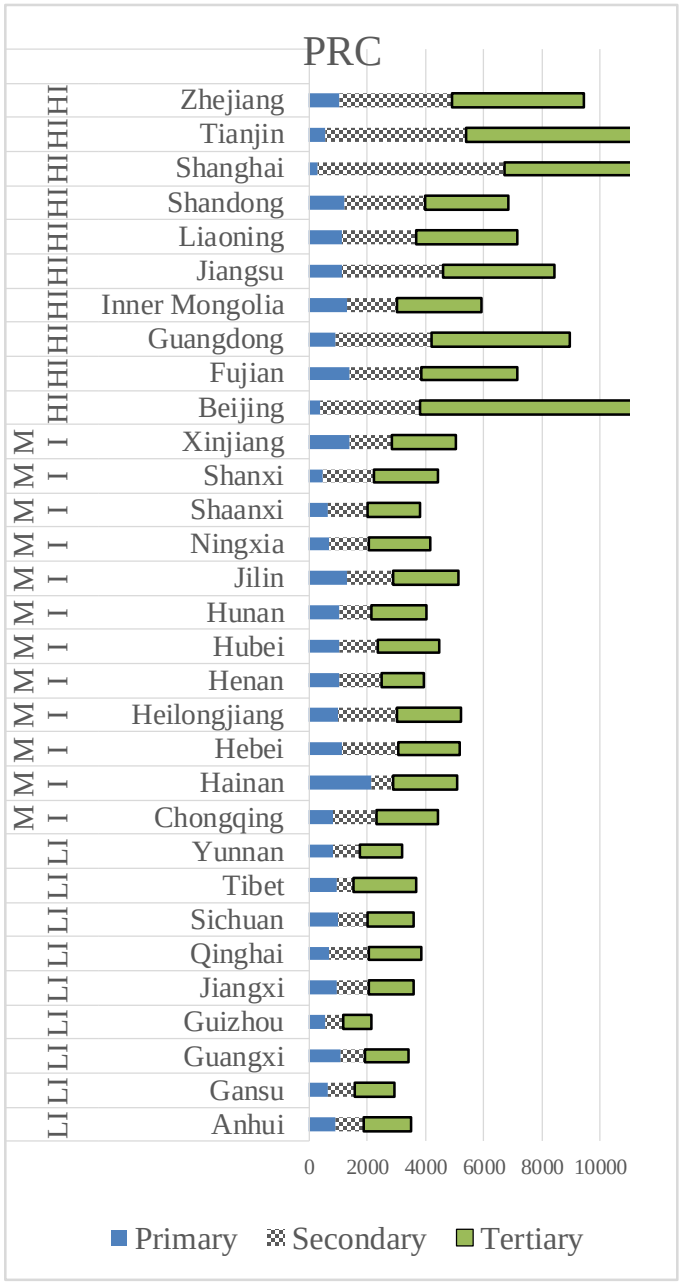




- The income in Indian economy was predominately sourced from the tertiary sector.
- The secondary sector for the PRC

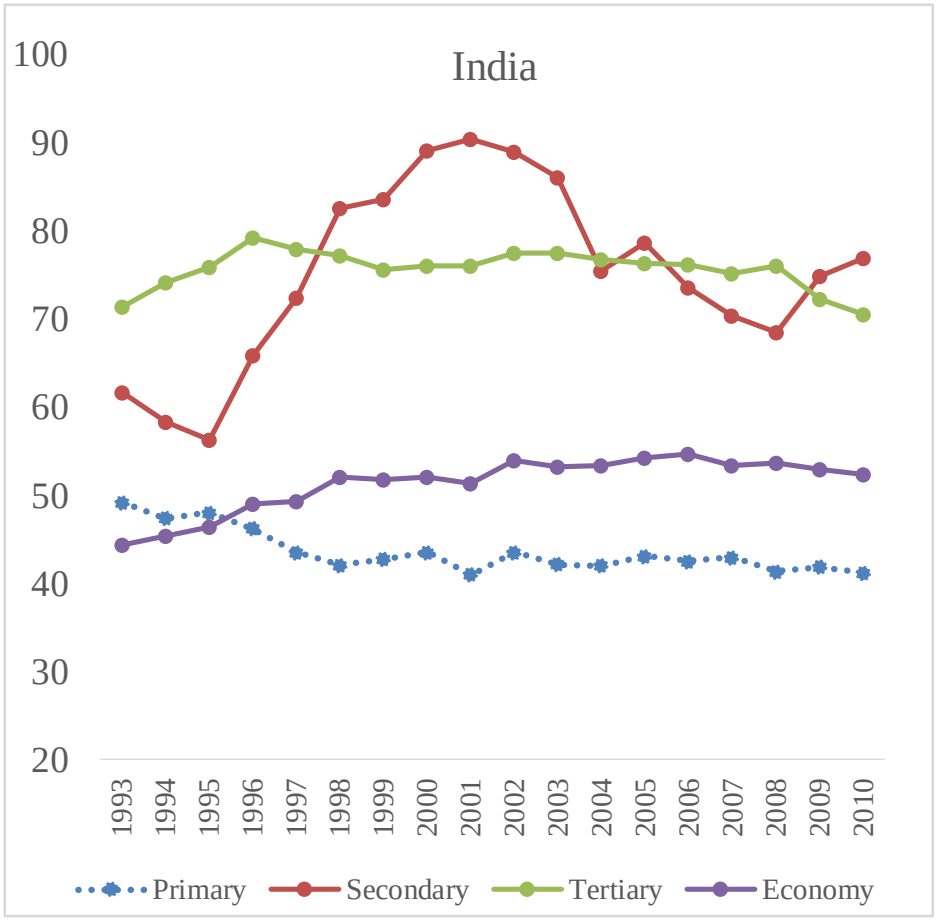
Fig 2: Regional Patterns of Per capita income (Annual averages in USD)

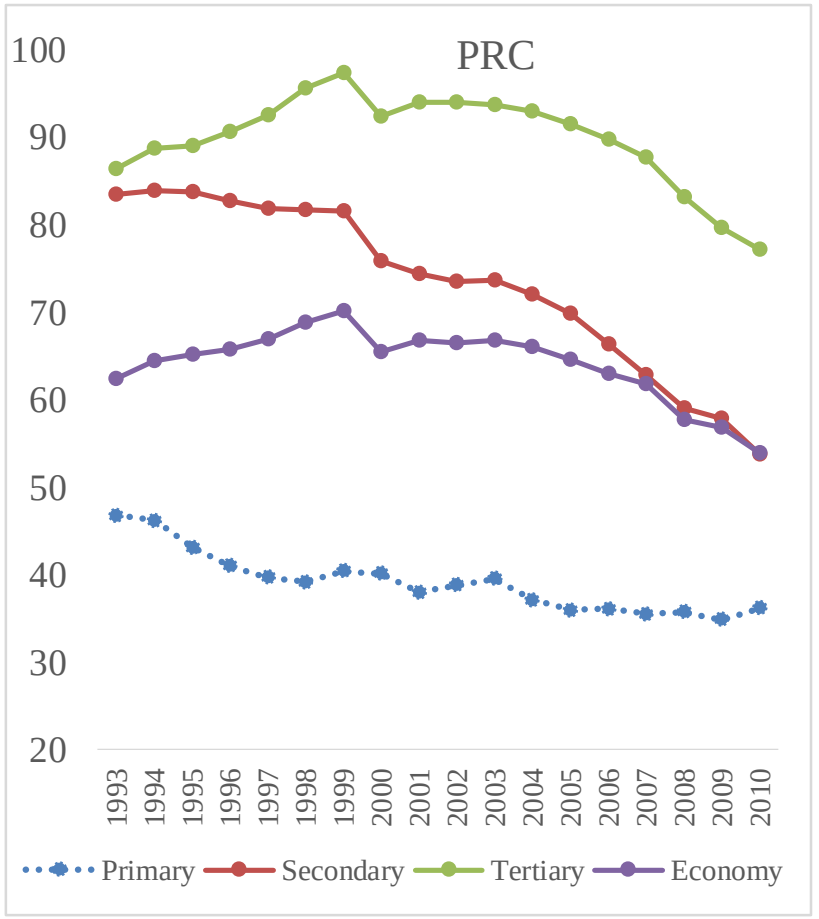




- The gap in the overall per capita income between HI states and non-HI states is due to the differences in the secondary and service sector.
- The income gap between MI and LI states is mainly due to the service sector income.

Fig 3: : Coefficient of Variations in Regional Per Capita Income (%)

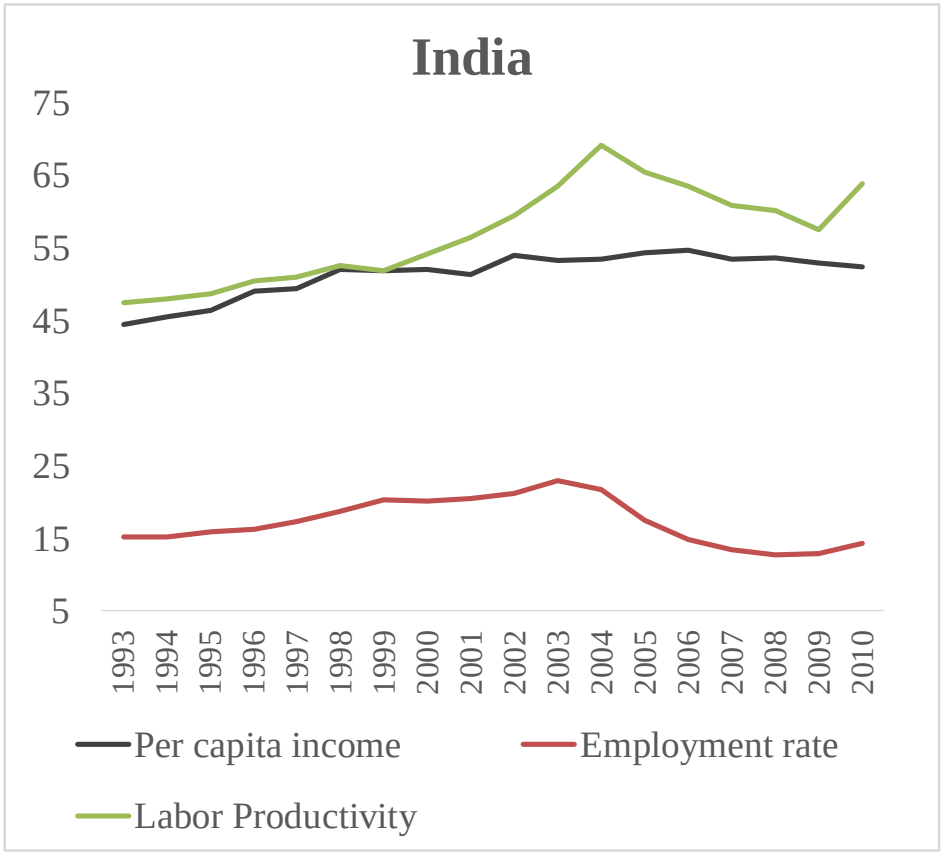


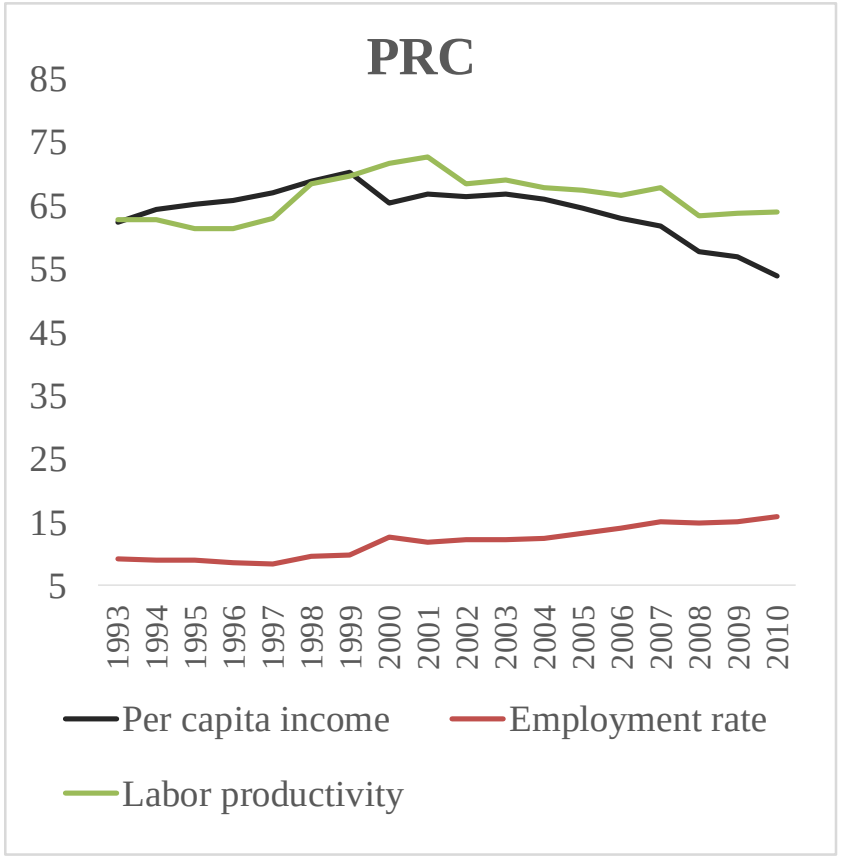


- *The income disparity in India n states is increased and in the PRC's provinces marginally declined in the recent years.*
- *The per capita income disparity in the **secondary and service activities** are higher than overall per capita income disparity in both countries.*

Sources of Regional Disparity in Income

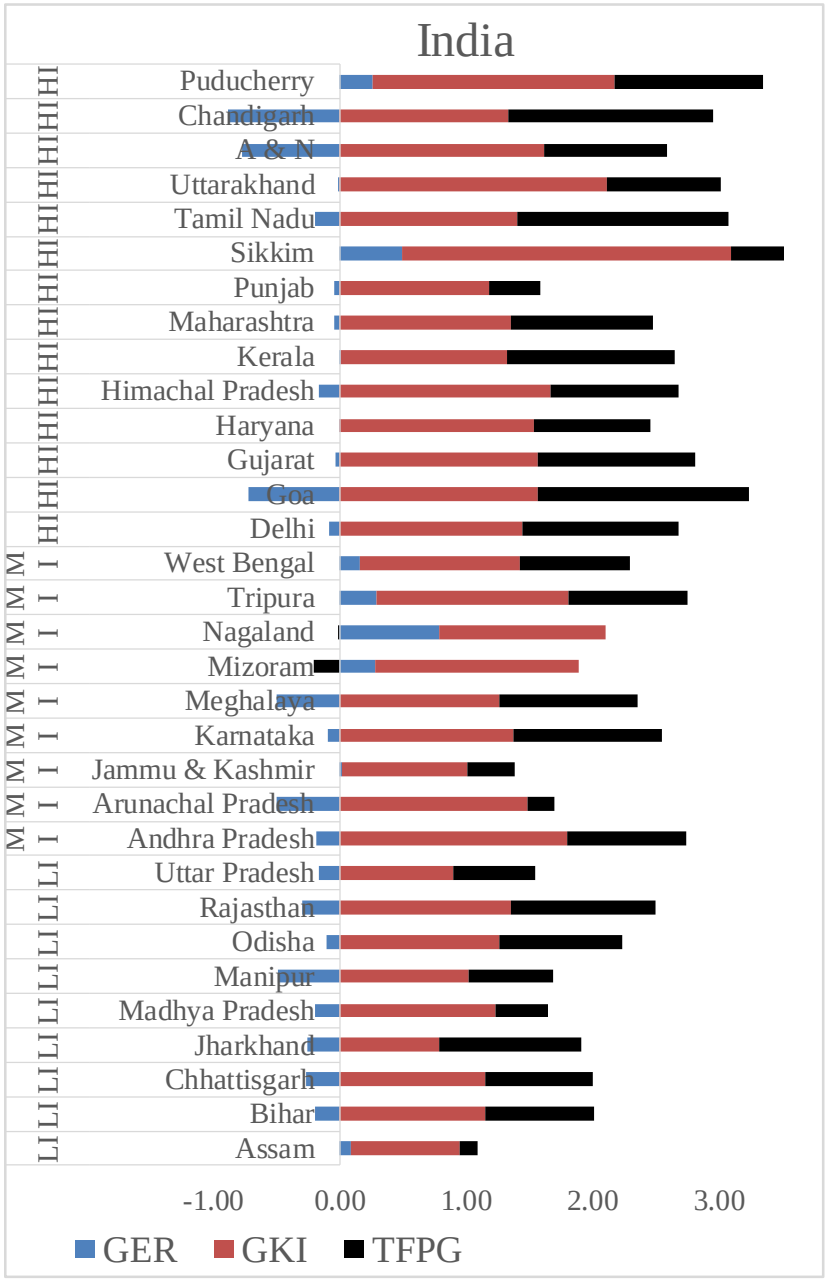
Fig. 4: Coefficient of Variations in Labor Productivity and Employment Rate (%)





- The high disparity in the per capita income is due to that of the labor productivity.

Fig. 4: Decomposition of per capita income growth in the three regions (%)



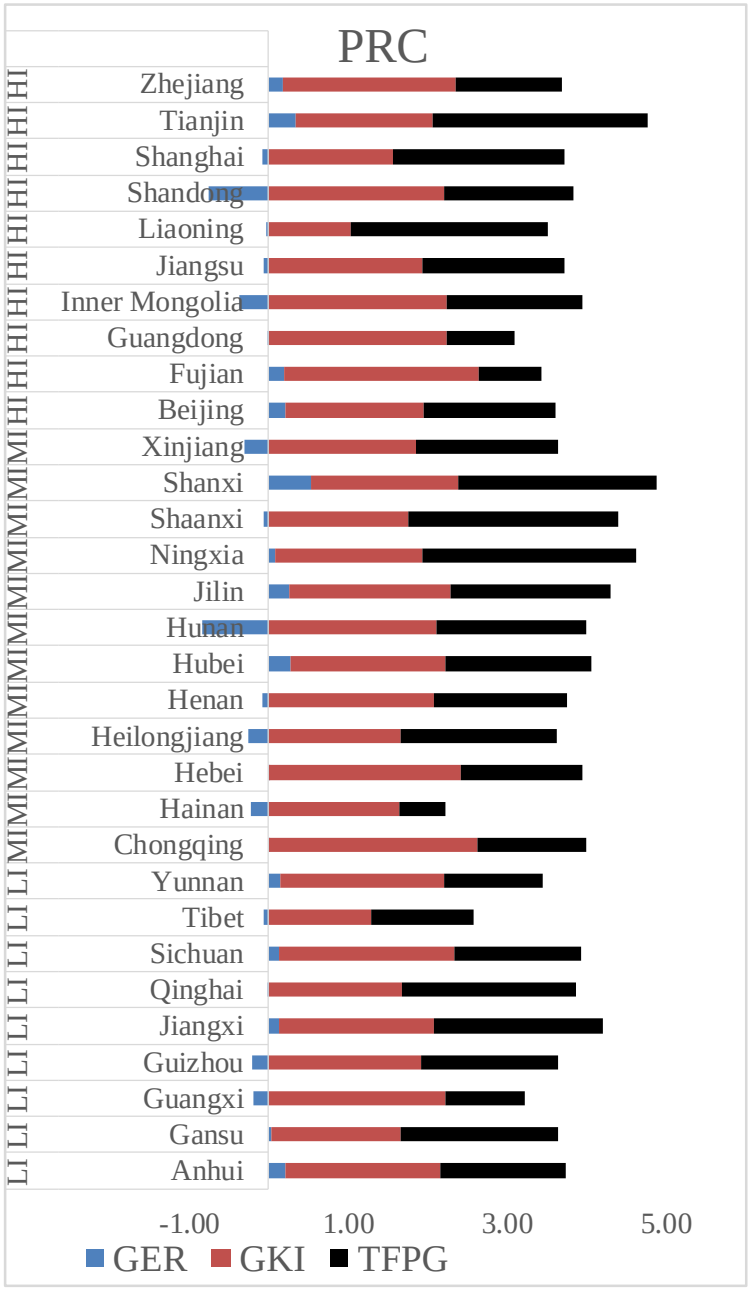
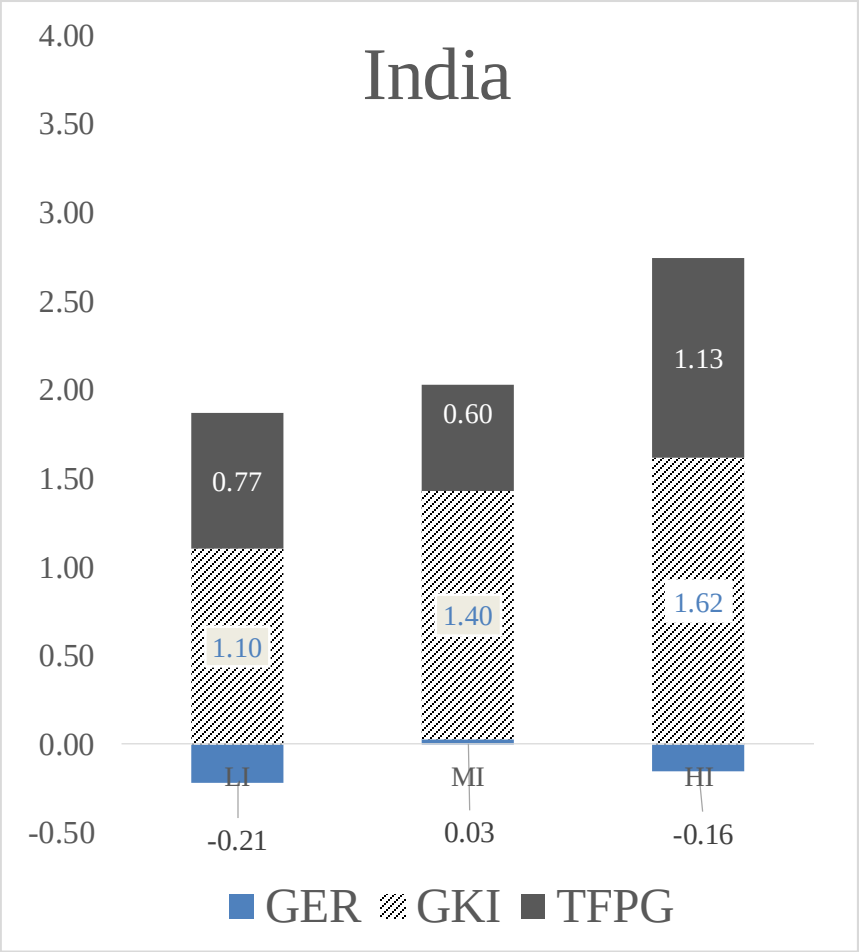
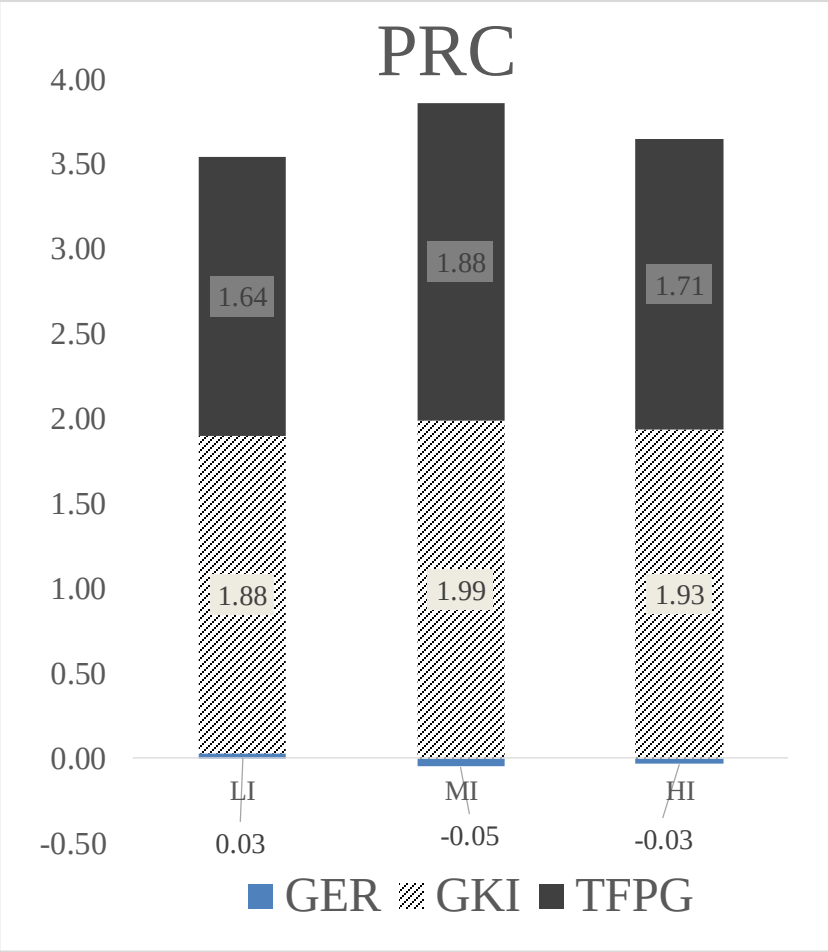


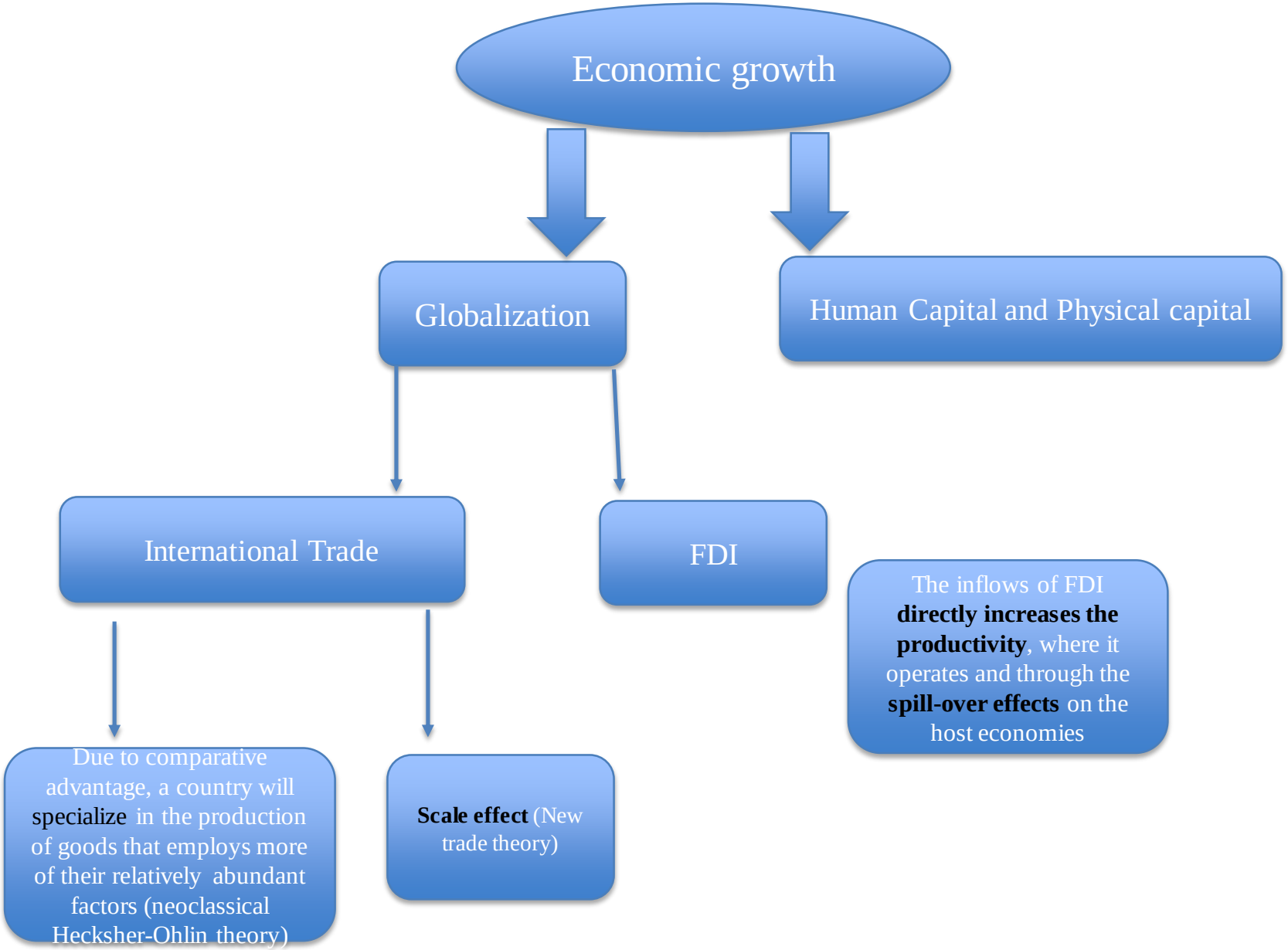
Fig. 4: Decomposition of per capita income growth in the three regions (%)





- The gap in per capita income growth in the three regions in India is due to the differences in **TFPG and the growth of capital intensity**
- The gap in income growth in China is mainly due to the **TFPG component** during this study period

Empirical Evaluation



$$GPY = f(FDI, INV,\ HK) \qquad (9)$$

Where, LPG: labour productivity growth,

FDI: foreign direct investment

INV: physical investment or capital formation

HC: human capital.

- FDI inflows and capital formation are measured as the percent of regional income.
- Human capital is measured by –

  (1) The ratio of gross enrolment of students in the higher education to the total population for Indian states.

  (2) The percent of literate person of age 15 and above in total population for Chinese provinces.

Table 1: Variables and Data sources

Variables	Measurement	Sources	
		India	PRC
Income	Regional domestic product	Central Statistical Organisation (CSO)	National Bureau of Statistics of China (NBSC)
Labor	Employed person	Estimated from the National Sample Survey Organisation (NSSO) data following the approaches of Mallick (2016)	NBSC
Capital	Capital stock	Estimated from the CSO data following the approaches of Mallick (2016)	Estimated using data from NBSC and Li (2003)
Investment	Percentage of investment in income	Investment is the net addition of capital stock.	Investment data is sourced from NBSC, which is converted to constant prices by regional income deflator
Human capital	The percentage of educated people to total population.	(The percentage of enrolment of students in higher education to total population) Annual reports of University Grant Commissioner of India	(The percentage of literate people of age 15 and over) NBSC
FDI	Percentage of FDI in income	Secretariat of Industrial Assistance (SIA)	NBSC

Measurement of state-wise capital stock in India

National Accounts Statistics (NAS) of CSO provides annual data on capital stock at the sectoral level in India.

Assumptions: The sectoral capital-output ratio remains the same for all the states in India in each year.

Seventeen sectoral classification; (1) Agriculture; (2) Forestry and Logging; (3) Fishing; (4) Mining and Querying; (5a) Manufacturing Registered; (5b) Manufacturing Unregistered; (6) Construction; (7) Electricity, Gas, and Water supply; (8a) Railways; (8b) Transport by other means; (8c) Storage; (8d) Communication; (9) Trade, hotels, and restaurants; (10) Banking and insurance; (11) Real estate, ownership of dwellings, and business services; (12) Public administration, and defense ; (13) Other services.

(a) Obtained national sectoral level income and capital stock data at 2004-05 prices from NAS and then, calculated the capital-income ratios for all the above seventeen sectors

(b) Applied the above ratios with the sectoral level state income (CSO) to estimate the state level net capital stock by sectors. The aggregate of all the seventeen sectors net capital stock is considered as the total net capital stock of a state.

(c) The state level investment is calculated as the addition of capital stock during a year.

Table.2: Basic statistics of variables

Variable	Obs	Mean	Std. Dev.	Min	Max
India					
GPY	340	2.18	1.99	-6.29	9.32
GRDP	340	2.91	1.95	-5.26	10.2
FDI	340	0.77	2.34	0	34.2
HK	340	0.95	0.33	0.41	2.2
Investment	340	10.39	10.45	-55.5	76.5
PRC					
GPY	510	3.72	1.43	-2.65	8.65
GRDP	510	4.10	1.27	-1.69	9.02
FDI	510	2.63	3.38	0.00	23.46
HK	510	86.46	9.81	33.8	98.3
Investment	510	22.4	7.2	8.43	50.65

1. ***Endogeneity of GPY, FDI and INV***
2. ***Dynamic characters***

Empirical Methods

a. Dynamic Panel

- A panel data equation can be written as follow.

$$Y_{it} = \partial + \beta * EX_{it} + \mu_i + \varepsilon_{it} \quad (10)$$

where, Y_{it} the GPY and EX_{it} is the vector of explanatory variables.

- The dynamic representation of equation (10):

$$Y_{it} = \alpha Y_{it-1} + \delta X_{it} + \lambda Z_{it} + \mu_i + \varepsilon_{it} \quad (11)$$

Where Yit-1 is one year lag of LPG, X_{it} is the vector of exogenous variables and Z_{it} is the vector of endogenous variables

- Difference GMM
- System GMM [Arellano and Bover (1995) and Blundell and Bond (1997)]
- Limitation: The panel data does not capture the spatial interaction or correlation (due to a number of dimensions.

b. Dynamic Spatial Panel

- These kind of relations can be controlled through spatial dependence models or spatial autoregressive (SAR) model.
- The panel representation of spatial lag model (fixed effect lag model):

$$LPG_{it} = \alpha + \rho \sum_{j=1}^{n} w_{ij}\, LPG_{it} + \beta X_{it} + \mu_i + \varepsilon_{it} \quad (12)$$

- Where, $\boldsymbol{\rho}$ is the SAR coefficient, and $\sum_{j=1}^{n} w_{ij}$ is the classical weight matrix, which is a row-standardized matrix of spatial weights describing the structure and intensity of spatial effects.
- The dynamic spatial panel lag model:

$$Y_{it} = \alpha Y_{it-1} + \rho \sum_{j=1}^{n} w_{ij}\, Y_{it} + \delta X_{it} + \lambda Z_{it} + \mu_i + \varepsilon_{it} \quad (13)$$

- The weight matrix is based on the classical binary connectivity matrix which assume the values of 1 if the two regions share a common border and zero otherwise (contiguous method).

Table.1: Factor of regional per capita income growth (India)

Independent Varriables	Model 1	Model 2	Model 3	Model 4
	SAR	SDM	SAR	SDM
L.GPY	-0.28 (0.03)*	-0.26 (0.03)*	-0.28 (0.03)*	-0.26 (0.03)*
FDI	0.05 (0.03)***	0.045 (0.03)***	0.36 (0.15)*	0.52 (0.16)*
INV	0.12 (0.01)*	0.12 (0.01)*	0.11 (0.01)*	0.11 (0.01)*
HK	1.19(0.17) *	1.72 (0.30) *	1.23 (0.16) *	1.85 (0.26) *
INT1			0.31 (0.013)**	0.45(0.14)*
INT2			0.002(0.004)	0.001(0.004)
wGY	0.06 (0.01)*	0.11 (0.02)*	0.06 (0.01)*	0.11 (0.02)*
wFDI		0.003 (0.02)		-0.02 (0.02)
wINV		-0.01 (0.004)*		-0.01 (0.004)*
wHK		-0.19 (0.09)**		-0.22 (0.08)*
Observations	320	320	320	320
Regions	20	20	20	20
Wald test	1214.68*	1189.21 *	1313.20*	1302.59*
F test	242.94*	148.65*	187.6	130.26*
(Buse 1973) R2 Adj	0.79	0.79	0.80	0.80
Raw Moments R2 Adj	0.81	0.81	0.81	0.81
Log Likelihood	-538.62	-537.89	-535.34	-533.83
AIC	1.75	1.78	1.74	1.75

Note: *, **, *** significant at 1 percent. 5 percent and 10 percent level. The parenthesis figures are the estimated standard errors.

Table.2: Factor of regional per capita income growth (PRC)

Independent Varriables	Model 1	Model 2	Model 3	Model 4
	SAR	SDM	SAR	SDM
L.GPY	0.01 (0.03)	0.01 (0.03)	0.03 (0.03)	0.02 (0.03)
FDI	0.04 (0.02)***	0.006 (0.03)	0.18 (0.12)***	0.24 (0.13)***
INV	0.02 (0.01)*	0.014 (0.01)***	0.02 (0.01)**	0.015 (0.01)***
HK	0.01 (0.003) **	0.03 (0.01) *	0.01 (0.003) **	0.03 (0.01) *
INT1			0.00 (0.003)	0.00 (0.00)
INT2			0.01 (0.003)**	0.01 (0.003)**
wGY	0.12(0.01)*	0.14(0.01)*	0.11(0.01)*	0.14(0.01)*
wFDI		0.006(0.01)		0.02(0.01)
wINV		0.004 (0.003)		0.003 (0.003)
wHK		-0.005 (0.001)*		-0.006 (0.001)*
Observations	480	480	480	480
Regions	30	30	30	30
Wald test	4320.37*	4343.03*	4432.43*	4474.16*
F test	864.07*	542.87*	633.2*	447.41*
(Buse 1973) R2 Adj	0.90	0.90	0.90	0.90
Raw Moments R2 Adj	0.92	0.92	0.92	0.92
Log Likelihood	-728.03	-727.67	-727.32	-728.56
AIC	1.24	1.26	1.25	1.27

Note: *, **, *** significant at 1 percent. 5 percent and 10 percent level. The parenthesis figures are the estimated standard errors.

Table.2: Regional Convergence of per capita income growth (SAR Estimation)

Independent Varriables	India			PRC		
	Reg. 1	Reg. 2	Reg. 3	Reg. 1	Reg. 2	Reg. 3
Ly0	-24.46 (15.1)***	-25.08 (15.20)*	-29.19 (15.61)**	-1.47 (067)*	-3.95 (0.88)*	-3.74 (1.09)*
Effective poplation growth	-29.91 (15.73)**	-30.33 (15.73)**	-26.47 (15.40)***	-0.58 (0.33)*	-0.48 (0.31)***	-.49 (0.31)***
Investment		0.08 (0.05)***	0.09 (0.05)***		0.32 (0.08)*	0.31 (0.08)*
HK			10.45 (4.03)**		4.52 (2.2)** *	0.31 (0.08)*
Spatial rho.	0.33 (0.11)*	0.33 (0.11)*	0.32 (0.11)*	0.72 (0.04)*	0.67 (0.05)*	0.67 (0.05)*
R-square	0.22	0.22	0.27	0.20	0.23	0.26
Observations	120	120	120	180	180	180
Regions	20	20	20	30	30	30

Note: *, **, *** significant at 1 percent. 5 percent and 10 percent level. The parenthesis figures are the estimated standard errors.

Conclusions

- The sources of regional income inequalities are the activities in **secondary and service sector** in both countries.
- The growth accounting approach establishes that the regional inequalities in **TFPG leads to the inequalities in economic growth in the PRC** [In India; TFPG and growth of capital intensity]
- In both countries, the inter-regional income growth is affected **positively by FDI**, spatial effect of **income growth** is positive and of **human capital** is negative.
- Only in case of India, the spatial effect of **capital formation is negative.**
- Based on the results of the study, **regions with a greater degree of economic globalisation or integration**, everything else being equal, are expected to have higher growth.

THANK YOU