HOW DO ASIAN GIANTS CHINA AND INDIA COMPARE ON GROWTH AND PRODUCTIVITY?

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4th World KLEMS Conference Presentation 2016- Madrid
Structure of the presentation

1. Introduction
2. India and China in Global Perspective
3. Selective Review of Literature
4. Data, Methodology and Concordance
8. Main Findings
9. Way forward
1. Introduction:

- Both China and India began their reform process with the period of 1980s and 1990s. (1978 for China; 1990-91 for India).
- In 2014, we find large divergence in per capita GDP between the two countries.
- This study attempts to understand the divergence in terms of growth and productivity in China and India.
2. Importance of China and India in the World Economy:

- **Population size and growth:**
  China with a little over 19% of the world population of about 7 billion, and India with a little less than 18% of the world population are the two most populous countries in the world. During the decade 2000-10, population growth rates for China and India were 1.5%p.a. and 0.6%p.a., respectively. Latest UN population projections indicate that India will have a population of about 1.4 billion in 2022, when China’s population will peak at this level. India’s population will peak at 1.75 billion around 2065, when China’s will be about 1.25 billion.

- **Income levels and Economic growth:**
  GNP (Gross National Product) per capita in 2010:
  India: $1270, China: $4270, World: $9069
  GNP per capita (PPPs) in 2010:
  India: $3400, China: $7640, World: $11066
  Average annual growth rate of GDP per capita, 2000-10:
  India: 6.5%p.a., China: 10.2%p.a., World: 1.5%p.a.
3. Selective Review of Literature:

- Some major studies are reviewed to provide a background to the analysis presented in the latter sections.

- **T.N. Srinivasan (2005)**’s paper on South Asia and China devotes one subsection to a comparison of TFP growth in China and India based on *Hu and Khan (1997)*, *Jorgenson and Vu (2005)* for China, *IMF (2002)*, *World bank (2000)*, *Ahluwalia (1992)* and *Jorgenson and Vu (2005)* for India. Srinivasan finds that by and large China experienced faster TFP growth than India during most of the 50 year period 1953-2003, except during 1995-2003, when the TFP growth rates were the same (2.5%p.a.). However, the estimates were found to be highly sensitive to the data used and the methodology of estimation.

- **Bosworth and Collins (2008)** study on growth and productivity in India using somewhat comparable data for the period 1968 to 2004 provides estimates of TFPG for agriculture, industry and services sectors. During the period 1978-2004, the annual GDP growth rate per worker in China was 7.3% and in India a mere 3.3%. Capital deepening, education, and TFP contributed 3.2, 0.3 and 4.6 percentage points to labour productivity growth. The respective contributions in the case of India were 1.3, 0.4 and 1.6 percentage points. The sectoral patterns of growth and productivity differed considerably between the two countries.

- **Pranab Bardhan’s (2010)** book, “Awakening Giants: Assessing the Economic Rise of China and India” is “erudite” and “informative”. He looks beyond short-run macroeconomic issues and compares major policy changes, political and economic structures and sectoral productivity performance using *Bosworth and Collins (2008)* data. He investigates the pattern and composition of growth, and the problems faced in the agricultural, industrial and infrastructure sectors. He studies the impact of these factors on poverty, inequality and environment. He argues that authoritarianism has distorted Chinese development while democratic governance in India has been marred by severe accountability lapses.

- The collection of ten essays, “Emerging Giants: China and India in the World Economy” edited by *B.Eichengreen, P.Gupta ad R. Kumar (2010)* is in three parts:
  - **Part I**: China and India in the Global Economy, with two comparative analyses,
  - **Part II**: Contrasts in Development experience, with three comparative essays,
  - **Part III**: Challenges to sustaining Growth, with a single comparative essay.

- The six essays, each comparing China and India on a specified theme are reviewed here.
In Chapter 1 of the book “What can be Learned About the Economies of China and India from Purchasing Power Comparisons?” Alan Heston who has long been associated with the UN International Comparisons Program (ICP) develops estimates of the relative size of the two economies. He draws attention to data deficiencies and big differences in estimates reported by researchers. According to Heston, China and India started at a similar level of income in the 1950s, and there has been a wide divergence since 1978, with the Chinese economy growing much faster and becoming much larger as a result of the first wave of reforms. He draws on the 2005 data at purchasing power parity (PPP) provided by the ICP. These estimates show both economies to be smaller than previously thought. New estimates of price levels, the way different regions in the world are linked, and downward adjustments to the productivity of the public sector appear to account for the differences between the two sets of estimates.

China and India have come to play an increasingly important role in global trade. The processing exports of China to the USA and the outsourcing of services to India with its implications for the employment of skilled workers in the USA, have received considerable attention. In Chapter 2 “Trading with Asian Giants”, Bosworth, Collins and Flaaen examine US trade with both countries. The authors note that the USA trade deficit is due more to unusually low USA exports than to unusually high imports from China and India.

- Chapter 4 “The Cost competitiveness of Manufacturing in China and India: An Industry and Regional Perspective” authored by van Ark, Erumban, Chen and Kumar, offers several comparison and contrasts. Productivity in India and China at the industry and provincial levels are compared. It is found that productivity in Chinese industry has been increasing over time and that this increase is quite uniform across provinces. In comparison, productivity growth is slower in India and there is considerable heterogeneity across provinces. The authors attribute the superior performance in China to faster implementation of market reforms in China and to lower factor mobility in India.

- Chapter 5 “Law, Institutions and Finance in China and India” with Allen, Chakrabarti, De, Qian and Qian as authors, compares the legal and financial systems and explores their implications for economic growth. The authors show the two systems are underdeveloped in China. In spite of its origin in English common law and the presence of an independent judiciary, investment protection and the quality of financial institutions remain weak in India. The authors point to informal finance and relational lending as mechanisms by which the two countries have surmounted financial obstacles to growth.

- **Kowalski** compares in Chapter 6 “A Tale of Two Trade Integration Approaches” trade and foreign investment liberalisation in China and India. The differences in approach have resulted in different sectoral growth patterns, with trade and growth led by manufacturing in China and by services in India. The author’s simulations show that the implementation of China’s General Agreement on Trade and Services (GATS) commitments would create important gains for China and its trading patterns. In India’s case, further expansion of trade will require removing residual barriers at the border, implementing reforms in labour laws, promoting labour mobility and improving infrastructure.

- In Chapter 8 “Deconstructing China’s and India’s Growth: The Role of Financial Policies”, **Jahangir Aziz** underscores the importance of financial reform for sustaining growth in the two countries. He observes that the cost of capital is quite distorted in both countries. In China it is depressed as a result of permissive policies toward non-performing loans, resulting in an inefficiently high level of investment. In India, in contrast, the cost of capital is elevated by limited financial sector competition and to absorption of resources by the State, resulting in inefficiently low level of investment. With the low-hanging fruit getting exhausted, the urgency of comprehensive financial reform has become obvious.

The six essays in Emerging Giants reviewed above have important policy lessons for economic growth in both China and India. A detailed, careful study of the analyses reported is called for.
Justin Y. Lin (2013) “The Chinese Miracle Demystified” in D. Acemoglu et al (eds.) “Advances in Economics and Econometrics” Vol II “Applied Economics”, analyses five reasons for China’s extraordinary performance in Transition. Lin draws attention to the finding of the Commission on Growth and Development headed by Michael Spence that 13 of the World’s economies achieved an average annual growth of 7%p.a. or more for 25 years or more. The first of five common features of these 13 economies is their ability to tap into the potential of the advantage of backwardness. The remaining features are macroeconomic stability, high rates of saving and investment, market system, and committed, credible and capable government.

Lin outlines Lessons of China’s Development for other Developing Countries. Every developing country has the opportunity to accelerate its growth if it knows how to develop industries according to its comparative advantage at each level of development. Lin has elaborated his theis is his book “The New Structural Economics” (2012).
4. Data, Methodology and Concordance: Data

- **Main sources of data:** China KLEMS dataset & India KLEMS dataset 2015 version
- **Main Variables in the Paper:**

<table>
<thead>
<tr>
<th>Variable</th>
<th>India</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Value Added</td>
<td><em>NAS data 1980-2011</em></td>
<td></td>
</tr>
<tr>
<td>Labour-No. Of Persons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labour Compensation</td>
<td><em>NSSO Employment-Unemployment Data</em></td>
<td></td>
</tr>
<tr>
<td>Capital Services</td>
<td><em>NAS and ASI</em></td>
<td></td>
</tr>
<tr>
<td>Labour Income Share</td>
<td><em>NAS data 1980-2011</em></td>
<td></td>
</tr>
</tbody>
</table>
Methodology:

- Labour Productivity = Real value added per person
- TFP growth – using Growth Accounting method (Jorgenson et al 2005)
- TFPG in Industry $j$:

$$\Delta \ln A_j = \Delta \ln Z_j - \tilde{v}_{K,j}^Z \Delta \ln K_j - \tilde{v}_{L,j}^Z \Delta \ln L_j$$

where $\Delta \ln A_j$ is the TFP growth rate, $\Delta \ln Z_j$ growth rate of real value added and $\tilde{v}_{K,j}^Z$ and $\tilde{v}_{L,j}^Z$ are respectively the compensation shares of capital services and labor input in nominal value added.

- Aggregate Sector VA growth = weighted sum of VA growth in industries (Tornqvist Aggregation)

$$\Delta \ln Z = \sum_j \tilde{v}_j^Z \Delta \ln Z_j$$
## Concordance between China and India’s Industrial Classification:

<table>
<thead>
<tr>
<th>CHINA KLEMS Industry Description</th>
<th>INDIA KLEMS Industry Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, Forestry, Animal Husbandry and Fishery</td>
<td>Agriculture, Hunting, Forestry and Fishing</td>
</tr>
<tr>
<td>Coal mining</td>
<td>Mining and Quarrying</td>
</tr>
<tr>
<td>Oil and gas extraction</td>
<td>Food Products, Beverages and Tobacco</td>
</tr>
<tr>
<td>Metal mining</td>
<td>Textiles, Textile, Leather and Footwear</td>
</tr>
<tr>
<td>Non-metallic minerals mining</td>
<td>Wood and of Wood and Cork</td>
</tr>
<tr>
<td>Food and kindred products</td>
<td>Pulp, Paper, Printing and Publishing</td>
</tr>
<tr>
<td>Tobacco products</td>
<td>Coke, Refined Petroleum and Nuclear fuel</td>
</tr>
<tr>
<td>Textile mill products</td>
<td>Chemicals and Chemical Products</td>
</tr>
<tr>
<td>Apparel and other textile products</td>
<td>Rubber and Plastics</td>
</tr>
<tr>
<td>Leather and leather products</td>
<td>Other Non-Metallic Mineral</td>
</tr>
<tr>
<td>Saw mill products, furniture, fixtures</td>
<td>Basic Metals and Fabricated Metal</td>
</tr>
<tr>
<td>Paper products, printing &amp; publishing</td>
<td>Industrial machinery and equipment</td>
</tr>
<tr>
<td>Petroleum and coal products</td>
<td>Electric equipment</td>
</tr>
<tr>
<td>Chemicals and allied products</td>
<td>Instruments and office equipment</td>
</tr>
<tr>
<td>Rubber and plastics products</td>
<td>Motor vehicles &amp; other transportation equipment</td>
</tr>
<tr>
<td>Stone, clay, and glass products</td>
<td>Miscellaneous manufacturing industries</td>
</tr>
<tr>
<td>Primary &amp; fabricated metal industries</td>
<td>Power, steam, gas and tap water supply</td>
</tr>
<tr>
<td>Metal products (excl. rolling products)</td>
<td>Construction</td>
</tr>
<tr>
<td>Industrial machinery and equipment</td>
<td>Wholesale and Retail Trades</td>
</tr>
<tr>
<td>Electric equipment</td>
<td>Hotels and Restaurants</td>
</tr>
<tr>
<td>Electronic and telecommunication equipment</td>
<td>Transport, Storage &amp; post</td>
</tr>
<tr>
<td>Instruments and office equipment</td>
<td>Information &amp; computer services</td>
</tr>
<tr>
<td>Motor vehicles &amp; other transportation equipment</td>
<td>Financial Intermediation</td>
</tr>
<tr>
<td>Miscellaneous manufacturing industries</td>
<td>Real Estate Activities</td>
</tr>
<tr>
<td>Power, steam, gas and tap water supply</td>
<td>Leasing, Technical, Science &amp; Business Services</td>
</tr>
<tr>
<td>Construction</td>
<td>Public Administration and Defense</td>
</tr>
<tr>
<td>Wholesale and Retail Trades</td>
<td>Education</td>
</tr>
<tr>
<td>Hotels and Restaurants</td>
<td>Health and Social Security</td>
</tr>
<tr>
<td>Transport, Storage &amp; post</td>
<td>Public Administration and Defense; Compulsory Social Security</td>
</tr>
<tr>
<td>Information &amp; computer services</td>
<td>Education</td>
</tr>
<tr>
<td>Financial Intermediation</td>
<td>Health and Social Work</td>
</tr>
<tr>
<td>Real Estate Activities</td>
<td></td>
</tr>
<tr>
<td>Leasing, Technical, Science &amp; Business Services</td>
<td></td>
</tr>
<tr>
<td>Public Administration and Defense</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Health and Social Security</td>
<td></td>
</tr>
</tbody>
</table>
Note on Periodization:

- Choice of sub-periods for comparing India and China’s growth and productivity performance is based on changes in world scene.
- There have been no studies that analysed statistical breaks in World GDP (using Bai-Perron tests).
- Based on graphical analysis of World GDP at constant prices, five sub-periods have been identified.
1. It is clear from this diagram that the Economy-wide GVA in China has been growing at a faster rate than in India.
2. This is true for every sub-period, with greater divergence in Sub-Period 4 and Sub-Period 5.
1. We find that Services and Manufacturing have played an important role in the growth process for China in each sub-period.

2. On the contrary, the Manufacturing sector has been largely missing in India. It has only seen a surge in Services.
1. For China, Services and electricity have consistently shown negative contributions, while manufacturing and construction have shown positive trends.
2. Services in India have seen consistently positive TFP growth along with electricity.
2. This is the period of high World GDP growth. This period has also seen an acceleration in economy-wide GVA growth for both China and India.
1. It is clear that China outperformed India in manufacturing GVA growth in each of the high growth sub-periods.
2. The trends for both the countries take a dip during the East Asian crisis.
1. Metal Products and Electrical Equipments had the largest contribution to manufacturing GVA growth for China. Similar results hold for India.

2. Food beverages & tobacco and Non-metallic mineral products also perform well for Indian manufacturing sector.

**China & India**
1. Although China manufacturing outperformed India in GVA growth, its TFP growth has been more volatile than that of India.
2. After a period high stable TFP growth for China, it took a plunge post 2003.
1. The choice of sub-period for comparing the service sector of the two countries is 2004-2012.
2. This is the period of post pro-market reforms for both the countries (post liberalisation phase in India and accession to WTO for China).
3. These two sub-periods show the best performance of the services sector for both the countries.
1. GVA of India’s Service Sector is much more stable than that of China.
2. It has hovered around the 8-10% p.a. for the entire period, while China’s reached a peak of 16% just before the Global Recession.
1. Trade has been the largest contributor to Services growth for China while Health performs poorly.

2. The same trend is seen for India as well – Trade the largest contributor and Health performing the worst as contributor to Services growth.

Overall Period: 1990-2012

Origins of Services GVA Growth: China

Origins of Services GVA Growth: India

China & India
1. The TFP growth rate in the services sector has generally been higher for India compared to China. As is evident, it is also more stable than China.

2. The TFP growth in China shows a steep increasing trend till 2008, but then gets hit due to the Global Recession.

**Trend of TFP in Services: China vs India**

- **Sub-Period 4**: Sharp Increase
- **Onset of Global Recession**: China TFP got hit by the Recession. India's more stable, although it takes a minor hit too.
Note on Periodization:

- The entire period of analysis covers 1990-2012 (23 calendar years)
- Periodization is based on events affecting the Chinese economy
- The entire period has been divided into 4 sub-periods: 1990-1995; 1995-2001; 2001-2008; 2008-2012
- Characterization of each sub-period:
  1. 1990-1995 (Sub-Period 1): phase driven by govt led changes
  2. 1995-2001 (Sub-Period 2): series of reforms, particularly in state owned enterprises
  3. 2001-2008 (Sub-Period 3): post WTO accession – business oriented environment
1. China’s GVA growth has been generally high since its accession to WTO in 1991. It has hovered between 9 and 11% p.a. in sub-periods.
2. The Global recession of 2008 didn’t affect its overall GVA growth to a large extent. However, it has seen a somewhat downward trend in Sub-Period 4.
1. We find that Manufacturing and Services has been important contributors to GVA growth in every period, especially 3 and 4.

2. Agriculture contribution has been decreasing and played a small role only in period 2.
1. The performance of manufacturing industries has been much better than that of services (much more scattered).
2. Transport and Electrical Equipments have been the best performers. Health and Education have had very low growth rates.
Overall Period: 1990-2012

Sources of GVA Growth: Disaggregate Picture

TFP negative for most Services industries, contrasting with India.

Capital Stock and TFP have been important contributors to growth for most of the manufacturing industries.
1. The importance of TFP growth for manufacturing and Agriculture is clearly seen from its upward trends.
2. Electricity (with heavy govt intervention) and Services have shown slightly declining trends.
1. It is clear from the comparison that TFP has been more important contributor for growth in the manufacturing industries than the services industries in each sub-period.

2. Even in manufacturing, the TFP gets stagnant in later sub-periods.
1. LP growth in the manufacturing sector has exceeded that in all other sectors. The gap has increased in each period. The trend in all other sectors has been relatively flat.

2. Thus LP growth has been an important source of growth for the manufacturing sector in each time period.
1. Labour Productivity has been a positive contributor to growth for manufacturing industries in each sub-period. Same is not the case for Services.

2. Post and Telecommunication Have shown high positive contribution throughout.
Sources of Labour Productivity Growth: Industry level

TFP again shows negative contribution to LP growth. Labour composition plays an important role though.

K/L ratio most important contributor to LP growth here

Labour Productivity Growth Rate

Capital- Labour Ratio  Labour Composition  TFP

China
1. The relationship between TFP and LP growth here is different from that of India’s.
2. The industries in the Manufacturing sector are more scattered. The relationship is stronger for Services sector.
Note on Periodization:

- We follow the Panagariya et al (2014) periodization for the Indian Economy.
- Justification for the periodization:
  1. 1980-1993 (Sub-Period 1): period of relatively low growth
  2. 1994-2003 (Sub-Period 2): onset of reforms, growth a bit higher
  3. 2004-2011 (Sub-Period 3): high growth phase
1. The trend of Gross Value Added has been generally upwards in the Indian Economy.
2. There have been certain crests and troughs, most notably during the Balance of Payments (BoP) Crisis of 1991 and the Global Recession of 2008.
3. The 2000s have been the highest growing phase with an average of almost 9%p.a.
1. Much of the growth in each year has been coming from the Services sector as a whole. This is true for every sub-period in consideration.
2. The labour reallocation term is positive only in Sub-Period 3.
3. Most other sectors have minor contributions, with manufacturing in the third period.
1. Going from the Broad Sectors to the Individual Industries, we find that Post and Telecommunication, Financial Services and Business Services have been the best performers in the overall period.
2. Wood Products and Agriculture have been the worst performers.
3. Most other industries in the manufacturing and services sector show average growth of around 6-8% p.a.
Sources of GVA Growth: Disaggregate Industrial Level Picture

Overall Period: 1980-2011

Services
- TFP is important in the Services industry

Manufacturing
- Large contribution of capital stock in most industries

Growth rate of Inputs and TFP

India

- No of Persons
- Labour Quality
- Capital Stock
- Capital Composition
- TFP
1. The importance of TFP as a source of growth for the Services sector can be seen from this trend line. The only rival sector is mining.
2. Manufacturing, Construction and other sectors show stagnant TFP growth.
1. Post and telecommunication has been the most productive industry in the services sector in TFP terms while Other services and Health have regressed.

2. TFP growth has been modest in the manufacturing industries, with Electrical Equipment the best performer.
1. Labour Productivity has been upward rising for most of the industries. Only the construction and agriculture sectors are stagnant.

2. Manufacturing and Services follow very similar trends.

3. Divergence is mostly in the 3rd period while the trends are very closely knit in 1st period.
1. LP growth has been generally accelerating through the time periods for both the Manufacturing and Services Industries.
2. Post and Telecommunication and Wood Products have accelerated the most.
Sources of Labour Productivity Growth: Industry level

Overall Period: 1980-2011

TFP has a larger impact in these industries

K/L ratio very important contributor here, TFP has mixed impact
1. We find that the relationship between TFP and LP growth is more pronounced in manufacturing than in services.
2. The services industries are more scattered.
8. Main Findings:

- Despite the onset of reforms at similar points of time, China has surged ahead of India in terms of per capita GDP from the 1990s.
- This surge for China has come through the Manufacturing and Services sectors, while India’s growth is solely Services-driven.
- While the industry origins of Manufacturing GVA has been similar for both countries (Metal Products and Electrical Equipments major contributors), the GVA growth and TFP growth have been higher and more stable for China than in India.
- On the contrary, the GVA growth rate of the Services sector has been more stable for India than China. The same holds true for TFP growth trend of the two countries.
- The industry origins of Services growth for the two countries have been similar – mostly trade driven, with Health the worst performer.
9. Way forward:

- To present a disaggregated view of Chinese and Indian productivity and growth using the KLEMS approach.
- To undertake productivity level comparisons between China and India.
- To examine the sources of Chinese and Indian growth experience.
Acknowledgment

- Financial Support to the INDIA KLEMS research project by RESERVE BANK OF INDIA is gratefully acknowledged.

- The authors would like to thank Shomak Chakraborty for research assistance on this project.