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**PRODUCTIVITY GROWTH AND  
LEVELS - A COMPARISON OF  
FORMAL AND INFORMAL  
MANUFACTURING IN INDIA**

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# Outline

- Background and objectives of the study
- Data and methodology
- TFP growth in Indian manufacturing, 1980-2011
  - TFP growth in formal and informal segments of various manufacturing industries;
  - TFP growth at the aggregate level of formal and informal segments of Indian manufacturing
- TFP growth and Labour productivity – comparing Indian manufacturing with Korean manufacturing
- Differences in the level of TFP between formal and informal manufacturing in India
- Conclusions

# Background

- ◉ Formal manufacturing ( alternatively referred to as organized manufacturing or registered manufacturing) covers those manufacturing units/plants which are registered as 'factories' under India's Factories Act, 1948 (i.e. production units employing 10 or more workers with power, or 20 or more workers without the use of power)
- ◉ The rest of the manufacturing units belong to informal manufacturing.
- ◉ Informal manufacturing accounts for about 80% of total manufacturing employment and about 30% of manufacturing gross value added (GVA) in India.

# Background

- ⦿ Informal manufacturing is characterized by
  - low technology,
  - low productivity,
  - relatively high labour intensity of production which has not changed much over time.
- ⦿ The informal manufacturing sector has a very large number of production units (14.4 mn in informal manufacturing, as against 0.2 mn in formal manufacturing), many of which are driven by the objective of providing subsistence employment to people who are not able to get suitable jobs.
- ⦿ The situation is changing somewhat with the growth in subcontracting – a growing portion of formal sector manufacturing units are giving job work to informal sector manufacturing units.

# Why TFP level and growth rate is expected to be lower in informal manufacturing?

- ◉ There are several reasons to expect that informal manufacturing would have relatively lower level of TFP and slower growth in TFP than formal manufacturing:
  - Informal manufacturing units commonly being very small in size are not able to take advantage of scale economies and are not able to make use of advances in technologies of production.
  - Entrepreneurs and managers with technical skills self-select themselves to the formal sector (Taynaz, 2009). Hence, the entrepreneurs/managers of informal sector units lack technical skill, hampering TFP level and growth.
  - Formal sector enterprises invest in intangible capital while informal sector enterprises do not make such investment (Heish and Klenow, 2014). Intangible capital gives productivity advantage to the formal sector enterprises.

# Why is this issue important?

- India needs to raise the share of manufacturing in GDP by about 10 percentage points in the next 10 years. This is the objective of the National Manufacturing Policy, 2011.
- This requires a significant step-up in the growth rate in TFP in Indian manufacturing.
- If the level of TFP is relatively low in informal manufacturing as is known from studies undertaken, and the growth rate in TFP is negative or negligible as some earlier studies have found, this may prove to be a drag on TFP growth in Indian manufacturing.
- With the formal sector getting increasingly linked to the informal sector through sub-contracting, the TFP growth performance of the formal sector will be influenced by TFP growth (or lack of it) in informal manufacturing.
- A study on TFP in Indian manufacturing segregated by formal and informal segments is therefore important.

# Study Objectives

- ⦿ Analyze trends in TFP growth in formal and informal segments of Indian manufacturing industries. Period: 1980-2011.
- ⦿ Compare Indian and Korean manufacturing in regard to TFP growth rate achieved and level of labour productivity. Aim: benchmarking. Period: 1980-2011; particular focus, 2003-2011.
- ⦿ Compare the level of TFP (i.e. assess relative efficiency) between formal and informal manufacturing in India. Period: 2003-2011.

# Data sources

- ⦿ The analysis is essentially based on the India KLEMS database (2015). The main source of data used for the preparation of the India KLEMS database is the *National Accounts Statistics* (NAS), published annually by the Central Statistics Office (CSO).
- ⦿ These data are supplemented by Input-Output tables (published by CSO) and *Annual Survey of Industries* (ASI) brought out by the CSO and various rounds of NSSO (National Sample Survey Office) surveys on employment & unemployment and on unorganized manufacturing.
- ⦿ Time series data on output and inputs, available in India KLEMS database, 2015, have been split into formal and informal segments using several data sources.
- ⦿ For Korea, comparable data for manufacturing industries have been taken from the Asia KLEMS website. In this case, formal-informal segregation is not available.



# Methodology – TFP Growth

- TFP growth rate estimates for formal and informal segments have been made for 13 major manufacturing industries (as in KLEMS classification) by applying the Translog index.
- These computations have been made using the framework of a gross output function. Five inputs are considered:
  - Labour (number of persons employed)
  - Capital services
  - Materials input
  - Energy input
  - Services input
- For computing TFP growth rate at the aggregate level, Domar aggregation method has been applied.

# Methodology – Relative TFP Level

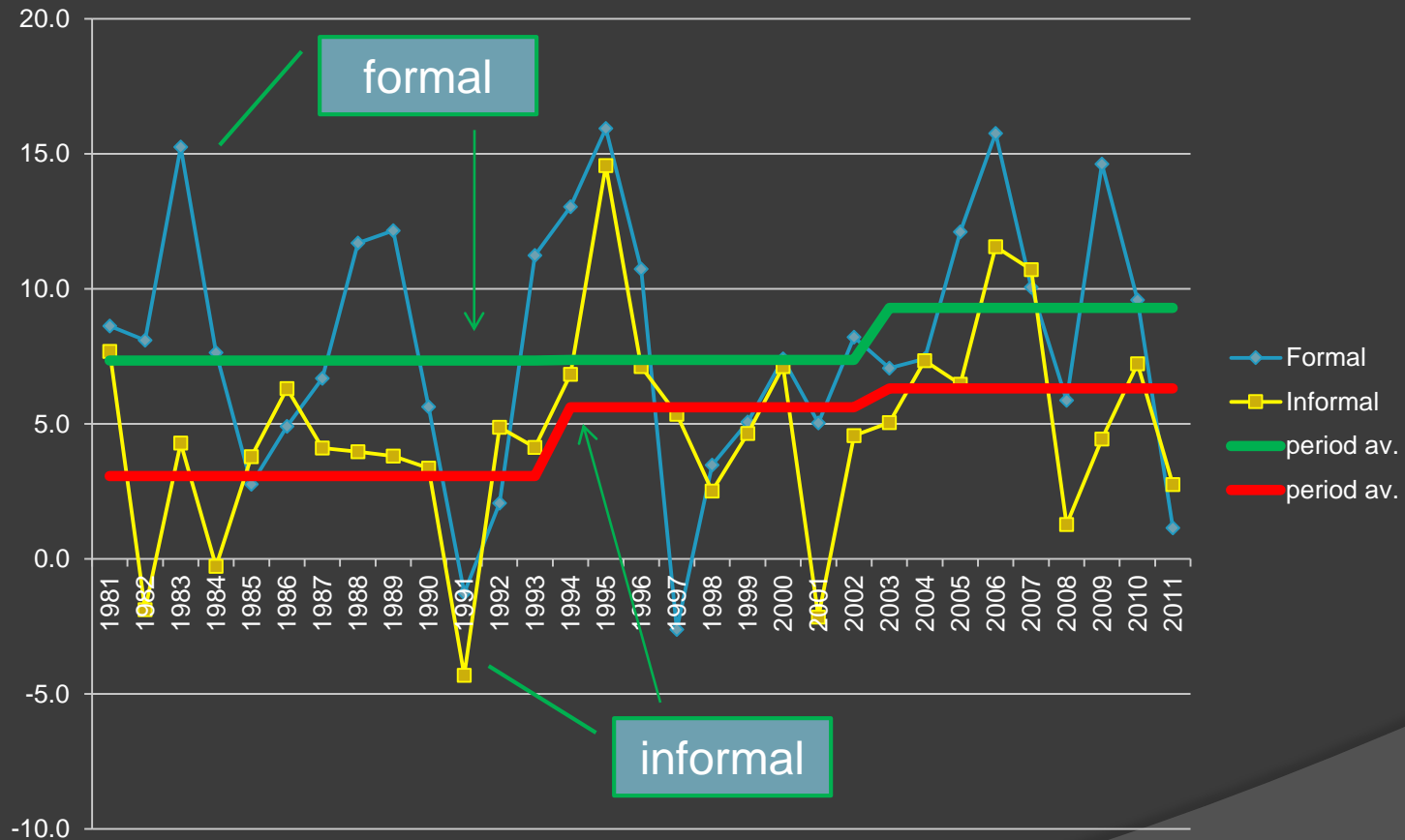
- ⦿ A simple methodology has been applied to measure TFP difference between formal and informal segments of different manufacturing industries.
- ⦿ This analysis is based on the value added function: gross value added is taken as the measure of output, number of persons employed is taken as the measure of labour input and gross fixed capital stock is taken as the measure of capital input.
- ⦿ Relative labour productivity and relative capital productivity are first computed, and then relative TFP or relative efficiency is derived as a weighted average, the weight being the factor income shares.

# Periodization

- The period considered for the analysis is 1980-81 to 2011-12.
- To analyze trends in TFP growth, three sub-periods are considered. These are 1980-81 to 1993-94, 1994-95 to 2002-03 and 2003-04 to 2011-12.
- Analysis of relative TFP between formal and informal manufacturing has been done for the period 2003-04 to 2011-12.

# Estimates for Formal and Informal Segments of Indian Manufacturing

# Real GVA growth rate – formal and informal manufacturing in India

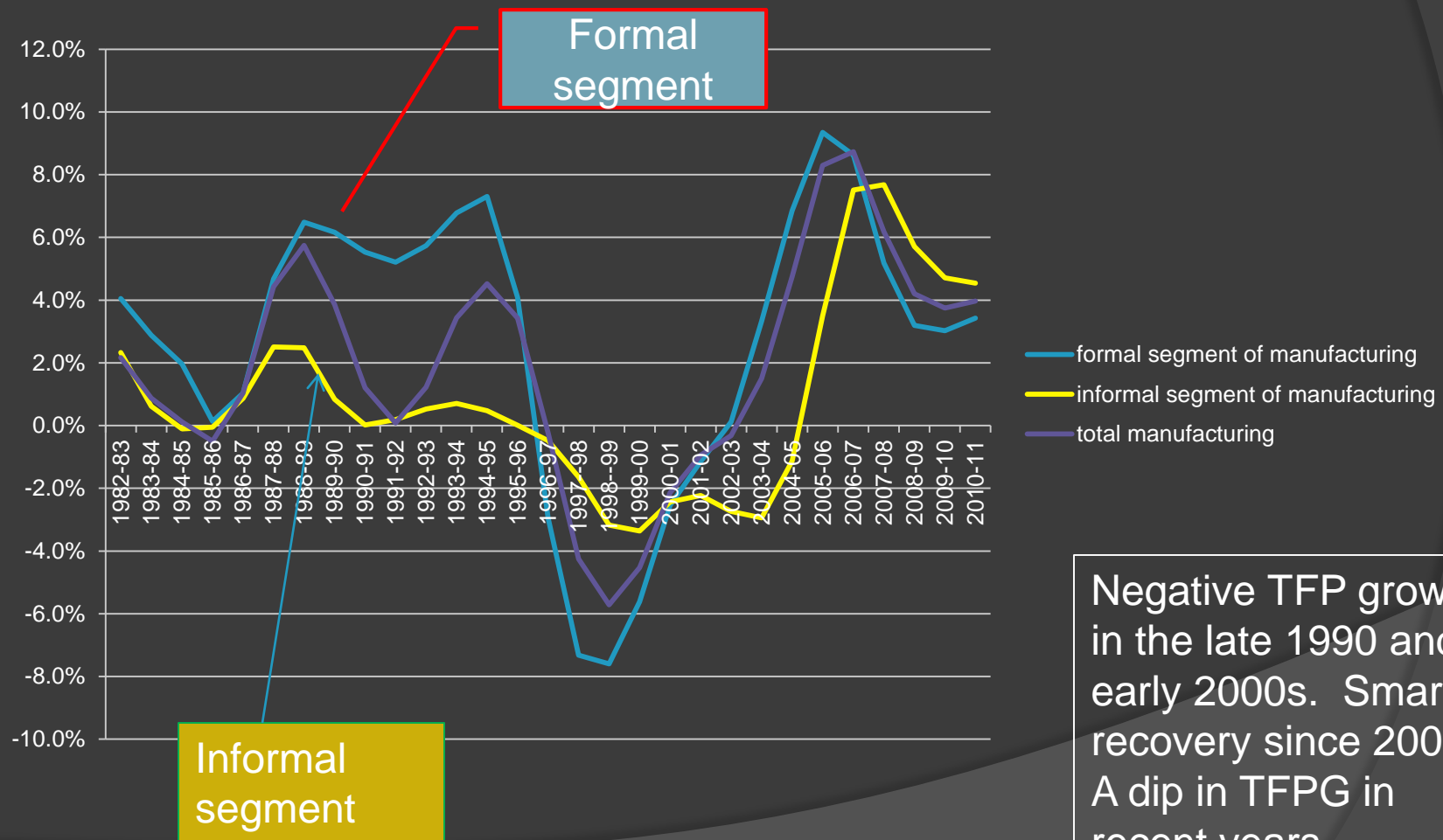


# TFP Growth Rate in Manufacturing, Domar Aggregation

<b>Industry Segment</b>	<b>1980-81 to 1993- 94</b>	<b>1994-95 to 2002- 03</b>	<b>2003-04 to 2011- 12</b>	<b>1980-81 to 2011- 12</b>
Formal segment of the manufacturing sector	6.01	0.11	4.93	4.14
Informal segment of the manufacturing sector	-0.11	-1.62	3.02	0.41
Total manufacturing sector	3.26	-0.36	4.77	2.83

Acceleration in real GVA growth and TFP growth in both formal and informal manufacturing in the 3<sup>rd</sup> period (2003-11). TFP growth in informal manufacturing is relatively lower in each period.

# TFP Growth Rates (%) in Different Years, Smoothened Time Series, Domar Aggregation,



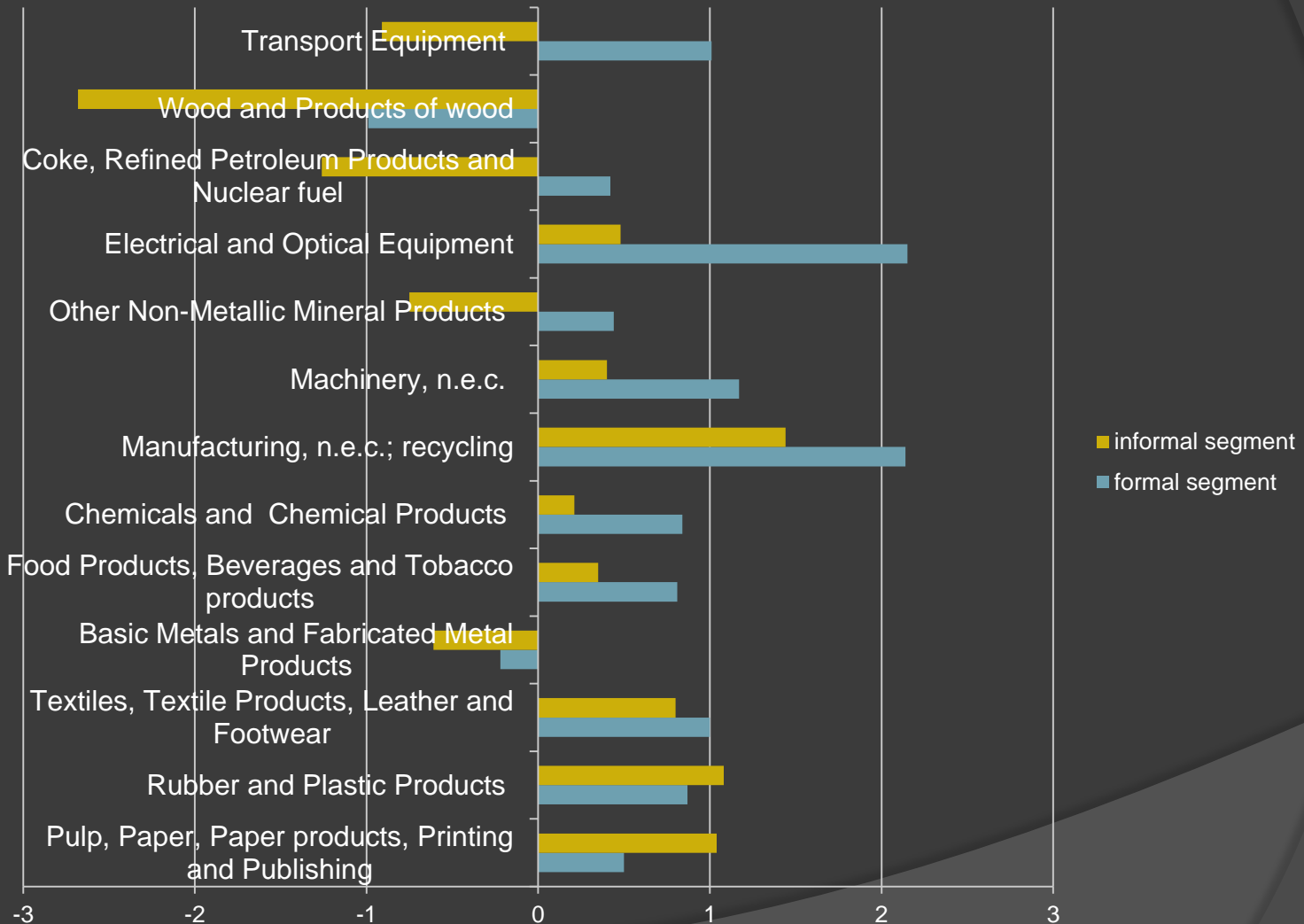
Negative TFP growth in the late 1990 and early 2000s. Smart recovery since 2003. A dip in TFPG in recent years.

# Trends in TFP, Indian manufacturing industries

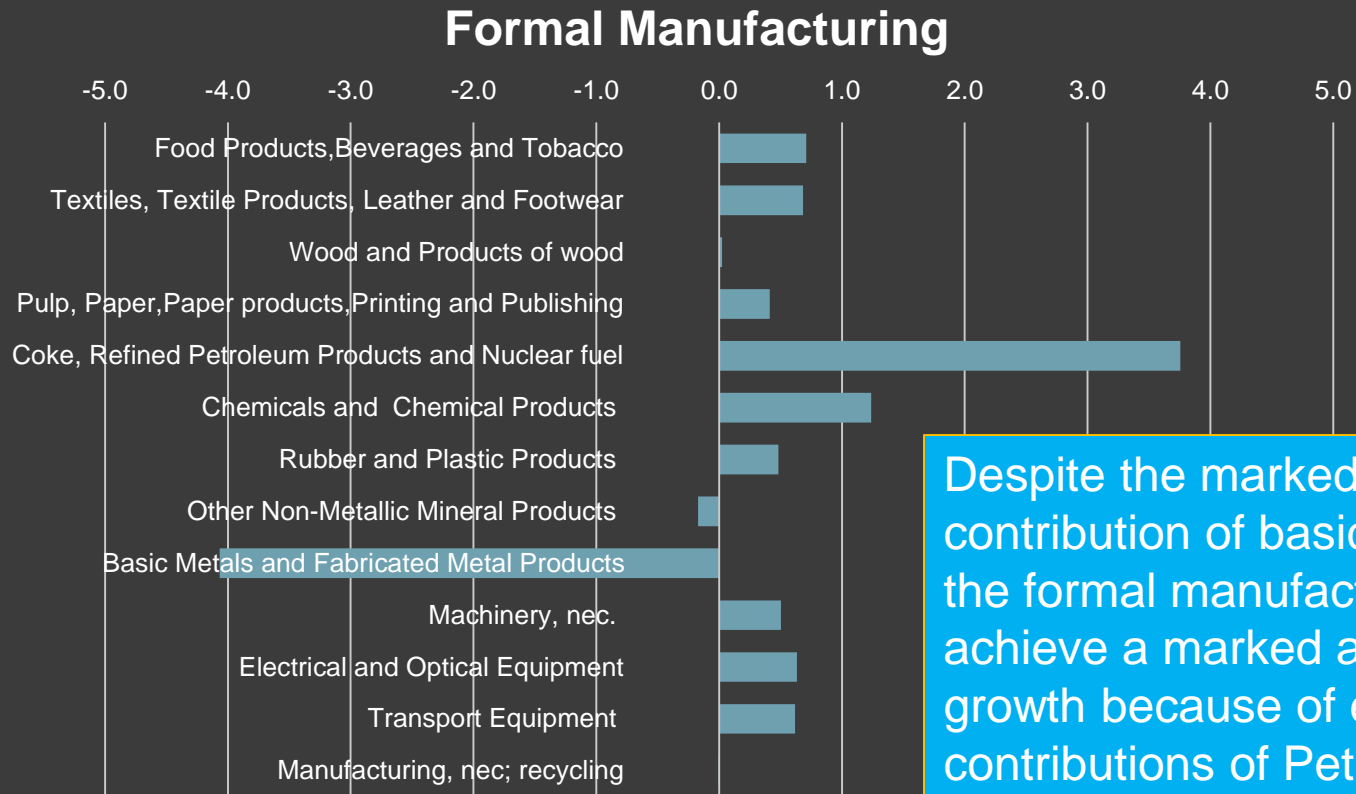
- Taking the entire period, 1980-2011, the growth rate in TFP is found to be relatively higher for the formal segment than the informal segment of various (13) manufacturing industries.
- Exceptions are (i) Paper, paper products and printing industry and (ii) Rubber and plastic products. In these cases, TFP growth rate in the informal segment is not lower than that in the formal segment.



# TFP growth rate (% p.a.) comparison, 1980-2011

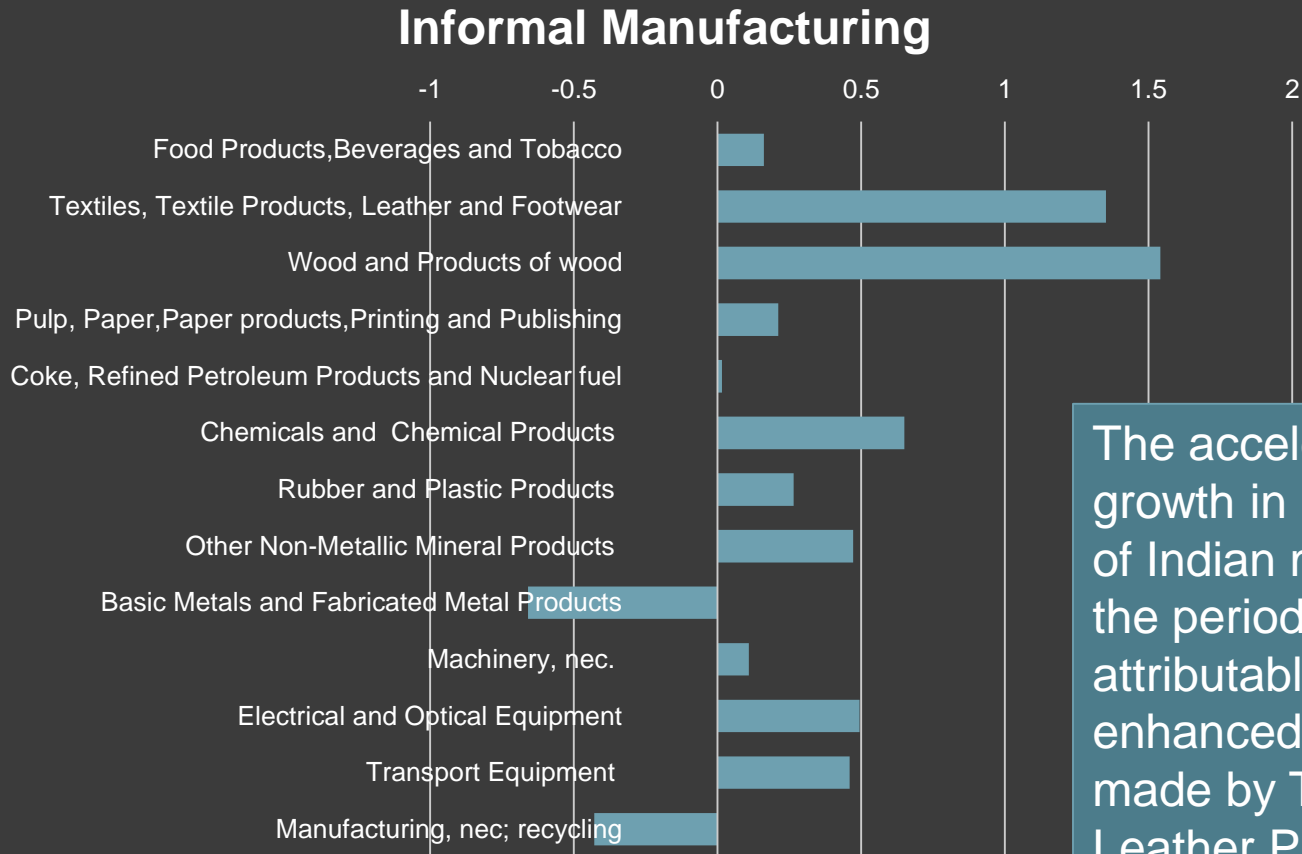


# Change in Industry Contribution to TFP Growth in Manufacturing, 2003-2011 less 1994-2002 (% p.a.), formal manufacturing



Despite the marked fall in the contribution of basic metals industry, the formal manufacturing sector could achieve a marked acceleration in TFP growth because of enhanced contributions of Petroleum refining and Chemical and chemical products industries along with increases in the contributions of several other industries.

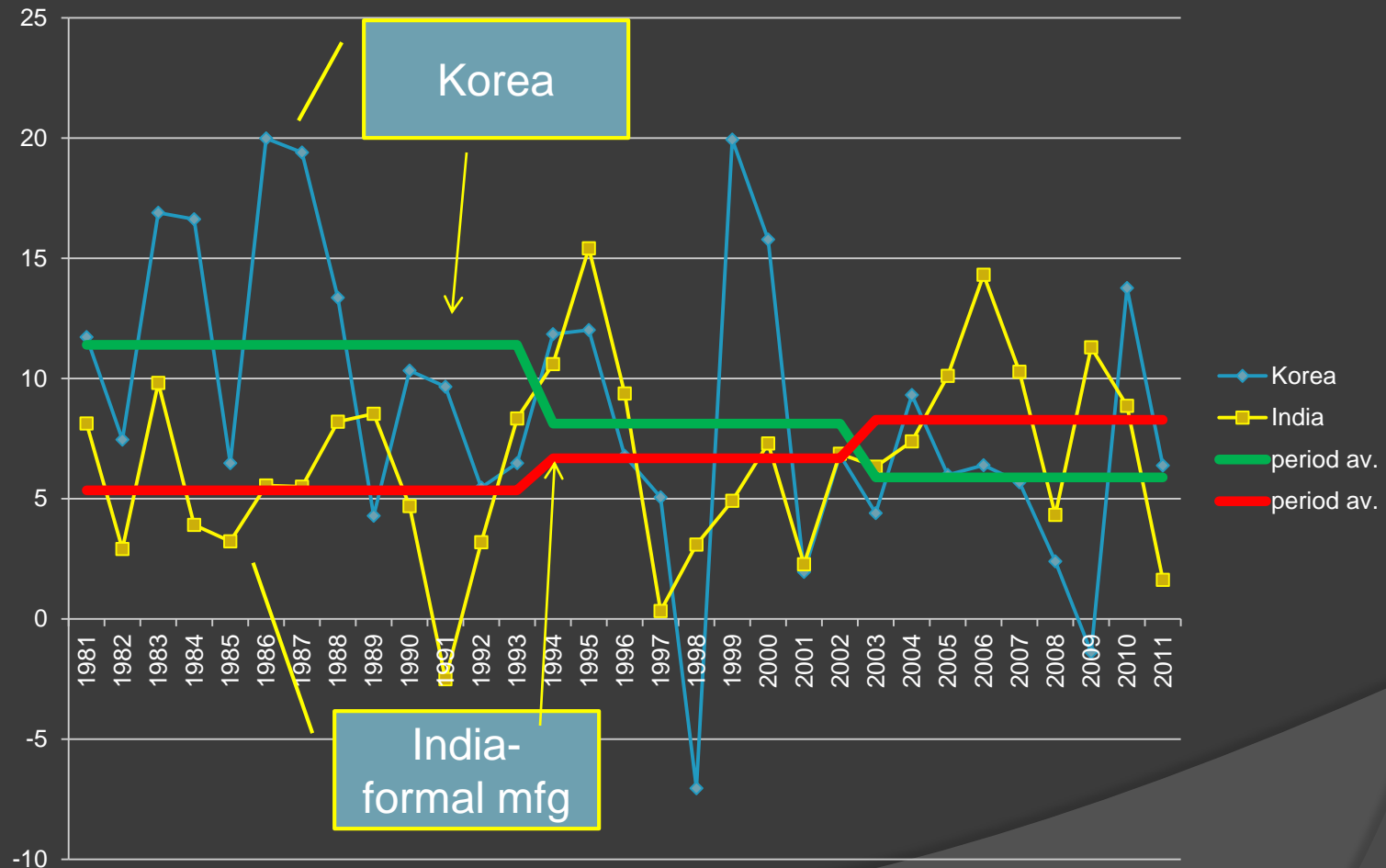
# Change in Industry Contribution to TFP Growth in Manufacturing, 2003-2011 less 1994-2002 (% p.a.), informal manufacturing



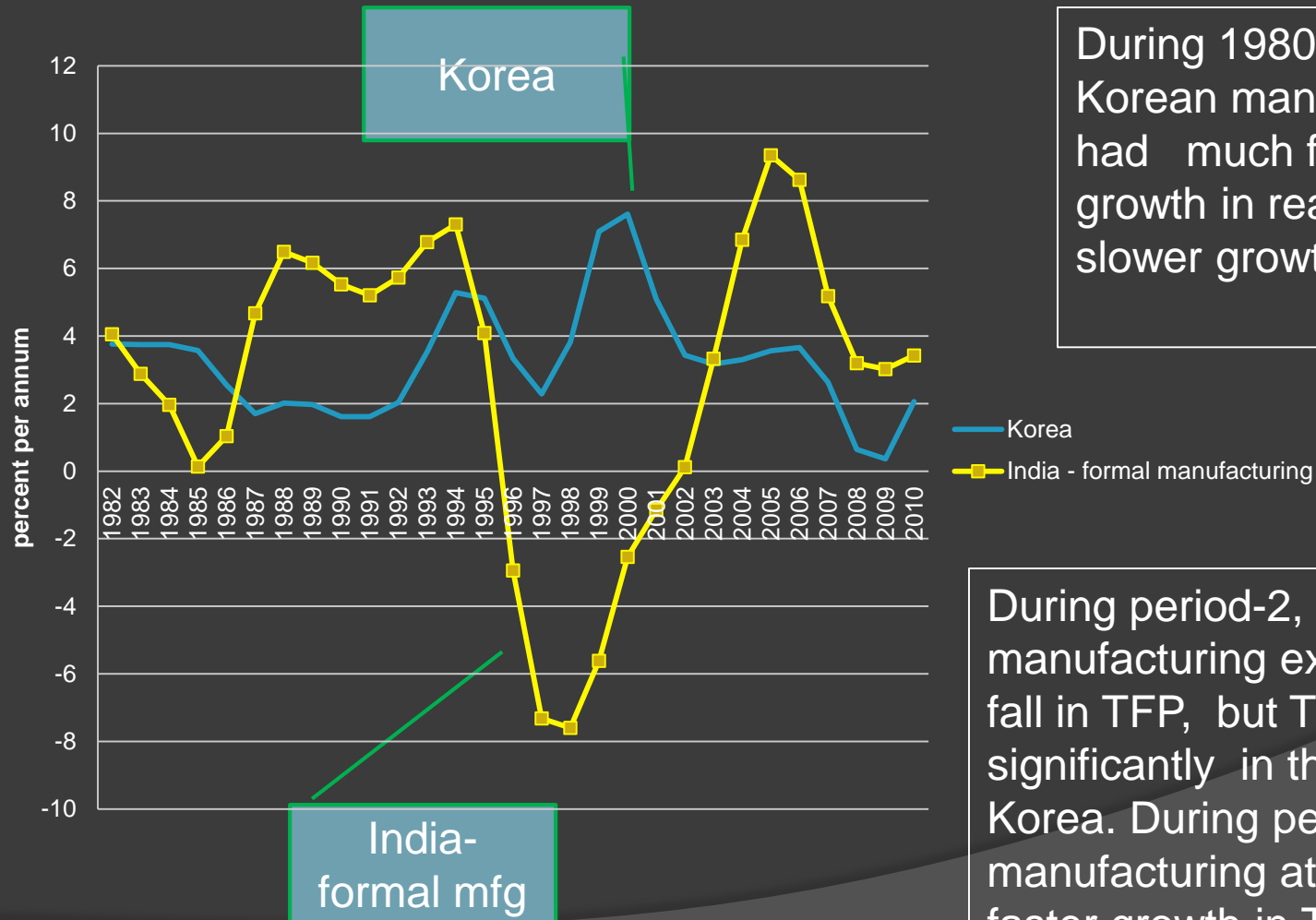
The acceleration in TFP growth in informal segment of Indian manufacturing in the period since 2003 seems attributable mainly to the enhanced contributions made by Textiles and Leather Products, Wood and wood products, and Chemicals and chemical products.

# Comparing Indian Manufacturing with Korean Manufacturing

# Real GVA Growth Rate, Korea and India



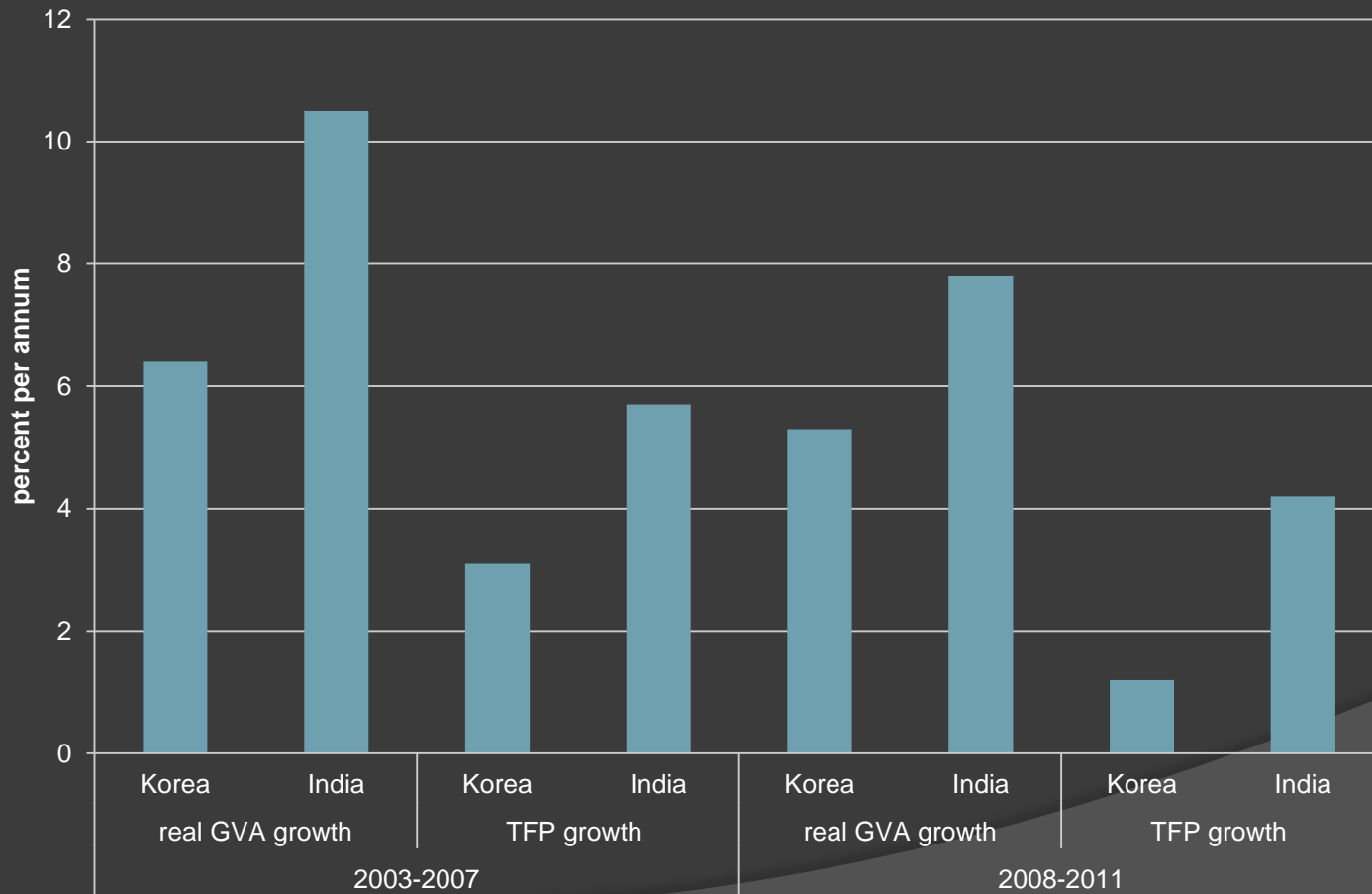
# TFP Growth Rate (Smoothened Time Series), Korean Manufacturing and Formal Segment of Indian Manufacturing



During 1980-1993, Korean manufacturing had much faster growth in real GVA but slower growth in TFP

During period-2, Indian manufacturing experienced a fall in TFP, but TFP grew significantly in the case of Korea. During period 3, Indian manufacturing attained a faster growth in TFP.

# Real GVA growth and TFP growth in the period since 2003, Comparing Korean manufacturing with India's formal manufacturing



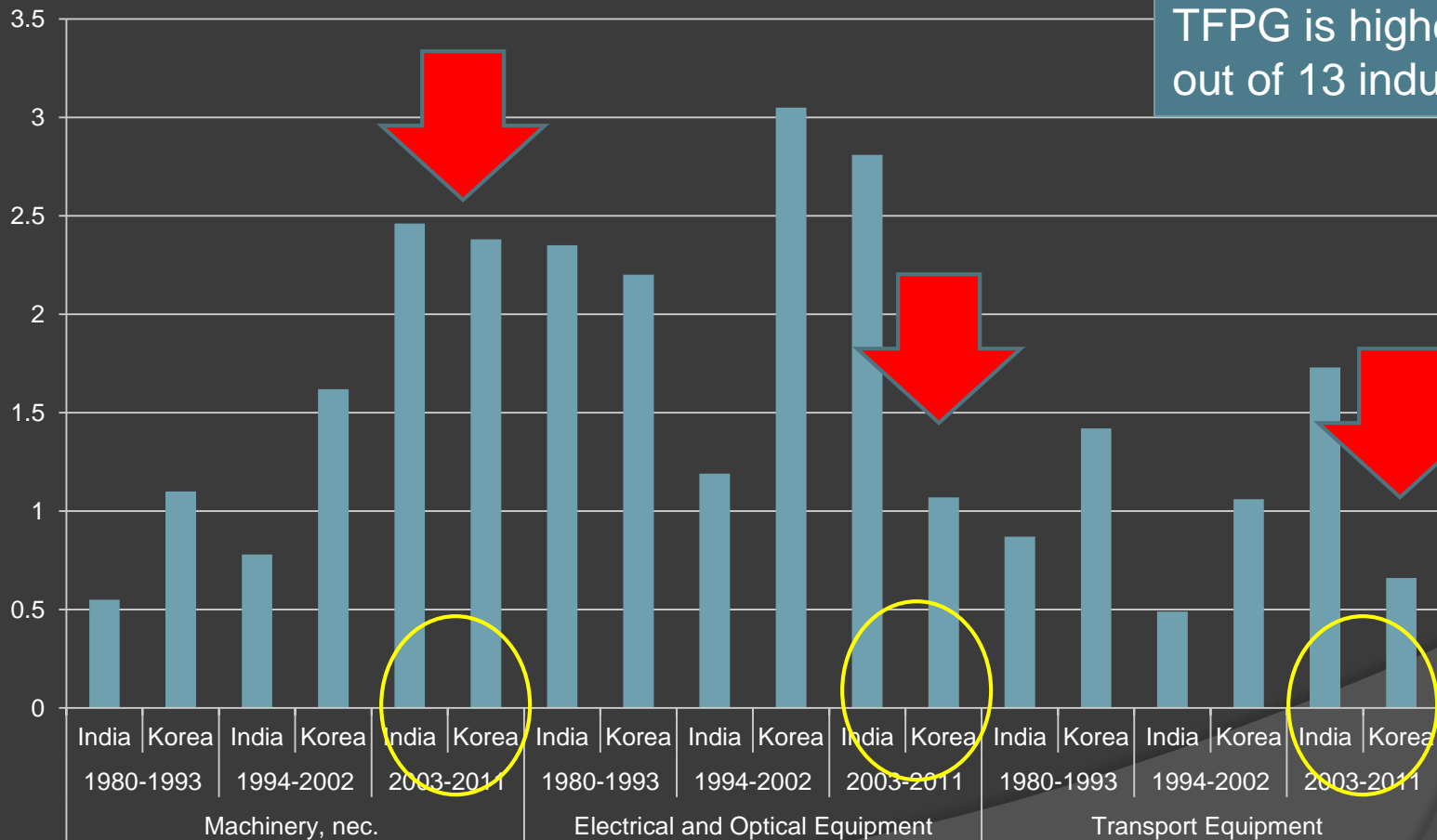
# TFP growth in various manufacturing industries, India vs. Korea, 1980-2011

- In about half of the manufacturing industries, the growth rate in TFP in India exceeds that in Korea, and in the other half, Korean industries have an advantage. This is true for both formal and informal segments of Indian manufacturing.
- The industries in which India had a faster TFP growth include Food products, beverages and tobacco products, Textile and leather products, Rubber and plastic products, and the miscellaneous manufacturing products group.
- On the other hand, India performed worse than Korea in terms of growth rate in TFP in Wood and wood products industry and Basic metals industry.
- In Electrical machinery and Transport equipment, India almost matched Korea in TFP growth.



# TFP growth rate comparison, Korean manufacturing vs. Formal segment of Indian Manufacturing (% p.a.)

In the 3<sup>rd</sup> Sub-Period, India has performed better. TFPG is higher in 9 out of 13 industries

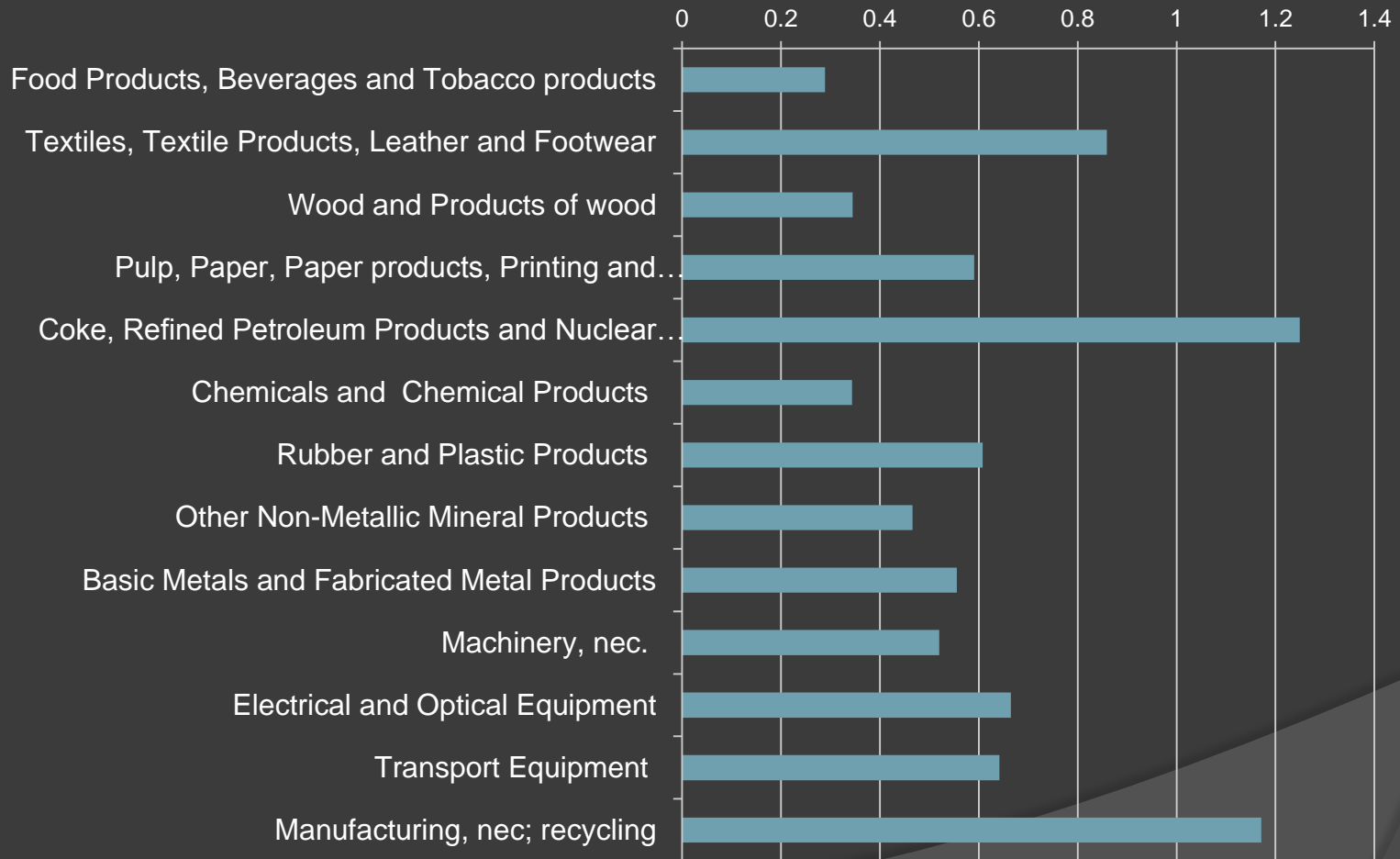


Labour productivity, India's  
formal manufacturing compared  
with Korean Manufacturing

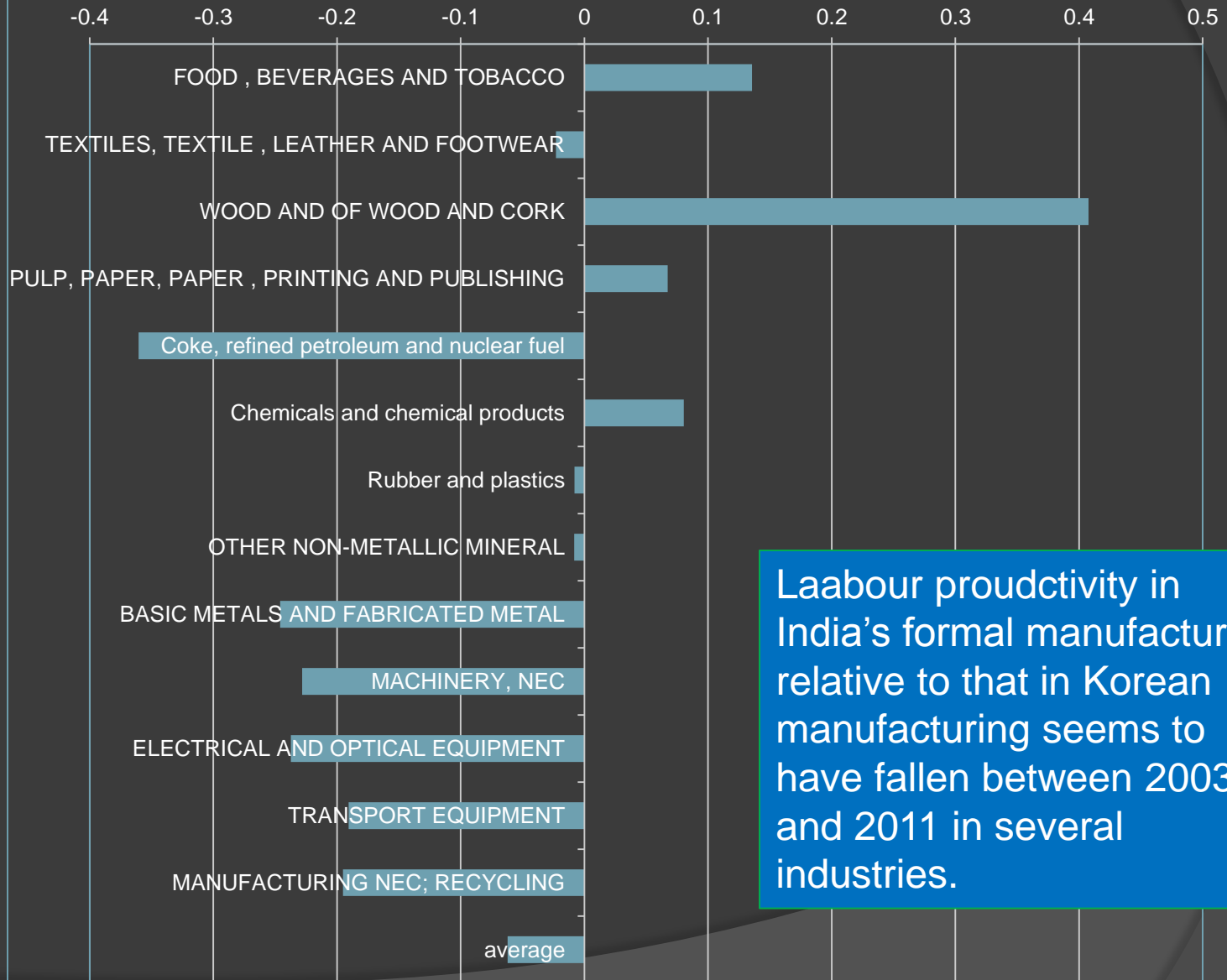
# Relative labour productivity in manufacturing, India versus Korea

- Labour productivity (GVA per person, after PPP adjustment), has been compared between Korea manufacturing and India's formal manufacturing
- On average, labour productivity in India's formal manufacturing is about 35% lower.
- In certain industries, the gap is more than 60%. There are Food products, Beverages and Tobacco products, Wood and products of wood, and Chemical and chemical products,
- In Petroleum refining and the miscellaneous manufactured products group, labour productivity in India exceed that in Korea.

## Relative labour productivity, India's formal manufacturing compared to Korean Manufacturing (2003-2011)



## Change in Relative labour Productivity of India and Korea between 2011 and 2003



Laabour proudctivity in India's formal manufacturing relative to that in Korean manufacturing seems to have fallen between 2003 and 2011 in several industries.

Relative efficiency: informal vs.  
formal manufacturing in India

# Differences in TFP between formal and informal manufacturing

- On average, the level of TFP in informal manufacturing is 30% lower than that of formal manufacturing.
- The gap is relatively less in Textiles and leather products, Wood and wood products, Chemicals and chemical products, Basic metals and fabricated metal products, and Transport equipment.

# Differences in TFP between formal and informal manufacturing

- Within informal manufacturing, the level of TFP is relatively lower in own account enterprises (those which do not use any hired workers) than establishments (which use at least one hired worker).
- There are indications that TFP gap between formal and informal segments of different manufacturing industries is widening over time.



# Conclusions

# Conclusions

- The average growth rate in TFP in informal manufacturing during 1980-2011 was significantly lower than that in formal manufacturing (0.4 percent per annum as against 4.1 percent per annum).
- Both formal and informal manufacturing experienced a fall in the rate of TFP growth during 1994-2002 as compared to 1980-1993, and then achieved a marked acceleration in TFP growth during 2003-11.
- The growth rate in TFP in formal segment of Indian manufacturing was about 5 percent per annum during 2003-2011 and that in the informal segment of Indian manufacturing was about 3 percent per annum in this period.

# Conclusions

- In the recent period 2003-2011 the rate of TFP growth achieved by the formal segment of Indian manufacturing was higher than that of Korean manufacturing.
- A better performance of Indian manufacturing in terms of the rate of TFP growth is observed for the recent period for a majority of industries.
- Labour productivity in Indian industrial enterprises is lower than that in Korean manufacturing enterprises in most industries.
- In several industries, the relative labour productivity is falling.

# Conclusions

- ⦿ Comparison of level of TFP between formal and informal segments of Indian manufacturing reveals that the informal manufacturing enterprises are relatively less efficient. The gap is about 30%.
- ⦿ Within the informal sector, enterprises with small size of employment (OAME) tend to have lower TFP as compared to larger firms (Establishments).
- ⦿ Resource reallocation from OAME to establishments within the informal sector, and from informal to formal sector within manufacturing can contribute significantly to productivity advances in Indian manufacturing.

Additional slides

# Data sources – formal-informal split

- The data series in India KLEMS 2015 have been split into formal and informal segments for manufacturing industries.
- For certain variables, the formal and informal segments are estimated first and then these two are added to compute the value of the variable for the industry, the two segments, formal and informal, combined. This is the method used for gross value added, gross output and capital stock (capital service). The same applies to total value of intermediate inputs at current prices and income share of labour in gross value added. In these cases, the time series for the relevant variables could readily be obtained for the formal and informal segments of each industry.
- As regards the number of persons employed, the employment in the formal segments of various industries has been obtained from ASI data for various years. Employment in the informal segments has been derived as a residual.