

# The Productivity Gap between Europe and the United States: Trends and Causes

Bart van Ark, Mary O'Mahony, and Marcel P. Timmer

Katrin Trojer

# Structure

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- ▶ **European and U.S. Productivity: 1950 – 2006**
  - ▶ European Catch-Up: 1950 - 1973
  - ▶ The Productivity Slowdown: 1973 - 1995
  - ▶ Europe`s Falling Behind: 1995 – 2006
- ▶ **Growth Accounting for Europe and the United States**
- ▶ **Structural Change and Sectoral Productivity Growth**



# European Catch-Up: 1950-1973

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- ▶ Rapid labor productivity growth in the European Union went together with catching-up in terms of per capita income levels with the United States.
- ▶ technology imitation and new institutions
  - ▶ to speed up growth and productivity
  - ▶ well-educated population and strong set of institutions (human capital and financial wealth)
  - ▶ emergence of a new set of institutions in the area of wage bargaining (involved limiting wage demands in exchange for a rapid redeployment of profits for investment)



# The Productivity Slowdown: 1973–1995

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- ▶ Average Annual Growth Rates of GDP, GDP per Capita, and GDP per Hour Worked, EU-15 and United States, 1950 – 2006 (in percent)

Growth in	GDP	GDP per capita	GDP per hour worked
<b>1950-1973</b>			
EU-15	5.5	4.7	5.3
US	3.9	2.4	2.5
<b>1973-1995</b>			
EU-15	2.0	1.7	2.4
US	2.8	1.8	1.2
<b>1995-2006</b>			
EU-15	2.3	2.1	1.5
US	3.2	2.2	2.3



# The Productivity Slowdown: 1973–1995

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- ▶ US GDP growth slowed from 3.9 percent on average per year to 2.8 percent - EU-15 the growth slowed substantially more from 5.5 percent to 2.0 percent
- ▶ average growth rates of per capita income of EU-15 and US became quite the same
  - ▶ while per capita income in Europe hovered around 75 to 80 percent of the U.S. level between 1973 and 1995, the productivity gap between Europe and the US continued to narrow.
- ▶ average annual labor productivity growth in the EU-15 was still twice as fast as in the United States
  - ▶ Thus, the labor productivity gap virtually closed from 25 percentage points in 1973 to only 2 percentage points in 1995.

## Europe`s Falling Behind: 1995–2006

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- ▶ patterns of productivity growth changed dramatically
- ▶ average annual labor productivity growth U.S. accelerated from 1.2 percent (1973-95) to 2.3 percent (1995-2006)
- ▶ EU decline from 2.4 to 1.5 percent
- ▶ labor market is unlikely to be the main explanation (no signs of a significant slowdown e.g. in the skill level of the labor force)
- ▶ burst of higher productivity in industries producing ICT equipment, and a capital-deepening effect from investing in ICT assets (the advent of knowledge economy has been much slower in Europe)



# Growth Accounting for Europe and the United States

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- ▶ Contributions to Growth of Real Output in the Market Economy, European Union and the United States, 1980 – 2004 (annual average growth rates, in

		European Union		United States	
		1980-1995	1995-2004	1980-1995	1995-2004
1	Market economy output (2+3)	1.8	2.2	3.0	3.7
2	Hours worked	-0.6	0.7	1.4	0.6
3	Labor productivity (4+5+8)	2.4	1.5	1.5	3.0
4	Labor composition	0.3	0.2	0.2	0.3
5	Capital services per hour (6+7)	1.2	1.0	0.8	1.3
6	ICT capital per hour	0.4	0.5	0.5	0.8
7	Non-ICT capital per hour	0.8	0.5	0.2	0.4
8	Multifactor productivity	0.9	0.3	0.5	1.4
	Contribution of the knowledge Economy to labor productivity (4+6+8)	1.6	1.1	1.3	2.6

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# Growth Accounting for Europe and the United States

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- ▶ market economy output was in the US in both periods higher than in Europe → gap increased
  - ▶ hours worked in EU grow and slowdown in US (as a result, labor productivity growth in the US market economy doubled compared to a large slowdown in EU after 1995)
  - ▶ The largest difference is in the contribution of multifactor productivity growth (EU decline; US growth)
    - ▶ The Multifactor productivity reflects the overall efficiency of the production process.
  - ▶ Contribution of the knowledge economy to labor productivity (EU decline; US growth)
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# Structural Change and Sectoral Productivity Growth

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- ▶ experienced a major shift of production and employment from manufacturing towards services
  - ▶ Market services now account for almost half of the market economy employment (different across European countries)
- ▶ Reasons for the growth of market services
  - ▶ Result of a number of interacting forces
    - ▶ Higher per capita income leads to higher demand for services.
  - ▶ Increasing marketization of traditional household production activities
  - ▶ Manufacturing firms outsourcing services



# Structural Change and Sectoral Productivity Growth

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- ▶ Major Sector Contribution to Average Annual Labor Productivity Growth in the Market Economy, 1995-2004 (annual average growth rates, in percentage)

	Market Economy	ICT Production	Goods Production	Market Services	Reallocation
European Union	1.5	0.5	0.8	0.5	-0.2
United States	3.0	0.9	0.7	1.8	-0.3



# Structural Change and Sectoral Productivity Growth

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- ▶ productivity growth in market services has been much faster in the United States than in Europe (not in every European Country the productivity growth was so small – Netherlands and UK)
- ▶ US bigger share in ICT producing sectors
- ▶ Quite the same in Goods Production (Good production > Market Services in EU)



# Accounting for Growth: Comparing China and India

by Barry Bosworth and Susan M. Collins  
(Journal of Economic Perspectives, Winter 2008)

Schallhart Manuela

# Structure

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- ▶ Economic growth
- ▶ Aggregate Growth Accounts
- ▶ Sectoral Growth Accounts
  - ▶ Agriculture
  - ▶ Industry
  - ▶ Services
- ▶ Future Prospects
- ▶ Conclusions



# Economic growth

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- ▶ Since 1980 China and India have achieved remarkable rates of economic growth and poverty reduction
- ▶ These countries comprise over a third of the world's population
- ▶ Paper examines sources of economic growth over the past 25 years
- ▶ Both countries are large geographically and have enormous populations that remain very poor
- ▶ In 1980 extremely low per capita incomes
- ▶ Since then impressively rapid growth

# Aggregate Growth Accounts

**Table 1. Sources of Growth: China, India, and East Asia 1978-2004**

Annual percentage rate of change

Period	Output	Employment	Output per Worker	Contribution of:				
				Physical Capital	Land	Education	Factor Productivity	
<b>Total Economy</b>								
1978-04	China	9.3	2.0	7.3	3.2	0.0	0.2	3.8
	India	5.4	2.0	3.3	1.3	0.0	0.4	1.6
1978-93	China	8.9	2.5	6.4	2.5	-0.1	0.2	3.6
	India	4.5	2.1	2.4	1.0	-0.1	0.3	1.1
1993-04	China	9.7	1.2	8.5	4.2	0.0	0.2	4.0
	India	6.5	1.9	4.6	1.8	0.0	0.4	2.3
<b>East Asia Excluding China</b>								
1960-80		7.0	3.0	4.0	2.2		0.5	1.2
1980-03		6.1	2.4	3.7	2.2		0.5	0.9
1980-93		7.3	2.7	4.6	2.6		0.6	1.4
1993-03		4.5	2.0	2.5	1.8		0.5	0.3

Source: Authors' estimates as described in text; Bosworth and Collins (2003). The employment series is a census comparable concept for both China and India.

# Table 1

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- ▶ This table reports the growth accounts for China and India over the period 1978-2004
  - ▶ It shows Output, Employment, Output per Worker
  - ▶ Three major sectors: agriculture, manufacturing, services
  
  - ▶ Output growth : China 9.3 %, India 5.4 %
  - ▶ Employment growth: 2 %, nearly identical in both countries (largely determined by growth in the population of labor force age)
  - ▶ Growth in output per worker: China 7.3 %, India 3.3 %
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# Table 1 – Output per Worker

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- ▶ Division in physical capital per worker (land is included here), education (human capital per worker), total factor productivity (measure of efficiency)
  - ▶ Growth is in both countries equally split between increases in physical and human capital and gains in total factor productivity (values for China are twice those for India)
  - ▶ India: strongly rising trend for gross private investment since 1993; declines in public sector investment as a share of GDP (worrisome given concerns about India's weak and deteriorating infrastructure)
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# Educational Attainment

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- ▶ India stands out from other Asian economies for its slow progress in reducing the share of the population with no schooling
  - ▶ Literacy rate of 76 % among youth aged (15-24) in India
  - ▶ Analysis of relationship between earnings and years of schooling in China finds surprisingly low returns
  - ▶ Large divide in educational attainment of rural and urban workers
  - ▶ Largely eliminated illiteracy – 99 % of youth aged are literate
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# Sectoral Growth Accounts

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- ▶ Three major sectors:
  - ▶ Primary sector – agriculture (including forestry and fishing)
  - ▶ Secondary sector – manufacturing, construction, utilities
  - ▶ Tertiary sector – services



**Table 2. Sources of Growth by Major Sector, 1978-2004**

Annual percentage rate of change

Period		Output	Employment	Output per Worker	Contribution of:			
					Physical Capital	Land	Education	Factor Productivity
<b>Agriculture</b>								
1978-04	China	4.6	0.3	4.3	2.3	0.0	0.2	1.8
	India	2.5	1.1	1.4	0.4	-0.1	0.3	0.8
1978-93	China	5.2	0.9	4.3	2.5	-0.2	0.2	1.8
	India	2.7	1.4	1.3	0.2	-0.1	0.2	1.0
1993-04	China	3.7	-0.6	4.3	2.1	0.2	0.1	1.8
	India	2.2	0.7	1.5	0.7	-0.1	0.3	0.5
<b>Industry</b>								
1978-04	China	10.0	3.1	7.0	2.2		0.2	4.4
	India	5.9	3.4	2.5	1.5		0.3	0.6
1978-93	China	9.3	4.4	4.9	1.5		0.2	3.1
	India	5.4	3.3	2.1	1.4		0.4	0.3
1993-04	China	11.0	1.2	9.8	3.2		0.2	6.2
	India	6.7	3.6	3.1	1.7		0.3	1.1
<b>Services</b>								
1978-04	China	10.7	5.8	4.9	2.7		0.2	1.9
	India	7.2	3.8	3.5	0.6		0.4	2.4
1978-93	China	11.3	6.5	4.7	1.8		0.2	2.7
	India	5.9	3.8	2.1	0.3		0.4	1.4
1993-04	China	9.8	4.7	5.1	3.9		0.2	0.9
	India	9.1	3.7	5.4	1.1		0.4	3.9

Source: Authors' estimates as described in text. For China, the output data are the official series of the the national accounts for agriculture and services, and the series for industry is based on the alternative price deflator discussed in the text.

# Agriculture – China

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- ▶ China faced more fundamental institutional reforms – they took place stepwise
  - ▶ Beginning with the restoration of family farms and movement of large numbers of workers into rural enterprises (late 1970s)
  - ▶ Devolution of fiscal and administrative powers to local governments, greater autonomy for state-owned industrial enterprises, steady introduction of market incentives (late 1980s and 1990s)
  - ▶ Emerging of domestic and foreign-owned private enterprises – China became a „socialist market economy“
- ▶ Output grew rapidly (4.6 % per year) – although declining employment in this sector



# Agriculture – India

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- ▶ Growth in agricultural output – annual increases of more than 1 %
- ▶ Striking for India is that employment in the agricultural sector has continued to grow in the 1993-2004 period
- ▶ Due to insufficient rate of expansion of employment opportunities in industry and services relative to population growth



# Industry

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- ▶ Differs dramatically in size between China and India
- ▶ China: this sector has consistently accounted for about half of GDP  
Spectacular rates of growth in output/worker (nearly 10 % annually in average)
- ▶ India: remained below 30 % of GDP  
Acceleration of output growth but much smaller (mainly due to increased employment)



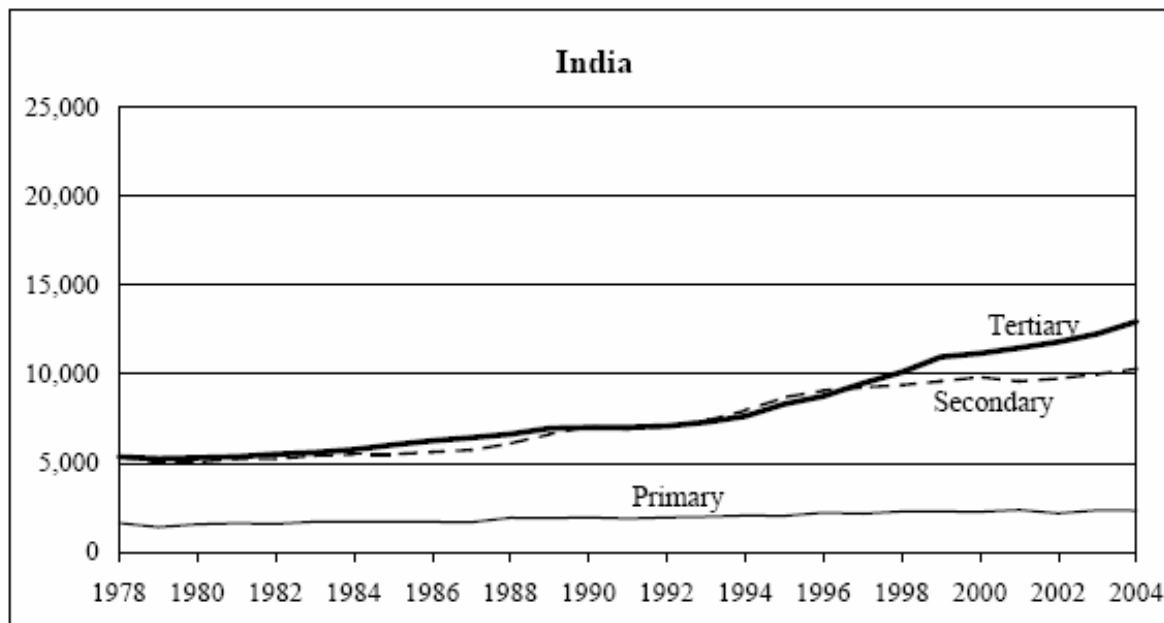
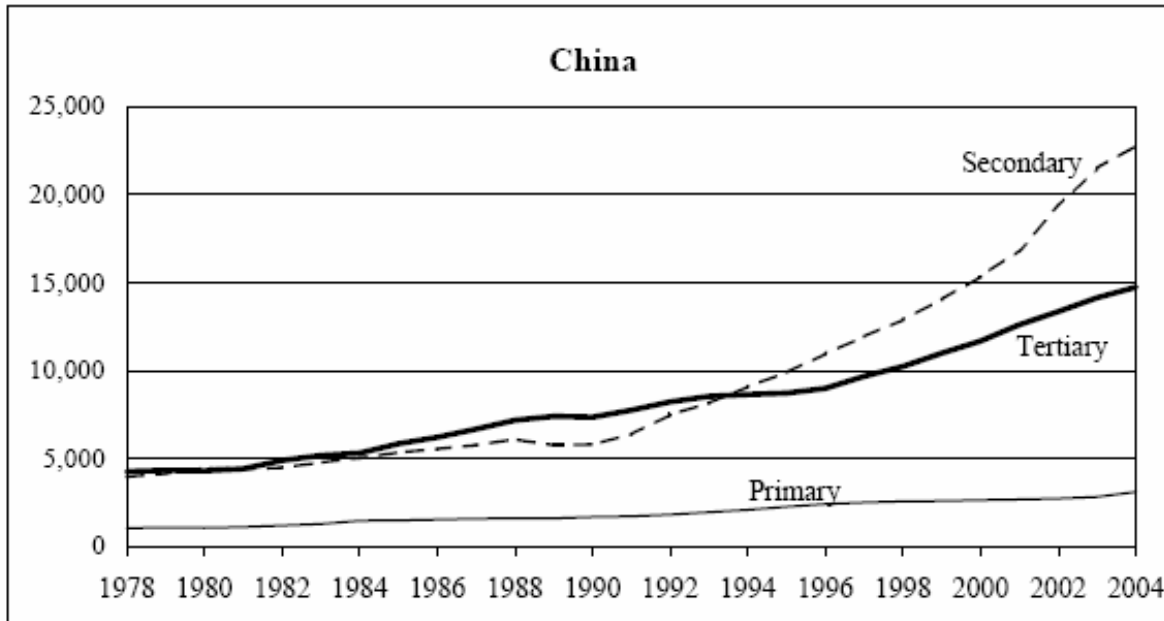
# Services

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- ▶ China: has grown as rapidly as its industrial sector and accounts for the most of the growth in employment
  - ▶ Output per worker has grown at a steady 5 % annually
  - ▶ Increase in the contribution of capital per worker
  - ▶ Weak rate of improvement in total factor productivity
  
  - ▶ India: comes closest to matching China's performance
  - ▶ Rate of improvement in output per worker exceeds 5 % annually (modest contribution from increased capital/worker)
  
  - ▶▶ Rapid improvement of total factor productivity
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**Figure 1. Output per Worker by Sector, China and India, 1978-2004**  
International dollars of 2004



Source: China Data Center and CSY; India National Accounts; India NSSO.

In 1978 level of Chinese labor productivity in all sectors only about 70 % that for India.

In 2004 output in services, agriculture & industry had risen to 110, 130, 220 % of India's levels.

By 2004 Indian labor productivity in industry and services had risen to four and five times that for agriculture.

In China industry is seven times higher than agriculture and services five times higher.

→ Sectoral gaps in India and China appear quite large

# Future Prospects

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- ▶ India's growth has been strongest in various service-producing industries, while the manufacturing sector has remained weak
- ▶ China's growth is broad across agriculture, industry and services
- ▶ Despite, China and India are still very poor countries relative to the United States
- ▶ Using PPP exchange rates (differences in prices of goods and services across countries) China stands at 15 % and India at 8 % of the U.S. level of gross national income per capita



# Future Prospects – China

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- ▶ Slowing of the increase in the population of labor force age → but it should be able to sustain its economic growth in future years by continuing to shift workers out of agriculture to higher productivity jobs in industry and services
- ▶ Great progress in raising the educational skills of younger workers
- ▶ China is faced with an excess of capital accumulation that could threaten to disrupt growth through overinvestment in some sectors
- ▶ China raised the ratio of total trade to GDP to 65 % in 2004 compared to 14 % in 1978



# Future Prospects – India

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- ▶ India has a large share of its workforce still in agriculture which offers still great opportunities for reallocation to more productive sectors
- ▶ India faces serious deficiencies in the education of the bulk of its youth population
- ▶ Private saving rate has increased substantially over the past decade, but much of this is drained off into the financing of a large public sector deficit
- ▶ India's government borrows funds directly to finance its expenditures
- ▶ India's trade has also expanded rapidly and reached 42 % of GDP in 2004



# Conclusions

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- ▶ Supply-side prospects for continued rapid growth in China and India, in terms of labor, physical capital and reallocation across sectors are very good
- ▶ India will need to redress its inadequate infrastructure and to broaden its trade beyond the current emphasis on services – only an expansion of goods production and trade can provide employment opportunities for its current pool of underemployed and undereducated workers
- ▶ China needs to focus on development of domestic markets, reducing inefficiencies in its financial sector and achieving a more balanced trade position



Thanks for your  
attention!

