

Structural Transformation in South Asia

Raghendra Jha
Sadia Afrin

2018

sadia.afrin@bb.org.bd
sadia.afrin@anu.edu.au

Deputy Director, Bangladesh Bank
Visiting Fellow, Australian National University

Outline

- Motivation
- Data and methodology
- Results
- Conclusion and some challenges

Structural change

“Since the industrial revolution, no country has become a major economy without becoming an industrial power.”

Lee Kuan Yew, delivering the Jawaharlal Nehru Memorial Lecture in New Delhi, 2005.

“...Industry does not emerge out of cumbrous bureaucratic planning, but from close human contact between small farmers and industrialists that released the latter’s latent entrepreneurial talent.” H. Myint

“The slow take-off of India’s manufacturing sector compared with many of its Asian neighbors is the source of a considerable amount of consternation and mystery.” OECD (2010)

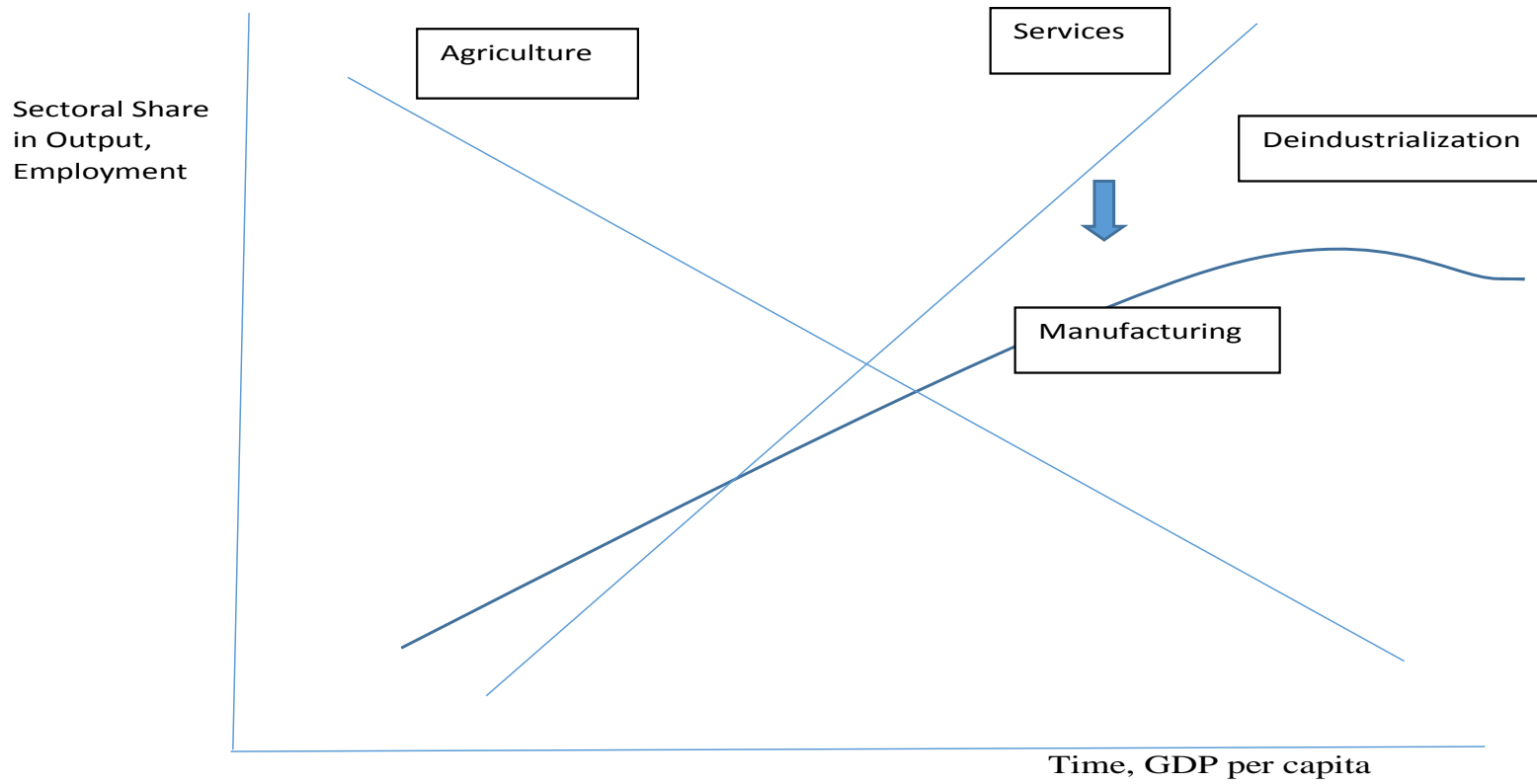
Structural change

- Neo-classical school of economic growth: structure of output hardly matters.
- Kuznets (1966) and others (Hollis Chenery, Arthur Lewis and many more): involved change in composition of GDP/employment.
- Echeveria (1997): Dynamic general equilibrium model to show the mutual cause and effect relation between economic growth and composition of aggregate output.
- Timmer et al (2012): structural transformation is both a cause and effect of economic growth.*
- Structural transformation - the process of economic development in which economic activities shift from low to high productivity sectors/activities

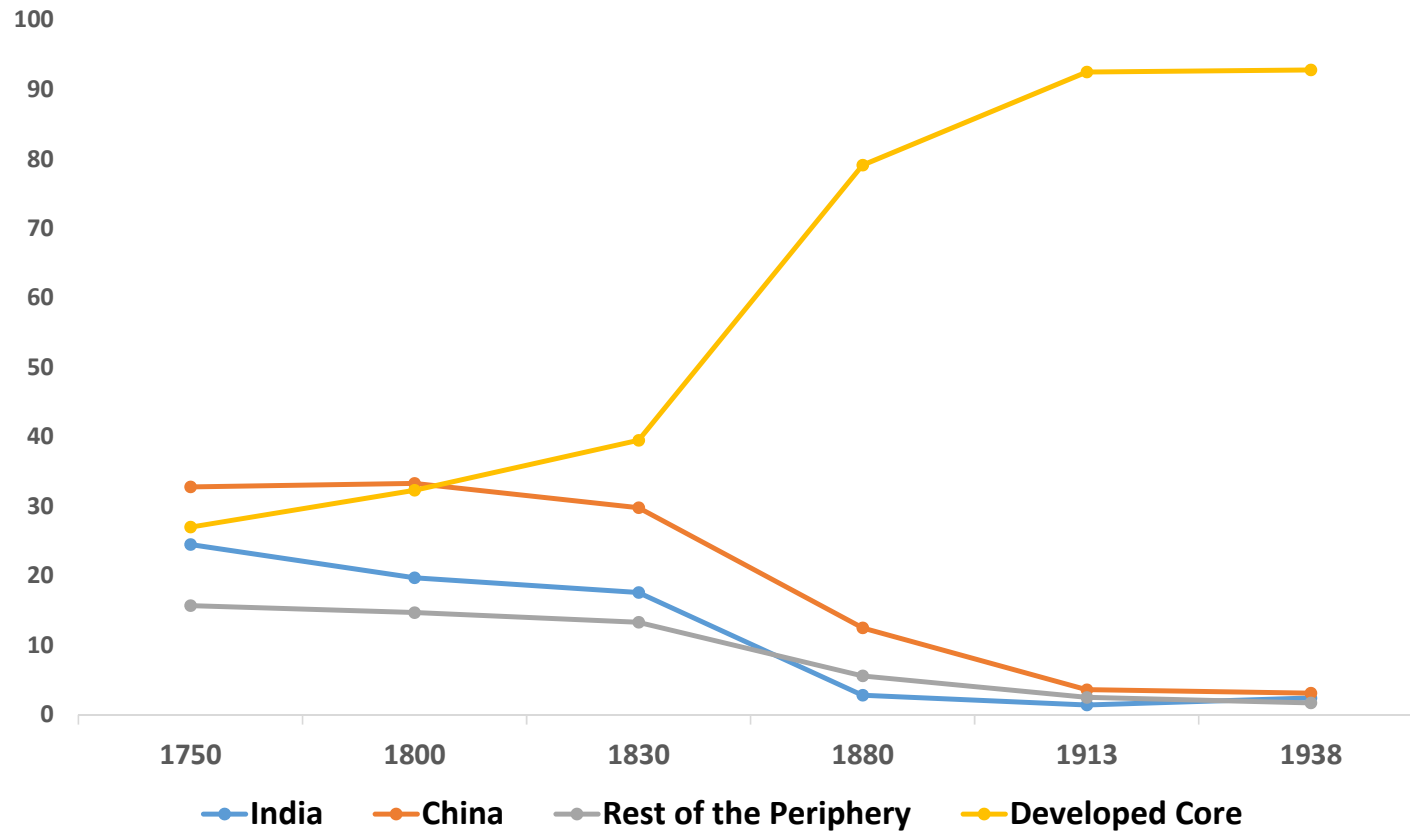
Some stylized facts

- Negative association between the agriculture sector's value added share and the per-capita GDP growth.
- Positive association between the manufacturing and the service sectors shares of GDP and per-capita GDP growth.
- Similar pattern is true in terms of employment shares in each of the three sectors to total employment shares.

Some stylized facts



World Manufacturing Output 1750-1938 (in percent)

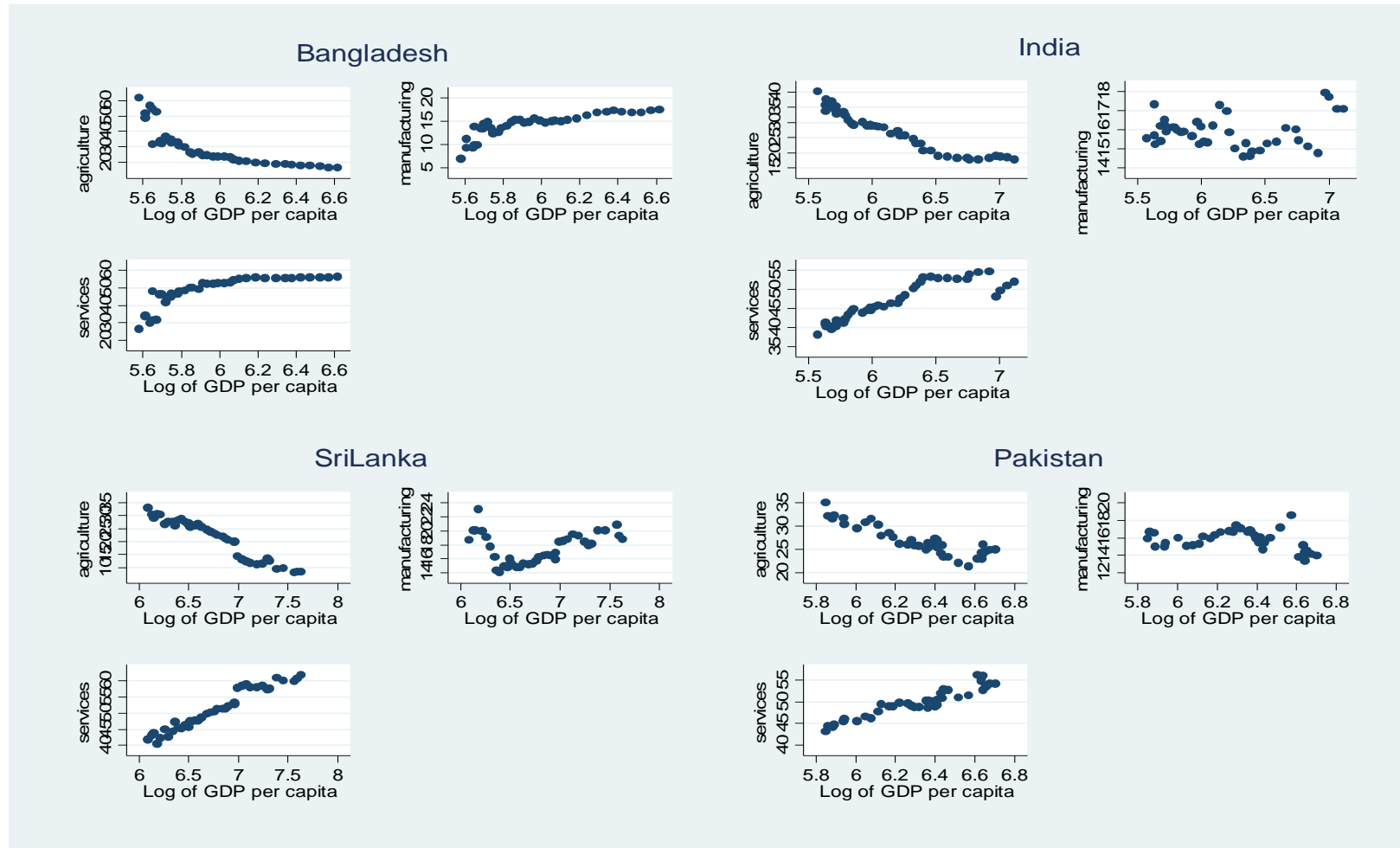


World Manufacturing Output 1750-1938 (in per cent)

Year	India	China	Rest of the Periphery	Developed Core
1750	24.5	32.8	15.7	27.0
1800	19.7	33.3	14.7	32.3
1830	17.6	29.8	13.3	39.5
1880	2.8	12.5	5.6	79.1
1913	1.4	3.6	2.5	92.5
1938	2.4	3.1	1.7	92.8

Source: Clingingsmith and Williamson (2005) quoting Simmons (1985), Table 1, p. 600. N.B. India refers to the current Indian sub-continent.

Patterns of sectoral shares in South Asia



The paper focuses on

While the general pattern of structural transformation is known, the determinants of structural transformation can vary across regions.

- The paper focuses on the roles of country fundamentals and policy measures in facilitating the structural transformation in South Asia in a model of determinants of the share of value added of various sectors.
- Alternatively, the paper investigates the empirical regularity of structural transformation in South Asia

Data

- The regional structural transformation was analyzed in terms of sectoral shares of value added to total GDP, not in terms of employment due to data constraint.
- Variables of interest are categorized as
 - Country fundamentals
 - Policy measures
 - Decadal dummies

$$\bullet Y_{i,t} = \beta_1 GDP_{i,t} + \beta_2 fundamentals_{i,t} + \beta_3 policy_{i,t} + \beta_4 decades_{i,t} + \beta_{2 \times 4} GDP_{i,t} \times decades_{i,t} + \epsilon_{i,t}$$

- Four South Asian countries (Bangladesh, India, Sri Lanka and Pakistan), 41 years (1974-2014) data, mostly from World Development Indicators latest update.

Summary Statistics of Variables

Variable	Observation	Mean	Std. Dev.	Min	Max
Agriculture share	164	26.16	8.55	7.99	61.95
Manufacturing share	164	15.77	2.11	7.04	23.13
Service share	164	48.95	6.16	26.43	61.66
Log (GDP per capita)	164	6.31	0.48	5.58	7.63
Log (Land per capita)	164	-5.78	0.67	-7.11	-4.43
Arable land	160	43.87	19.21	13.30	73.39
Age dependency ratio	164	70.89	13.39	48.02	93.29
Trade	160	38.47	20.68	10.66	88.64
Capital formation	160	21.83	5.89	6.15	38.16
Log (Power)	156	5.16	0.89	2.83	6.61
FDI	163	0.71	0.74	-0.05	3.67

Table 3: Determinants of the share of Agriculture in total value added in South Asia (contd.)

Panel GLS regression:	Agriculture share in total value added				
	Model 1	Model 2	Model 3	Model 4	Model 5
Log (GDP per capita)	-13.235 (0.00)	-11.539 (0.00)	-2.053 (0.457)	-13.768 (0.00)	-7.904 (0.009)
Log (Land per capita)			5.195 (0.009)		4.046 (0.054)
Arable land			0.201 (0.009)		0.123 (0.136)
Age dependency ratio			-.0835 (0.386)		0.0079 (0.937)
Trade			.014 (0.751)		.036 (0.369)
Capital formation			-.201 (0.01)		-0.236 (0.005)
Log (Power)			-4.782 (0.001)		-4.495 (0.004)
FDI			-.212 (0.533)		-0.105 (0.756)

Note: p-value of the respective coefficient in parenthesis.

Panel GLS regression:	Agriculture share in total value added				
	Model 1	Model 2	Model 3	Model 4	Model 5
D70		3.676 (0.021)	2.779 (0.141)	47.350 (0.043)	45.21 (0.145)
D80		1.96 (0.157)	1.724 (0.278)	-19.668 (0.308)	-50.00 (0.047)
D90		1.077 (0.346)	1.573 (0.213)	-22.502 (0.204)	-45.42 (0.033)
D00		-0.495 (0.829)	-.072 (0.935)	-15.457 (0.282)	-26.875 (0.114)
D10					
Log (GDP per capita)				-7.493	-7.82
*D70				(0.044)	(0.112)
Log (GDP per capita)				3.395	7.857
*D80				(0.246)	(0.041)
Log (GDP per capita)				3.669	7.02
*D90				(0.161)	(0.027)
Log (GDP per capita)				2.274	3.931
*D00				(0.272)	(0.111)
Constant	110.607 (00)	97.70 (0.00)	94.59 (00)	112.83 (0.00)	121.89 (0.00)
Wald chi ² test	129.26 (0.00)	270.56 (0.00)	234.59 (00)	341.98 (0.00)	399.87 (0.00)

Table 4: Determinants of the share of Manufacturing in total value added in South Asia (cond.)

Panel GLS regression:	Manufacturing share in total value added				
	Model 1	Model 2	Model 3	Model 4	Model 5
Log (GDP per capita)	1.688 (0.012)	1.787 (0.032)	-4.576 (0.00)	4.219 (0.00)	0.518 (0.702)
Log (Land per capita)			-0.941 (0.20)		-2.256 (0.002)
Arable land			-0.077 (0.037)		-0.105 (0.001)
Age dependency ratio			0.0236 (0.497)		0.0702 (0.042)
Trade			0.0568 (0.015)		.039 (0.055)
Capital formation			0.0729 (0.075)		.0468 (0.247)
Log (Power)			1.963 (0.001)		2.911 (0.00)
FDI			-0.153 (0.405)		-.318 (0.107)
D70		0.509 (0.561)	-0.179 (0.852)	-25.50 (0.022)	2.324 (0.871)

Panel GLS regression:		Manufacturing share in total value added				
	Model 1	Model 2	Model 3	Model 4	Model 5	
D80		0.561 (0.457)	0.0383 (0.962)	28.35 (0.001)	52.055 (0.00)	
D90		0.341 (0.584)	-0.208 (0.743)	24.70 (0.002)	40.776 (0.00)	
D00		0.0678 (0.882)	-0.361 (0.426)	9.384 (0.193)	17.997 (0.049)	
D10						
Log (GDP per capita) *D70				4.973 (0.005)	.468 (0.838)	
Log (GDP per capita) *D80				-4.293 (0.001)	-8.094 (0.00)	
Log (GDP per capita) *D90				-3.711 (0.002)	-6.26 (0.00)	
Log (GDP per capita) *D00				-1.33 (0.205)	-2.656 (0.05)	
Constant	5.065 (0.231)	4.159 (0.455)	27.11 (0.002)	-12.204 (0.053)	-20.40 (0.091)	
Wald chi2 test	6.33 (0.011)	5.77 (0.329)	68.34 (0.00)	79.97 (0.00)	213.61 (0.00)	

Table 5: Determinants of share of Service in total value added in South Asia (contd.)

Panel GLS regression:		Service share in total value added				
	Model 1	Model 2	Model 3	Model 4	Model 5	
Log (GDP per capita)	10.225 (0.00)	7.263 (0.00)	5.968 (0.012)	7.341 (0.00)	7.746 (0.005)	
Log (Land per capita)			-4.180 (0.022)		-3.906 (0.048)	
Arable land			-0.109 (0.104)		-.0832 (0.277)	
Age dependency ratio			0.105 (0.241)		.0899 (0.338)	
Trade			-0.0535 (0.158)		-.0537 (0.157)	
Capital formation			-0.00254 (0.973)		.0648 (0.411)	
Log (Power)			2.677 (0.047)		2.721 (0.061)	
FDI			0.373 (0.276)		.352 (0.281)	
D70		-5.848 (0.00)	-3.570 (0.062)	-57.805 (0.008)	-41.10 (0.149)	

Panel GLS regression:		Service share in total value added				
	Model 1	Model 2	Model 3	Model 4	Model 5	
D80		-4.3112 (0.00)	-2.48 (0.123)	9.324 (0.597)	28.52 (0.213)	
D90		-2.940 (0.003)	-1.840 (0.139)	9.531 (0.560)	17.72 (0.366)	
D00		-0.334 (0.666)	0.199 (0.821)	13.391 (0.33)	16.343 (0.298)	
D10						
Log (GDP per capita)				8.782 (0.012)	6.627 (0.142)	
*D70						
Log (GDP per capita)				-2.108 (0.436)	-4.765 (0.172)	
*D80						
Log (GDP per capita)				-1.867 (0.443)	-2.899 (0.319)	
*D90						
Log (GDP per capita)				-2.047 (0.305)	-2.391 (0.294)	
*D00						
Constant	5.065 (0.231)	4.988 (0.485)	-26.56 (0.229)	4.733 (0.702)	-38.644 (0.157)	
Wald chi2 test	76.52 (0.000)	243.95 (0.00)	212.90 (0.00)	211.13 (0.00)	248.90 (0.00)	

Tests for Heteroskedasticity and Serial correlation of order 1.

Test	Results
LR test for heteroscedasticity, $\chi^2(3)$	143.82 (0.00)
Wooldridge test for autocorrelation (in panel data), $F(1, 3)$	19.521 (0.0215)

Summary of findings

- With increase of per capita income the share of agriculture decreases and that of services increases, supporting the Kuznets hypothesis
- however the share of manufacturing sector shows a more tepid rise and even decreases in some model specifications.
- Thus, the Kuznets model of structural transformation is supported to some extent, but not strongly in South Asian countries.
- More attention required for the development of Manufacturing sector. Greater infrastructural availability such as electricity (power) and higher capital investment can ensure steady increase of manufacturing share to GDP.

Growth of manufacturing sector: financial sector challenges in Bangladesh

Challenges in the supply side of long term finance for manufacturing sector:

- Under developed bond market
 - Government reliance on NSC (lack of pension fund, social safety nets)
 - Failed to produce a benchmark for corporate bonds.
- Higher NPL in the banking system
 - Poor governance
 - Lack of risk assessment capacity

Demand side challenges:

- Human capital
- Competitiveness and innovation