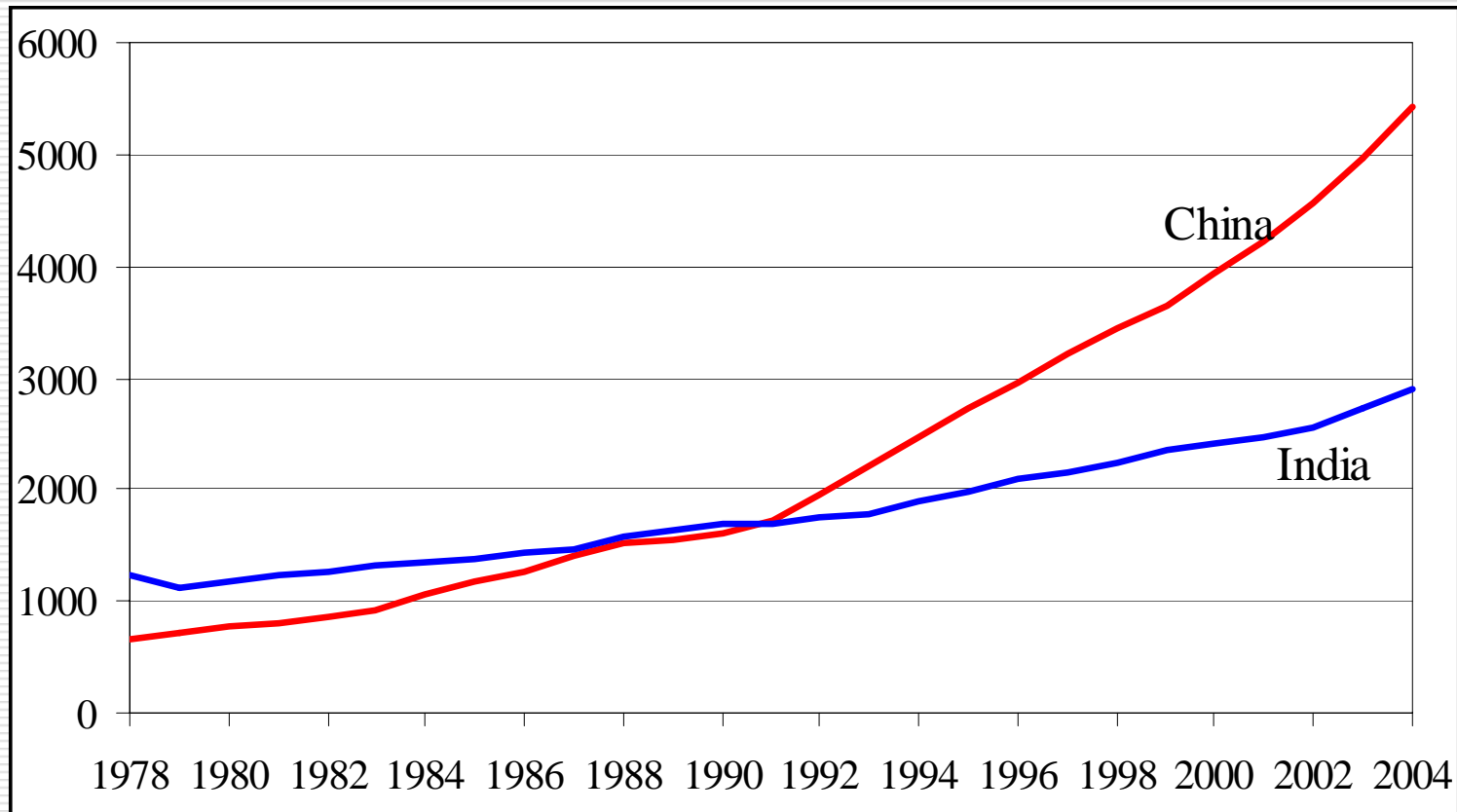


Accounting for Growth: Comparing China & India

Barry Bosworth & Susan M. Collins
December 2006

GDP per Capita

Constant 2000 International (PPP) Dollars



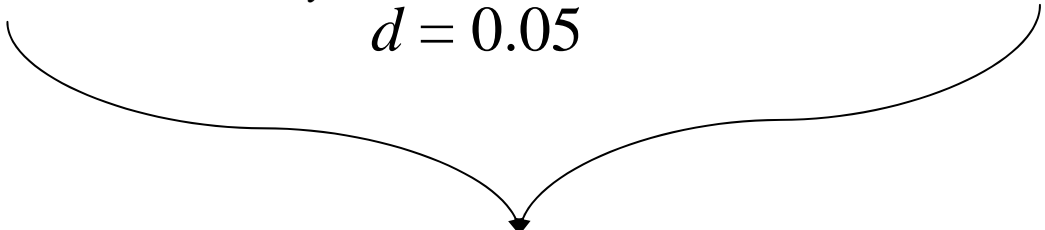
This Study

- Contrasts growth performance in China vs. India based on construction of growth accounts for 1978-2004
 - Supply side sources of growth: Physical capital, Labor, Education & Land
 - Highlights the very different growth patterns by disaggregating:
 - 3 sectors - primary, industry & services
 - Efficiency gains associated with factor reallocation
 - Draws implications for future prospects
-

Construction of Growth Accounts

$$K_t = K_{t-1}(1-d) + I_t \qquad H_t = (1.07)^{s_t}$$

$d = 0.05$



$$Y = AK^\alpha (LH)^{1-\alpha}$$

↓

$$\frac{y}{l} = \alpha \left(\frac{k}{l} \right) + (1-\alpha)h + a$$

$\overset{=}{0.40}$

Some Data Issues

□ India:

- Large informal sector 5 yr. household surveys

□ China:

- Large industrial enterprises, HH surveys for some services
 - 2 employment indicators at sectoral level
 - Concerns national accounts overstate growth
 - We explored alternative price indices & prefer:
 - Official series for primary & tertiary sectors
 - Alternative for industry (reduces growth by 1.3 p.p)
-

Aggregate Growth

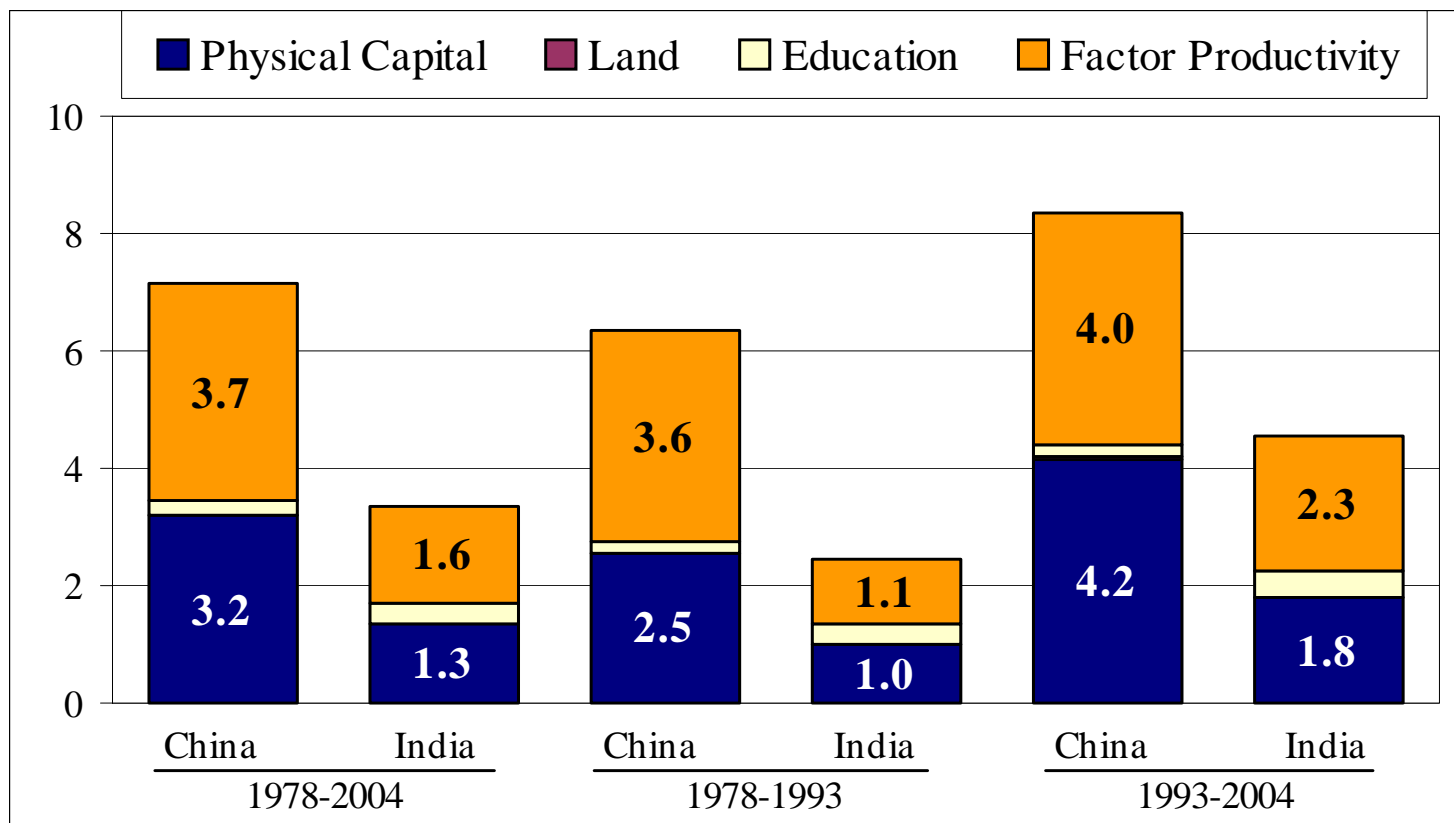
- **Entire Period: 1978-2004**
 - Similar annual employment growth
 - Chinese growth (Y/L) much more rapid
 - Gains in (Y/L) equally split between capital deepening & TFP in both countries
 - **China:**
 - 1978-1993: stands out for strong TFP gains
 - 1993-2004: employment growth slows, faster growth is primarily from increased capital deepening
 - We do NOT find evidence of slowing TFP growth
 - **India:**
 - 1978-93: Gains from (K/L) & TFP similar to global averages
 - 1993-2004: (Y/L) growth matches E Asia –but strong TFP contribution, not dominated by increased (K/L)
-

Sources of Economic Growth, Total Economy, 1980-2004

Annual percentage rates of change

Region	Output	Employment	Output per Worker	Contribution of:			
				Physical Capital	Land	Education	Factor Productivity
China 1978-04	9.2	2.0	7.3	3.2	0.0	0.2	3.7
India 1978-04	5.4	2.0	3.3	1.3	0.0	0.4	1.6
E. Asia 1980-93	7.3	2.7	4.6	2.6		0.6	1.4

Sources of Growth in Output per Worker, Total Economy



Contributions from Education

- Neither China nor India has achieved gains comparable to East Asia
 - India:
 - Illiteracy rates remain very high, just 60% primary students reach 5th grade
 - Estimated returns to primary school surprisingly low
 - Significant pool of highly educated – but rising returns suggest shortages
 - China:
 - Largely eliminated illiteracy, 98% reach 5th grade
 - Significant urban-rural divide
 - Estimates also suggest low returns to schooling
-

Sectoral Growth Patterns

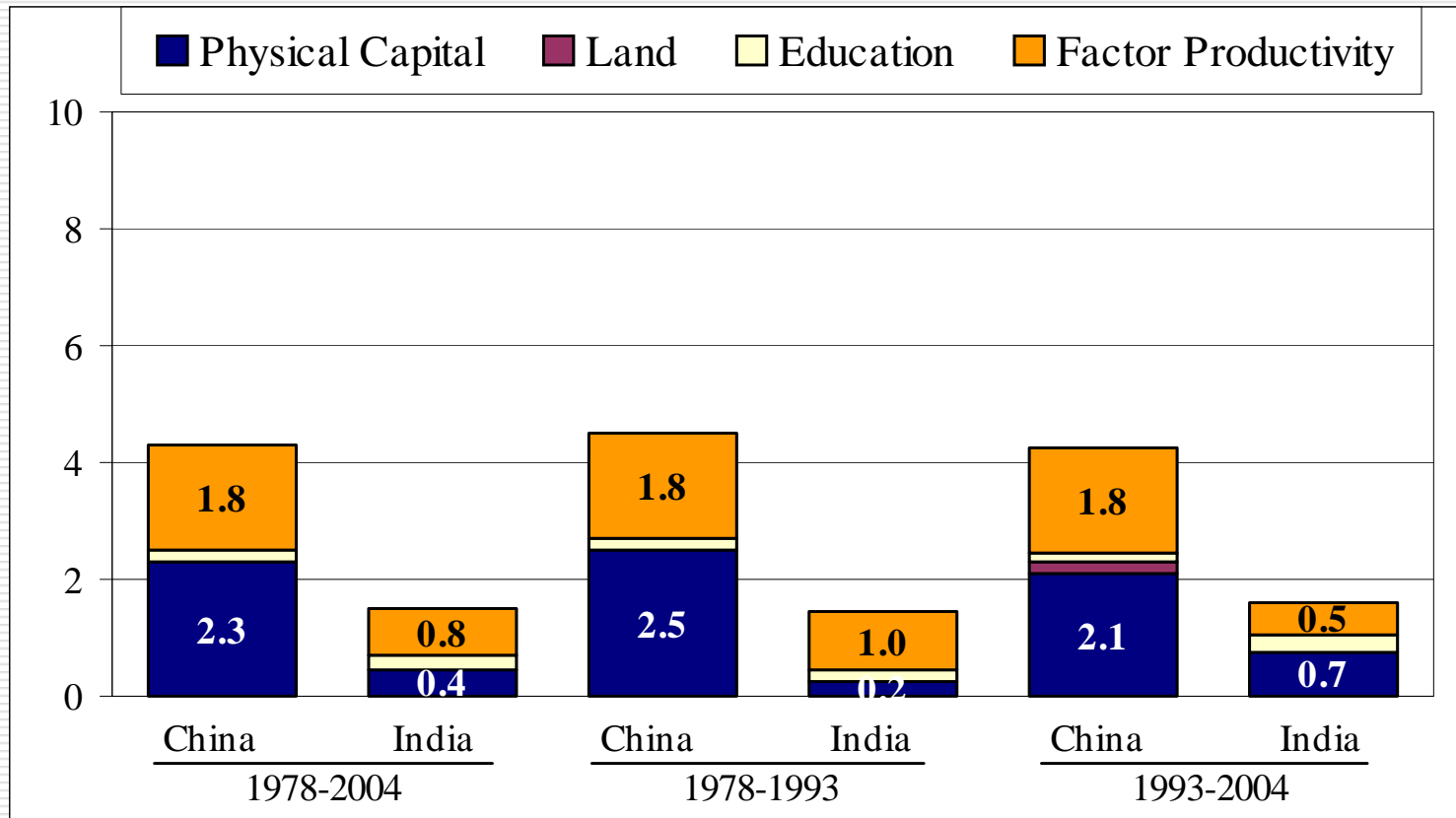
□ Primary Sector:

- Both benefited from Green Revolution – but labor force share in agriculture remains surprisingly high in both economies.
- China's growth remarkably rapid, esp. given declining employment
- Employment continued to **rise** in India

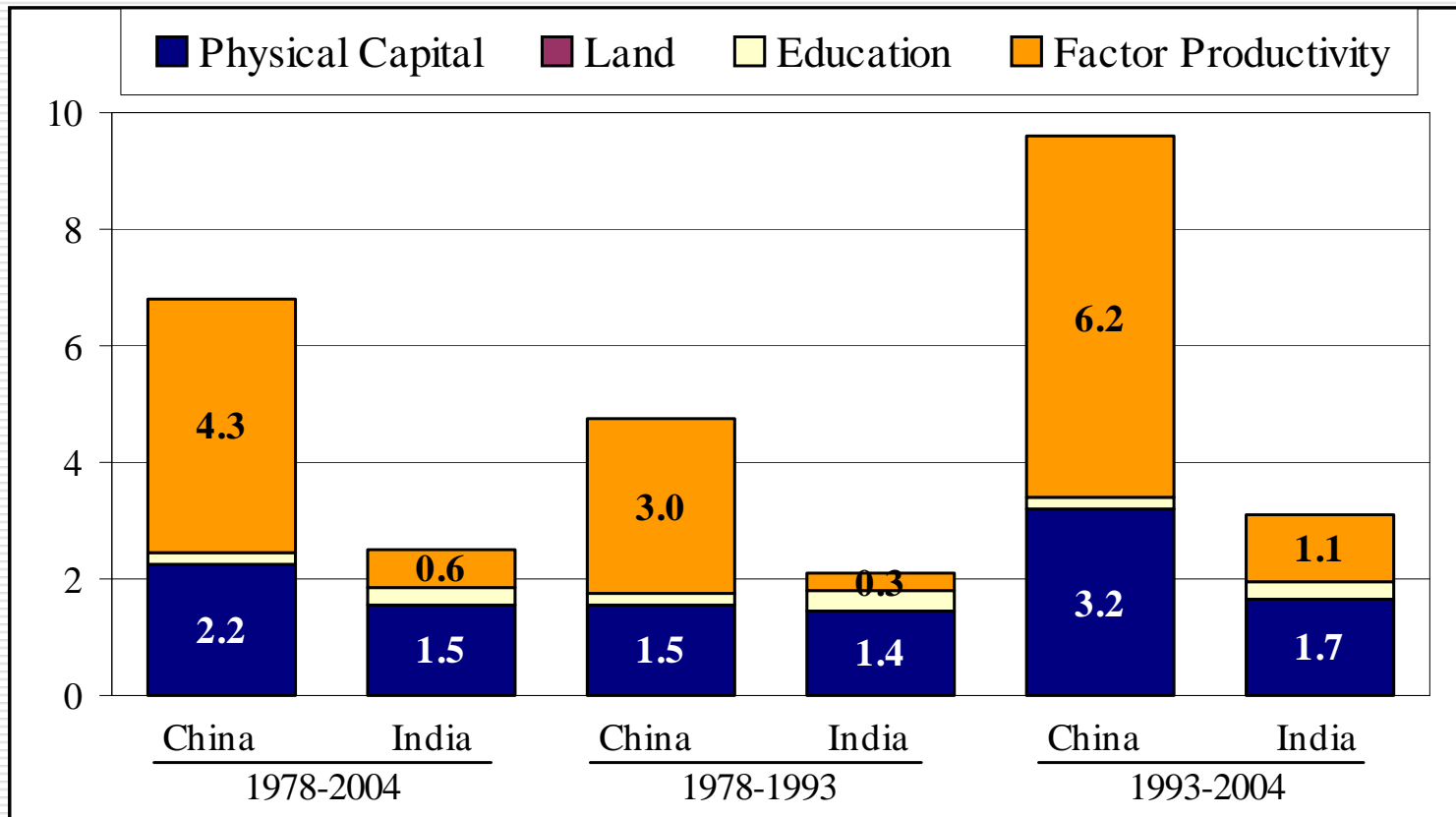
□ Industry:

- **China:** Truly spectacular performance, esp. post 1993 with doubling of gains from both K/L and TFP; now accounts for **over 50%** of output
 - **India:** Growth also rose post 1993, but ½ due to employment, and TFP gains were modest
-

Sources of Growth in Output per Worker, Primary Sector



Sources of Growth in Output per Worker, Industry



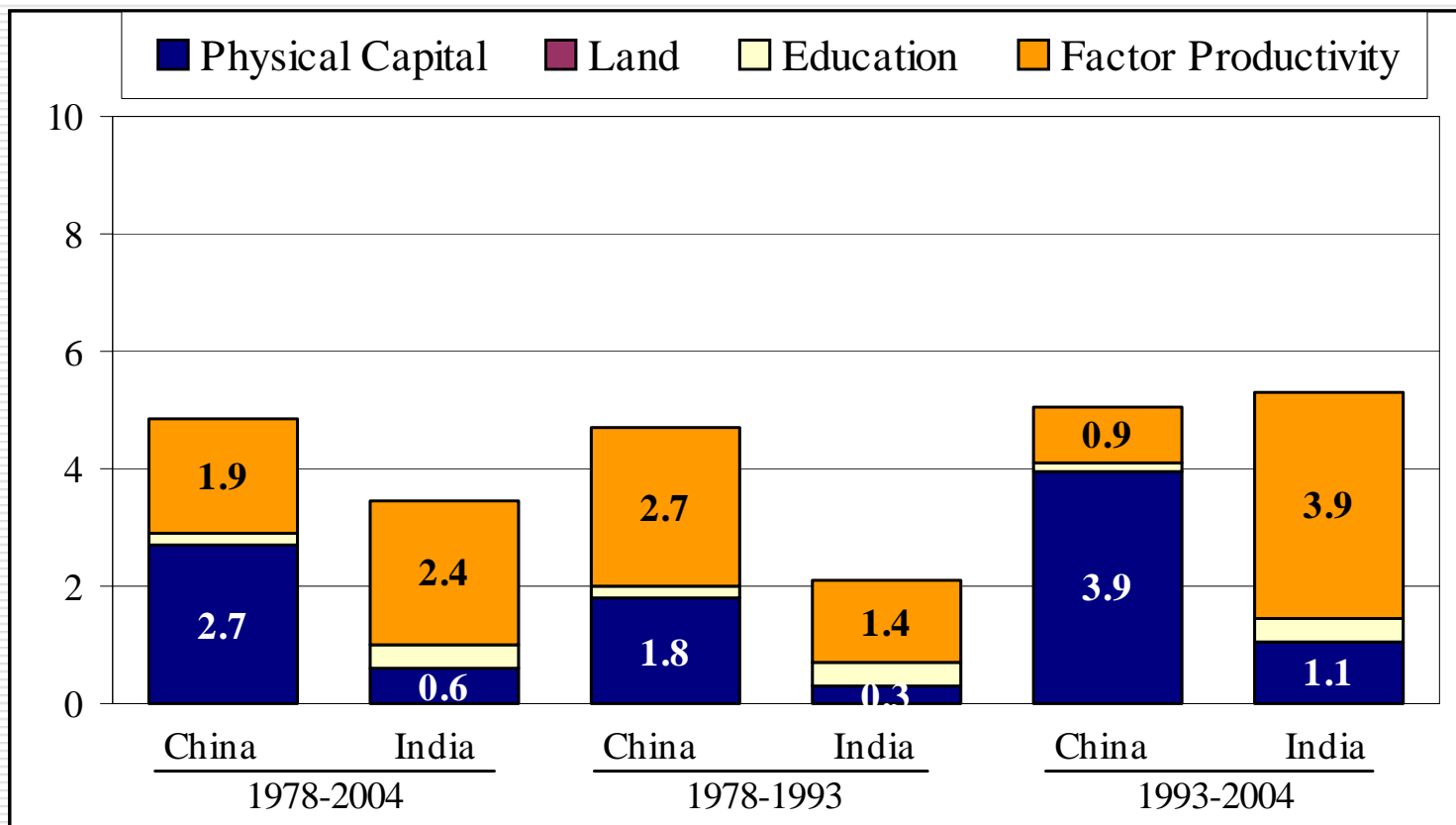
Sectoral growth patterns (cont)

□ Services:

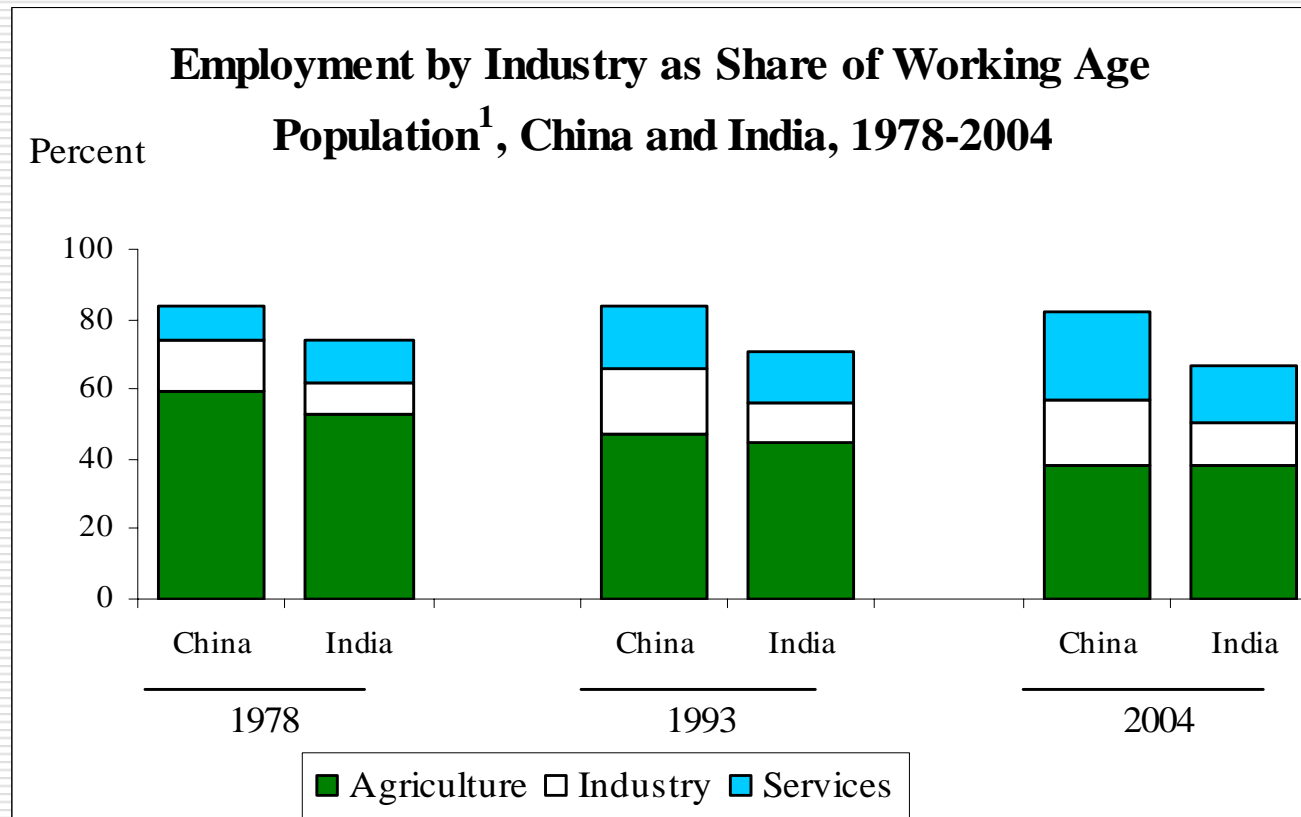
- **India:** strong recent performance is well-known – largely TFP, modest (K/L)
- **China:** strong growth began in 78-93; but gains primarily from (K/L) with weak TFP improvements

□ Services is the sector where India comes closest to achieving China's growth rates

Sources of Growth in Output per Worker, Services



Labor force share in agriculture remains surprisingly high in both economies.

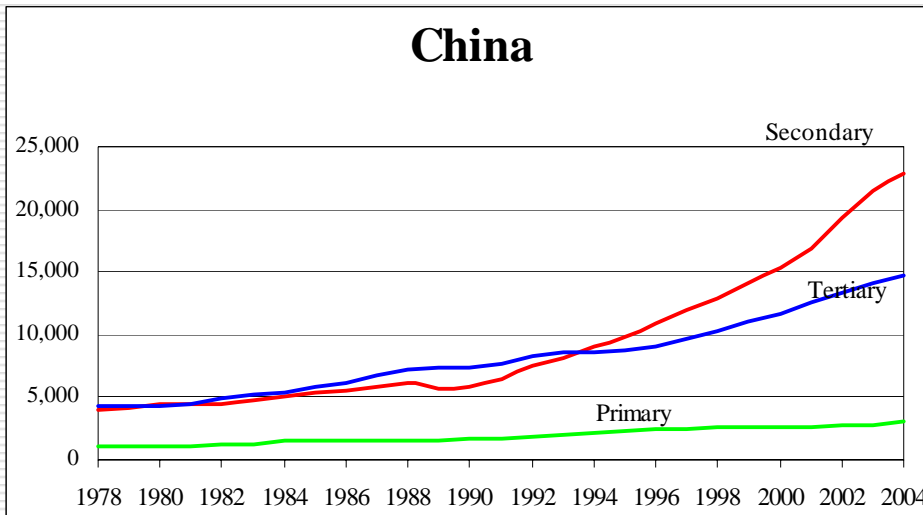


Reallocation Effects

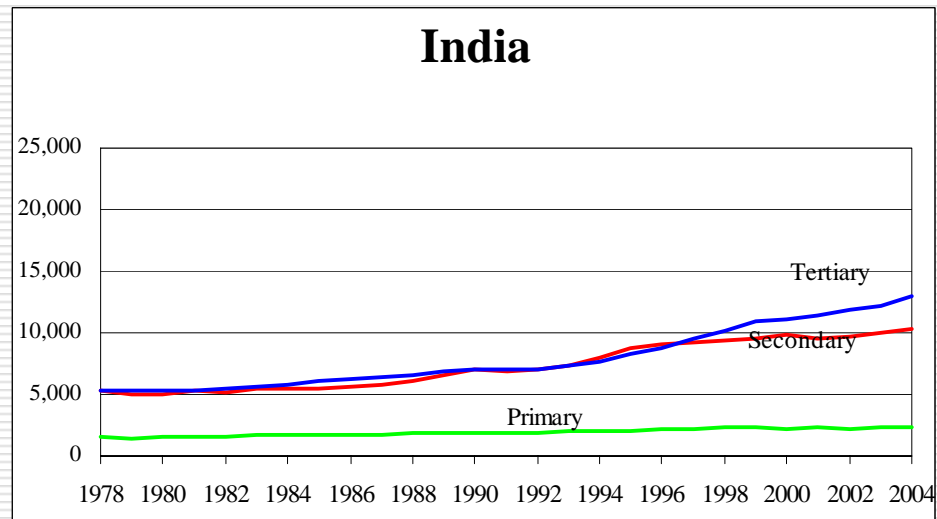
- Output growth arises from both:
 - Productivity gains within sectors
 - Resource reallocation among sectors
 - Output per worker in services & industry vs. agriculture:
 - 1978: roughly 3x for both countries
 - 2004: 4-5x for India, 5-7x for China
 - Aggregate output growth can be decomposed:
 - sectoral contributions (sector's growth x VA share)
 - residual due to reallocation
-

Output per worker by sector

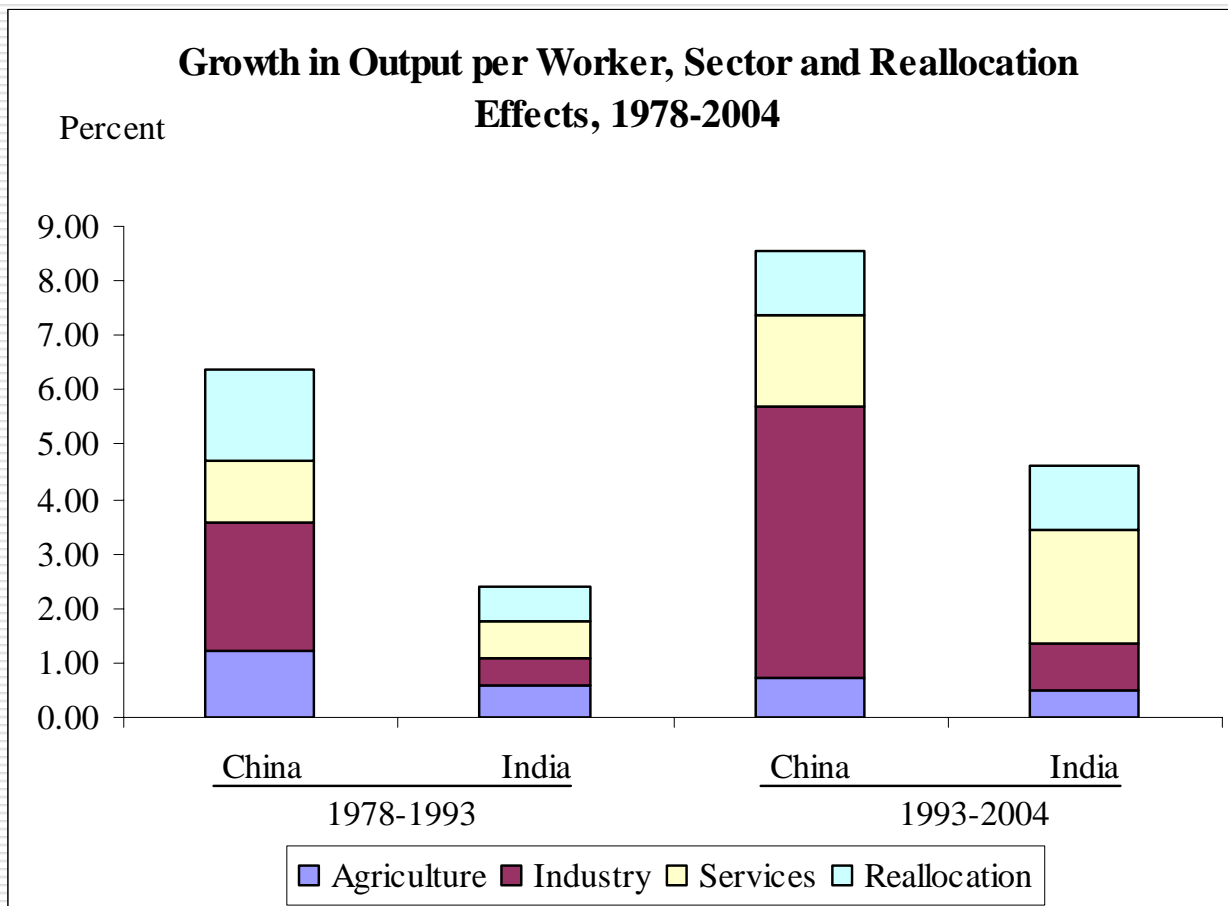
China



India



Growth in Output per Worker, Sector and Reallocation Effects, 1978-2004



Sectoral Growth in Output/Worker

(ALL of the recent difference between China's & India's performance can be attributed to industry)

		Total	Primary	Secondary	Tertiary	Reallocation
1978-93	China	6.4	1.2	2.4	1.1	1.7
	India	2.4	0.6	0.5	0.7	0.6
	Difference	4.0	0.6	1.9	0.5	1.0
1993-04	China	8.5	0.7	5.0	1.7	1.2
	India	4.6	0.5	0.9	2.1	1.2
	Difference	3.9	0.2	4.1	-0.4	0.0

Strong Future Growth Prospects

- Both still poor countries:
 - 15% (China), 8% (India) US GNI/capita (PPP)
 - Further gains from moving labor out of agriculture

 - **China:**
 - Slowing labor force growth but improvements in human capital
 - 40% national saving – but concerns about over-investment in some sectors
 - Impressive expansion of trade and FDI inflows
 - Problems include inefficient financial sector, need to develop domestic markets and address imbalances.
-

Future Growth Prospects (cont)

□ **India:**

- Growing labor force, still concentrated in agriculture
 - Room for expansion of services & esp. **manufacturing**
 - BUT
 - Educational institutions need to be strengthened and access expanded
 - Moderate investment rates will need to be increased to sustain growth >7%
 - Private saving has been increasing- but much is absorbed by high public sector deficits
 - Increased FDI could raise investment, promote access to global markets & technology
 - Also concerns about inadequate infrastructure
 - China provides a model for using global market stimulus to increase and sustain growth
-

Summary & Conclusions

- Growth accounts uncover sources of:
 - Truly extraordinary Chinese growth from both TFP and capital deepening
 - India's recent performance, matching E Asia, but with greater evidence of TFP
 - Central difference: China's stellar performance in industry vs. India's relatively weak manufacturing growth.
 - Goods production and trade will be essential for India to fully employ its workers.
 - India's recent services growth matches that for China.
 - We see strong prospects for continued growth in both.
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