2011

RINDAS INTERNATIONAL SYMPOSIUM SERIES 2

*Industrial Dynamics in India and China*
Comparing Growth Process of Indigenous Firms and Clusters
The image of India has recently shifted from “a country of stagnation and poverty” to “a country of great power” as a result of its growing economic strength. India has realized this remarkable economic development primarily because of its relatively stable “democratic” politics.

What interests us is that the norms and morals that maintain the Indian economy and politics reflect traditional Indian thought and philosophical concepts such as Satya (truth), Dharma (morality or duty), and Ahimsa (nonviolence), which have been formed during India’s long history.

Our project attempts to integrate the knowledge and materials on Indian philosophy and Buddhism accumulated during the 370-year history of Ryukoku University with the new findings of contemporary India studies, focusing on the “Living Tradition of Indian Philosophy in Contemporary India”.

The next generation of researchers will be fostered through their involvement in our project.

Research Unit 1: Politics, Economy and Philosophy of Contemporary India
Research Unit 2: Social Movements in Modern India across Borders
Industrial Dynamics in India and China
Comparing Growth Process of Indigenous Firms and Clusters

RINDAS the Second International Symposium Proceedings

Edited by
OHARA Moriki, NAGASAKI Nobuko, DAKE Mitsuya

25, February 2012

The Center for the Study of Contemporary India
Ryukoku University
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Preface

Moriki OHARA

Forward

In the last decade, a bunch of literatures of economic comparative studies on India and China have been produced. However, very little studies have ever challenged to figure out their micro-level characteristics as the foundations of their macro-level gaps between the two. Given the importance of the two countries in the on-going restructuring in global production networks, and, given the necessity to accommodate the emergence of new industrial powers in various industries from the two countries, it is extremely important to figure out what types of competitive advantages the indigenous firms and clusters have, and how such advantages and capabilities have been accumulated in their long-run growth process. At the same time, we need to understand what kind of market institutions and political/economic structures have brought about such different advantages. The participants of this international symposium, including economists, geographers, and political-scientists from India, US, and Japan, are ones of the global front-runners of the topics. I believe the papers and discussions apparent in the symposium have provided globally rare but detailed and reliable micro-level case studies of political economy to foresee the emerging super-large capitalism in 21st century to meet the wide-ranged needs from business and academics.

This is the second international symposium hosted by The Center for the Study of Contemporary India, Ryukoku University (RINDAS). We express our sincerest gratitude for all the persons and organizations that provided their devotions for the sake of the successful completion of the symposium, particularly for the sponsorship from National Institutes for the Humanities (NIHU).
Schedule

Date: Feb. 25, 2012
Venue: Conference Hall (3F), Seiwa-kan Building, Omiya-campus, Ryukoku University, Kyoto

Agenda
This symposium aims to explore the distinctive natures found in the growth process of major industries in China and India. The focus is explicitly on the indigenous firms and clusters that are emerging as the new world industrial leaders. It clarifies the fundamental differences in the competition and organization between the two countries, and explores the institutional context that created these gaps. Specific focus is placed on the role played by individual skills, organizational R&D, and inter-firm networks in capability creation. Other East Asian experiences are used to highlight the new realities of super populous ex-agrarian countries in the 21st century.

Program

13:30-13:40 Opening Address
Pauline Kent (Ryukoku University)
Akio Tanabe (Kyoto University)

13:40-14:30 Session 1
"Competition and Management in the Manufacturing Sector in India and China: An Overview"
Moriki Ohara (Ryukoku University)
Discussant: Atsushi Kato (Aoyama Gakuin University)

14:30-15:20 Session 2
"Two Tales of Agro-Industrial Transformation: State Capacity in India's and China's Textile Industries"
Mark P. Dallas (Union College, USA)
Discussant: Shuji Uchikawa (Institute of Developing Economics, JETRO)

15:20-15:40 Break
15:40-16:30 Session 3
"The Institutional Milieu of Skill Formation: A Comparative Study of Two Textile Regions in India and China"
M. Vijayabaskar (Madras Institute of Development Studies)
Discussant: Hitoshi Ota (Institute of Developing Economies, JETRO)

16:30-17:20 Session 4
"Capability-building via Inter-firm Relationship and In-house Employment in India and China: A Comparative Study of the Motorcycle Industry"
Moriki Ohara (Ryukoku University)
Discussant: Jun Otahara (Doshisha University)

*all sessions chaired by Satoko Nakane (Ryukoku University)

17:20-17:30 Concluding Remarks by Nobuko Nagasaki (Ryukoku University)
List of Participants

Nobuko NAGASAKI
  Director, Center for the Study of Contemporary India, Ryukoku University

Akio TANABE
  Professor, Graduate School of Asian and African Area Studies, Kyoto University

Pauline KENT
  Dean, Faculty of Intercultural Communication, Ryukoku University

Moriki OHARA
  Associate Professor, Faculty of Economics, Ryukoku University

Atsushi KATO
  Professor, School of Business, Aoyama Gakuin University

Mark P. DALLAS
  Assistant Professor, Political Science Department, Union College

Shuji UCHIKAWA
  Director-General, Research Promotion Department, Institute of Developing Economies, Japan External Trade Organization

M. VIJAYABASKAR
  Assistant Professor, Madras Institute of Development Studies

Hitoshi Ota
  Researcher, South Asian Studies Group, Area Studies Center, Institute of Developing Economies, Japan External Trade Organization

Jun OTAHARA
  Associate Professor, Faculty of Commerce, Doshisha University
Competition and Management in the Manufacturing Sector in India and China: A Statistical Overview
The per capita GDP of China and India remained almost the same until 1990, when it stood at USD388 for India and USD343 for China. However, the pace of increase subsequently widened significantly, leading to a gap in the average annual growth of the per capita GDPs during the period from 1990 to 2008, when it grew by 13.3% for China and 5.5% for India. As a result, in 2008, per capita GDP in China was USD3,266, three times more than India’s, which was USD1,017. As far as GDP growth is concerned, China seems to follow the path of its East Asian antecessors, Taiwan and Korea, in a 25-year time lag, whereas India does not seem to have entered into such a trajectory of high economic growth.

We assume that the main source of the growth gap between China and India stems from the paths of their industrial development, in particular in the manufacturing sector. This paper presents an overview of the aggregated and firm-level statistical data on the manufacturing sector of these countries in order to highlight the differences, on average, between manufacturers in China and India related to competition and management, i.e., (1) in firm management, “volume-oriented” Chinese firms vs. ”profit-oriented” Indian firms and (2) in competitive environment, numerous homogenous firms in China vs. heterogeneous firms with large gap between oligopolistic modernized industries and intensely competitive traditional industries in India. Then, we attempt to relate the gap to the fundamental differences in the conditions of their economic growth after the 1980s, i.e., the pace of homogenization of technological capability among manufacturers. Our basic assertion is that the basis of such differences has been created by the labor-intensive nature and rapid technological “catching-up” by “subordinates” to “superiors” among Chinese manufacturers, and lingering heterogeneity of Indian firms where the gap between capital-intensive and labor-intensive firms, in both the inter- and intra-industrial categories, remain very large.
1 Macroeconomic Overview of Manufacturing Development

1.1 East Asian Pattern: Labor-Intensive Manufacturing as Initial Driver of Upgrading

It was the manufacturing sector that drove the rapid economic growth in East Asian economies. Figure 1 shows the change in the manufacturing sector’s share in the total labor force (manufacturing labor ratio) in China, India, and several other East Asian economies in addition to China. In the other East Asian economies, the ratio has been nearly identical to the ratio of the manufacturing sector in GDP (manufacturing GDP ratio). In their peak year, manufacturing employees, who amounted to 28% of total employment, produced 37% of the GDP in Japan (1970), 32% produced 36% in Taiwan (1980), and 27% produced 32% in Korea (1985).

![Figure 1: The Ratio of the Manufacturing Sector in Total Employment (%)](image)

Note: The figures beside the dots are the number of manufacturing employment in million in each country.

The figure for China’s 2005 is based on the author’s estimation calculated from China’s official statistics on secondary industry employment size.

Source: MPI, JSYB, MSKE, TSDB, CSY, various years.

It should be noted that the years around the peak of the ratio coincide with the rapid economic growth period (of average annual GDP growth around 10%) in the countries;
for Japan, this period was from the late 1950s to the early 1970s, and for Korea and Taiwan, from the late 1960s to the early 1990s. This indicates that, in East Asian economies, the expansion of the labor-intensive manufacturing sector initiated the rapid economic growth, with the ratio reaching its peak in the latter half of the rapid growth period. Then, after the disappearance of the abundant labor pool, the upsurge in the wage rate brought about the rise of the capital-intensive (and further subsequent knowledge-intensive) sector as the next leading sector, which slowed the growth rate and, at the same time, decreased the income gap among workers as a whole.¹

1.2 China’s Manufacturing Sector vs. India’s Service Sector

The manufacturing sector in China and the service sector in India are the driving sectors of the growth in these countries, not only quantitatively but also in terms of productivity. Bosworth and Collins (2007) calculated the per capita productivity growth during 1983-1993 (Period I) and 1994-2004 (Period II), and found that (1) for both periods, China’s productivity increase was higher than India’s, (2) for both China and India, higher productivity growth was experienced in Period II than in Period I, and (3) secondary industry was the largest contributor to productivity growth in China, while it was the tertiary industry in India.² The most prominent cases that highlight the differences in industrial competitiveness are software and BPO service in India and electronics and IT-related hardware manufacturing in China.³

1.3 Potential “Labor-Intensive” Nature

Contrary to the East Asian economies, the manufacturing labor ratio has not increased significantly in either China or India, which indicates the immense difficulty of absorbing the huge absolute number of agricultural laborers by the manufacturing sector in the two countries.

The interesting difference between China and India is that, while in India, as in the other East Asian economies, the manufacturing labor ratio has been broadly identical to

¹ This broadly reflects the time when the societies went beyond the "Lewisian Turning Point" enjoying the “growth with equity” in East Asia.
² In Period I, annual per worker productivity increased on average by 6.4% in China and 2.4 in India, out of which secondary and tertiary industry constituted, respectively, 2.4% and 1.1% in China, and 0.5% and 0.7% in India. In Period II, within the overall growth rate of 8.6% in China, secondary industry made up 5.0% and tertiary industry 1.7%, while out of 4.7% in India, secondary was 0.9% and tertiary was 2.1%.
³ Gregory, Nollen, and Tenev (2009) introduces a clear contrast of China’s strength in hardware manufacturing and India’s in software service in the IT industry.
the manufacturing GDP ratio, China’s manufacturing GDP ratio has always far exceeded the manufacturing labor ratio.

In the case of China, the manufacturing GDP ratio reached 30% as early as the 1960s. China’s high ratio before the start of economic reform in the late 1970s was a result of the artificial emphasis on the construction of heavy industry in the planned economy era. The manufacturing GDP ratio declined shortly after the reform began, reflecting the real comparative advantage of the country, but later it rose to a level equivalent to the peak level of Taiwan and Japan during the 2000s. In 2008, manufacturing employees, who occupied 14% of total employment, produced as much as 34% of the GDP, while agricultural employees, who amounted to 40% of total employment, produced only 10% of the GDP.

![Graph showing productivity gap](image)

**Figure 2**
**Productivity Gap among Agricultural and Non-agricultural Industries**
(Par employee GDP of manufacturing/secondary and tertiary industries when that of primary industry =1 in each country)

Source: JSYB, CSY, ADB Key Indicators 2010 (for India)

This reveals the existence of a large gap in productivity, and hence, in the wage level between the manufacturing and agricultural sectors. Figure 2 shows the productivity gap between the agriculture and industrial sector, which has been higher since planned economy era, widened greatly after the mid-1980s. This is considered to be due partly to the extremely and continuously low productivity in agricultural sector

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4 See Naughton (2007).
and partly to the upsurge of productivity in industrial sector. The productivity growth in service (tertiary) sector has been less prominent. This is one of the most critical factors that brings about the lingering highly labor-intensiveness nature in China.

In contrast, in India where 12% of total employment produced 15% of GDP in manufacturing sector in 2005, the sector does not seem to be the main driver of the economic growth. It is the service sector that constitutes the largest share of Indian GDP, with service workers, who make up 23% of the labor force, having produced around 50% of the GDP in 2005. Agrarian workers, who comprise 60% of the labor force, only produced 21% of GDP that year.

These figures imply that the East Asian pattern of socioeconomic transformation driven by a labor-intensive manufacturing sector is difficult to accomplish in super-populous agrarian countries due to the fact that it is extremely difficult for the manufacturing sector by itself to absorb large numbers of agrarian laborers. In India, no sign of such transformation can be observed (Islam 2009). The long-term existence of a low-productivity agrarian population and the consequent large wage gap between agriculture and other sectors have provided a continuous source of low-wage workers, and hence, the lingering existence of labor-intensive manufacturing in such countries. The wage gap, which is partly due to the institutional segmentation of the labor market and partly due to the far better productivity in the globalized manufacturing sector which produced high earnings via massive exports, seems to be even larger in China than in India.

2. Competition and Management

The following section will present an overview of the degree of competition and several important aspects regarding management of firms.

Table 1 shows the number of firms that participate in the competition in various product segments and the share of top firms (the top 3, 5, or 10, depending on the industry). According to this table, in most of the product fields, China has a higher number of firms and the share of the top firms in the market is smaller. In the service sector, the software development service sector also displays the same phenomenon. An higher concentration of market share among the huge top firms can be observed in the Indian software and BPO industry, whereas there is no sign of such a trend in the sector in China.
We may assume that, in the dispersed market, firms tend to rush into “price competition,” whereas in the oligopolistic market, they tend to maintain “qualitative competition,” since they have more control on price and distribute more resources to improvements in the non-price aspects. The more homogeneous the firms are in the same segment, the harsher the pressure that pushes firms into “price competition” is. This assumption seems to hold when we contrast and compare the two countries.

In the following sections of this paper, using basic official industry data, we will examine the number of firms (participants in competition) and the degree of homogeneity of technology among firms in China and India.

Table 1. Concentration of Market Share and the Number of Firms Producing the Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Share(%)</th>
<th>No. of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparel</td>
<td>India</td>
<td>40.3</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>6.8</td>
</tr>
<tr>
<td>Shoes</td>
<td>India</td>
<td>23.7</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>3.6</td>
</tr>
<tr>
<td>Cotton Fabric</td>
<td>India</td>
<td>37.0</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>11.0</td>
</tr>
<tr>
<td>Cotton Yarn</td>
<td>India</td>
<td>18.0</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>12.3</td>
</tr>
<tr>
<td>Steel</td>
<td>India</td>
<td>50.4</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>26.0</td>
</tr>
<tr>
<td>Valves</td>
<td>India</td>
<td>61.0</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>15.8</td>
</tr>
<tr>
<td>Machine Tools</td>
<td>India</td>
<td>46.2</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>22.6</td>
</tr>
<tr>
<td>Storage Battery</td>
<td>India</td>
<td>78.0</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>18.0</td>
</tr>
<tr>
<td>Air Conditioners</td>
<td>India</td>
<td>48.2</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>26.5</td>
</tr>
<tr>
<td>Refrigerators</td>
<td>India</td>
<td>60.0</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>68.0</td>
</tr>
<tr>
<td>TV Sets</td>
<td>India</td>
<td>55.5</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>28.4</td>
</tr>
<tr>
<td>Passengers Cars</td>
<td>India</td>
<td>79.0</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>70.2</td>
</tr>
<tr>
<td>Motorcycles</td>
<td>India</td>
<td>86.0</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>21.0</td>
</tr>
<tr>
<td>Software</td>
<td>India</td>
<td>56.2</td>
</tr>
<tr>
<td></td>
<td>China</td>
<td>na</td>
</tr>
</tbody>
</table>

Note: Number of firms and share refers only to the ones that were observed by CMY and IMSS.
Source: CMY(China), IMSS(India)
The data used here is, for China, Industrial Enterprise Data (IED)\(^5\) which is collected by the National Statistic Bureau (NSB) of the Government of China, and for India, Annual Survey of Industries (ASI) Data which is managed by the Bureau of Statistics of the Government of India.\(^6\) There were some changes in the policy for collection and categorization of both IED and ASI Data. IED before 1997 includes the data of “all independent accounting industrial enterprises” and does not include massive numbers of individually- or privately-owned, whereas after 1998, it contains “all state-owned enterprises and non-state enterprises with a certain sales level” in the industrial sector. At present, “a certain level” is 5 million Yuan (equivalent to 750,000 USD in 2010 exchange rate). This means that, as time passes (and as the average size of sales per firm increases), the number of firms covered by the statistics also will increase. IED only covers industrial enterprises, and it does not include service sector enterprises. In 2007, IED covered about 60% of total manufacturing employment in China.\(^7\)

ASI Data includes firms registered under the Factory Law, the ones hiring more than 20 employees without power tools or more than 10 employees with power tools. IED is company-based data, whereas ASI is factory (unit)-based data.

As for the coverage, ASI only covers about 16% of the estimated total employment in India.\(^8\) This means that, if the estimation of total employment size is correct and if the majority of the units that employ more than 20 workers (or 10 workers with power tools) are actually covered by ASI, the Indian manufacturing sector is composed of an overwhelmingly large number of micro-firms/individual business units, at about 80% of the total, and by far smaller number of modernized firms that are covered by ASI. If this holds, the image of Indian industry that this paper presents is confined to that of the fairly modernized manufacturing sector.

Though the original ASI covers the service sectors as well, for purposes of comparison with IED, this section only analyzes the industrial sector. The “industrial sector” here can be divided into eight sub-industries, i.e., food products, textile products, paper/woods/leather-related products, chemical products (including petrochemicals), non-metal/construction material products, metal (including non-ferrous) products, machinery products, electronics and precision machinery products, and transportation.

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\(^5\) IED was accessed, for aggregated industry data, from CIEY, and, for firm-level samples of 2005, from Oriana of Bureau Van Dijk (which contains approximately 300,000 firms). The original data of Oriana is considered to be the same as IED.

\(^6\) Aggregated industry data of ASI was accessed, for figures up to 1997, from NASI, and for 1998-2007, from the website of MSPI. For 2000 and 2005, we utilized the firm-level sample data (approximately 10,000 samples) purchased from MSPI.

\(^7\) In 2002, total manufacturing employment was 83 million (CSY 2008) and the amount of employment covered by IED is 45 million (54% of total).

\(^8\) Out of 51 million persons engaged in the manufacturing sector as indicated by the census in 2002 (MPI 2005), 8 million (16%) are covered by ASI.
equipment products.\textsuperscript{9}

2.1 Number of Firms and Entry into Competition

As the basic factors that caused the aforementioned differences in the nature of competition between the two countries, we can cite the absolute size of firms and employees and changes in their numbers. Generally speaking, we can say that new entries into the competition were more frequent in the modernized manufacturing sector in China than in India. However, looking at the likelihood of creation of totally new firms, we cannot find any clear difference between the two countries. In fact, India experienced a massive amount of new entries by firms especially during the 1970s and 1980s which was not significantly smaller than that in China.

2.1.1 Number of Firms and Employees

The long-term changes in the number of firms and employees in various manufacturing sectors evince the transformation of industrial structure and the changes in comparative advantage and competitive environments.

According to IED and ASI, the number of modernized manufacturing firms in China is far larger than in India. Firms in the manufacturing sector in China totaled 400,000 in the late 1990s and 300,000 in 2007,\textsuperscript{10} whereas in India, the figure was 140,000 in 2007. Looking at other 2007 figures, in the textile industry, India had 18,000 firms and China 42,000 firms; in transportation equipment, India had 5,000 and China 15,000; and in the electronics industry India had 7,000 and China 35,000. While the gap at present seems natural since China’s GDP is quadruple the size of India’s, it should be noted that, in 1985, when their GDP size was almost identical, China already had 3.5 times the number of manufacturing firms in India (320,000 in China and 90,000 in India). Though we cannot compare the figures directly due to different methods of coverage in the two countries (particularly because Indian data does not include the huge number of tiny “unregistered” firms, though Chinese data does not either but to a lesser extent), we still can affirm that, as far as the modernized manufacturers are concerned, China always has had a larger number of firms than India, even in the period

\textsuperscript{9} Data categorized in NACSIS Code 313-339 (for China) and NIC Code15-35 (for India) was reorganized by the author. Data categorized as “miscellaneous” or “others” is excluded.

\textsuperscript{10} As stated above, the figures cannot be compared directly since their coverage significantly differs between before and after 1997-98.
The composition of industry also differs greatly. Indian manufacturing is characterized by light industry sectors such as textiles and food products (the two sectors occupy half of total employment). In China, these two light industry sectors composed 30% in the 1980s but decreased to 20% in the 2000s. China has been characterized more by heavy industrial sectors. The machinery sector composed 20% of manufacturing employment until the 1990s, and after the 2000s, the share of electronics employment increased, reaching 17% in 2007. In India, the share of electronics employment is quite small since it only employs 500,000 persons, whereas China employs 12 million persons in the industry.

2.1.2 Change in the Numbers: New Entry and Adjustment

The increase in the number of firms can be considered as representing “new entries” into the industry. From this, we can confirm that both India and China had active new entries, and we cannot clearly determine in which country new entries were more active.

After 1998, the statistical figures of firms and employees in China swelled greatly; however, as stated above, this is considered to be due mainly to the effect of increased statistical coverage caused by the growth of formerly smaller firms, not purely by the emergence of new firms.

We can observe the economic fluctuations caused by the trends in firms’ entry as well. In India, the number of firms continuously increased during the period from the 1970s to the mid-1990s, but in the mid-1980s, there was an absolute decrease in total employment. This decrease in employment was mainly due to the restructuring of the light industry sector, especially textiles and food products, and employment continued to increase in other sectors. This means that, in the manufacturing sector, firms had significant level of freedom to start a business before the launch of the liberalization policy. However, from 1998 to 2003, they experienced a decline in both the number of firms and employment in all the sub-sectors. This period is called the “jobless growth” period. In case of China, we also can observe serious reorganization of the

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11 This means that the average size of the Chinese firms used to be smaller than modernized Indian firms. In fact, up until the 1990s, it was always lamented in China that the fundamental problem of Chinese firms was that they were “small, dispersed, disordered, and technologically inferior (xiao, san, luan, cha).”

12 Rodrik and Subramanian (2005) assert that productivity growth started to rise in the 1980s, before the start of liberalization policies. They say that, at that time, the government’s attitude toward business society was to support incumbents (“pro-business”), rather than to support new entrants (“pro-market”). The productivity growth then was the result of these policies.

13 See Raveendran and Kannan (2009).
manufacturing sector which happened during the early 1990s. While the total employment size declined, but the total number of firms remained steady. The sectors that experienced an absolute decline then were textiles, food products, and machinery. The most severely hit were the publicly–owned sectors. The other new sectors were not hit so severely even during this time.

2.2 Management: Firm Size, Profitability, and Efficiency in Investment

Below, indicators that give a general idea of firms’ management are introduced. On the whole, we can observe a contrast between “heavy usage of labor-intensive technology” and “low-profit, high-turnover” orientations in China’s management, and “high-profit, low-turnover” orientations in India’s modern manufacturing sector. Such differences were prominent in the 1980s and 1990s; however, the gap seems to have narrowed recently.

2.2.1 Firm Size

Table 2 shows the relative average size of per firm employment and sales value\textsuperscript{14} (calculated in US dollars). According to the table, in 1985, the average Chinese firm employed 1.6 to 4 times more employees, but their sales value was smaller than their Indian counterparts in many sub-sectors. Chinese firms on average increased their size remarkably during the 1990s and 2000s. In 2003, though Chinese firms employed 3 to 6 times more employees than Indian firms, they only earned 1.6 to 5 times the sales. This means that the basic orientation of management at Chinese manufacturers, “hiring larger number of employees, earning smaller value,” and the technological nature of their labor intensiveness remained the same until recently.

\textsuperscript{14} “Rate” in the table signifies the relative size calculated by dividing the value of China by the value of India.
2.2.2 Profitability and Turnover Ratio

Another trait of Chinese firms is “low profit, high turn-over,” compared to their Indian counterparts. Table 2 also shows an apparent lower profit rate in Chinese manufacturing sectors from the 1980s until recently, whereas Indian firms enjoy a fairly high and stable profit rate (though there is a long-term downtrend).

According to Figure 3, the average turnover ratio of capital (value-added produced divided by fixed assets utilized) in the manufacturing sector has always been higher in China than in India. This suggests the fact that Chinese firms always use the capital equipment more efficiently than Indian counterparts, which probably due to China’s more intense input of labor to the capital (for example by running the machines more hours by inputting multiple shifts of workers). At the same time, China experienced a prominent upsurge in the ratio starting from late 1990s. This strongly suggests that China increased the productivity level by further intensifying the usage of capital, either by technological sophistication or by more labor input.

Contravening the conventional image of the source of the Chinese economy’s growth, which has been described as “investment-driven growth,” the investment ratio of Chinese manufacturing firms has been not significantly higher than that of India. Including the serious economic stagnation period during the mid-1990s to early 2000s, there has been no significant gap in the average investment ratios of modernized Indian

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### Table 2: Size Comparison of Chinese and Indian Manufacturers per Firm (Unit) Sales and Employment (persons, %)

<table>
<thead>
<tr>
<th></th>
<th>1985</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sales (rate)</td>
<td>No. of Emp. (persons)</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>I</td>
</tr>
<tr>
<td>Food Products</td>
<td>0.8</td>
<td>76</td>
</tr>
<tr>
<td>Textiles</td>
<td>1.2</td>
<td>251</td>
</tr>
<tr>
<td>Paper/Wood/Leather etc</td>
<td>0.8</td>
<td>108</td>
</tr>
<tr>
<td>Chemicals/Petrochemicals</td>
<td>0.6</td>
<td>211</td>
</tr>
<tr>
<td>Non-Metal/Const.Mat.</td>
<td>0.7</td>
<td>137</td>
</tr>
<tr>
<td>Metal/Steel</td>
<td>0.9</td>
<td>203</td>
</tr>
<tr>
<td>Machinery/Electrical</td>
<td>1.1</td>
<td>241</td>
</tr>
<tr>
<td>Transportation Equip.</td>
<td>1.0</td>
<td>305</td>
</tr>
<tr>
<td>Electronics/Precision Mach.</td>
<td>0.8</td>
<td>245</td>
</tr>
</tbody>
</table>

Note 1: C=China, I= India  
2: (Rate)= Value of China/ Value of India for both sales and number of employment  
3: Profit rate in the box for 2003 is substituted by that of 2001 (due to the availability of Indian figure)  
Source:
and Chinese manufacturing firms.\textsuperscript{15}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure3.png}
\caption{Turn-Over Ratio, Manufacturing Sector in China and India (value added/fixed assets, \%, current price in local currency)}
\end{figure}

Note: For China, we used “net output value” for 1981-1992, and “value-added” for 1994-2006.
Source: Same as Figure 3

2.3 Labor-Intensive Technology: Capital-Labor (KL) Ratio

To examine the technological differences between the manufacturing sectors in China and India, we examine the change in the capital-labor ratio (KL ratio) from the 1980s to the present (Figure 4). Though not shown here, the ratios in various sub-sectors, including textiles, chemicals, metals, automobiles, IT and electronics-related, machinery, and so on, also follow similar paths in each country.

Examination of the change in the KL ratio in various manufacturing sub-sectors in

\textsuperscript{15} Based on the calculation using IED and ASI, the investment ratio (the increase of fixed capital from year N-1 to year N/value added in year N, nominal) of manufacturing sector was, for 1985 to 1997, around 22% in China and 30% in India, for 1998-2002, around 12% in China and 11% in India, for 2003-07, around 25% in China and 22% in India. On the contrary, the macro-level investment ratio in the Chinese economy has always been higher than in India, with the Chinese ratio of capital formation in GDP changing from 32% in 1980 to 45% in 2008, versus India’s at 18% in 1980 and 33% in 2007. This gap may suggest the fact that the high investment ratio in the Chinese overall economy is the result of high investment in infrastructure construction rather than that in manufacturing firms. For example, among the three sub-sectors that comprise the industry sector, the investment ratio of the manufacturing sector was in the range of 8% to 16% during 1998 to 2006, while that of the energy/water/gas supply sector was 70% to 90% and that of the extraction of oil/coal/other minerals sector was 14% to 21% during the same period (calculated from CIEY). Various levels of governments are considered to have played significant roles in this high investment ratio in China.
Japan, Taiwan, and Korea reveals that Taiwanese and Korean firms boosted their KL ratio up to the Japanese level with only a few years’ time lag behind Japan. This represents a typical case of “catching up.” Compared to these countries, the rise of the KL ratio at Chinese and Indian firms has been slow. It is not proper to say that the manufacturing sectors of the two countries have continued catching up with the three aforementioned other East Asian economies, but rather we should say that the two belong to a different world of technological competition than those three East Asian antecessors. In particular, China followed a rather unique path in comparison to India. While Indian firms have raised their KL ratios steadily from the 1980s up to now, in contrast, China reduced their ratios (in nominal US dollars) for 15 years, from the 1980s until the mid-1990s, in various sub-sectors and then increased their ratios rapidly from the mid-1990s through the present day.

Both Chinese and Indian manufacturers have upgraded their technological capability on the basis of their fundamental characteristics of labor abundant economy. However, comparatively speaking, for most of the reform period after 1980s, the average Chinese firm has chosen more labor intensive technology than its average Indian counterpart, which we consider reflects their stronger adaptability and flexibility to the changes in resource endowments, in particular in human resources.

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16 The decline in China’s KL ratio expressed in US dollars (nominal) from 1981 to 1994 shown in Figure 4 can partly be explained by exchange rate fluctuations. During the 12 years from 1981 to 1993, the Chinese yuan depreciated 3.4 times to the US dollar (from 1.7 yuan to 5.8 yuan per US dollar). In yuan (nominal), the KL ratio increased 4.3 times between 1981 and 1994, from 4,800 yuan to 20,000 yuan. Obviously, no absolute decline took place in the Chinese KL ratio in the nominal local currency. However, during the same period, the Indian rupee also experienced almost the same rate of depreciation, at 3.5 times (from 8.7 rupees to 30.6 rupees per US dollar), while India still steadily increased its KL ratio in terms of the US dollar during the period. China and India also experienced an almost identical trend in their price indexes for the period (the fixed asset price deflator for China increased 284% between 1981 and 1994, and for India, the machinery price index increased 283%). Korea also experienced a depreciation of the won of 1.6 times (from 304 won to 484 won per US dollar) but rapidly increased its KL ratio in terms of the US dollar. Therefore, we cannot attribute China’s sluggish KL ratio from the 1980s to the mid-1990s only to the depreciation of the Chinese currency.
3. Technological Homogeneity among Firms

This section attempts to examine the technological homogeneity (or heterogeneity) among firms as the critical factor that caused the differences between the two countries that are observed in the previous sections. The basic assumption is that, the more homogeneous the capability of firms in competition is, the harsher the price competition will be among them. As an indicator of technological capability, we use the KL ratio again, and we examine the difference between firms of different sizes. The underlying assumption is that the more smoothly the “subordinate” firms of inferior capability (in the first stage) can catch up (by upgrading their capability) with those of superior capability (which means that they become homogeneous), the harsher the competition becomes, as observed in China and vice versa in India. In addition, to exemplify how smooth the upgrading of technological capability by “subordinates” was in China, the degree of retention of engineers (engineer ratio) will be examined.

3.1. Capital-Labor Ratio

Figure 5 shows the number of firms according to employment size in the

Figure 4 Changes in the Capital-Labor Ratio in Asian Economies
(Manufacturing sector, nominal, USD 1,000)

Source: For China and India, CIEY, NASI, MSPI, for Japan, Japan Census, for Taiwan, Taiwan Census, for Korea, Korea Census
manufacturing sector (total) in China and India in 2005, and Figure 6 is the average KL ratio of the firms in each category of employment size.

![Graph showing employment structure by firm size: China vs. India](image1)

**Figure 5:**
(vertical axis: the par firm employment size: persons, horizontal axis: the number of employees: million persons)  
Source: Calculated from Oriana for China and from ASI for India.

![Graph showing average KL ratio by firm size: China vs. India](image2)

**Figure 6:**
Average KL Ratio of Different Size of Firms: Manufacturing Sector (2005)  
(vertical axis: the par firm employment size: persons, horizontal axis: KL ratio: USD1,000)  
Source: Same as Figure 5

---

17 According to this figure, the firms whose employment size is 100 to 500 and 1,000 to 5,000 persons are the largest layers that absorb the most labor in both countries. In this sense, there is no big difference in the basic structure of the employment hierarchy between the two. (See Mazumdar and Sarkar (2008) and note 15 of Introduction of this book). The major difference observed from this figure is that, in China, there exist numbers of super large firms such as the one employing more than 500,000 persons. This difference might be caused by the difference in the data collection; Chinese data is enterprise-based whereas Indian data is unit (factory)-based (though super-large firms also exist in India, such as Tata Motors, and appear in ASI data as one unit). In China’s figures, the layers of the smallest employment size, 50 to 99 persons and “less than 49,” are fairly thin. This is again due to the method of coverage which was explained above, and ASI also suffers the same problem. However, since this paper mainly deals with firms with modernized technologies and management, this point is not a very serious problem.
What is noteworthy here is that the KL gap between large and small firms is larger in India and smaller in China. This phenomenon is also true for each sub-sector in the manufacturing industry. Figure 7 presents (1) the largest, (2) the average, and (3) the smallest KL ratios from various sizes of firms in the sub-sectors. In many sub-sectors, the gap between “the largest” and “the smallest” is bigger in India than China. At the same time, in the most capital-intensive sub-sector, petro-chemical industry, the average KL ratio is far larger in India than in China, and in the most labor-intensive sub-sector, apparels, the average KL ratio is far smaller in India than in China. These mean that firms are more homogeneous technology-wise in China (and heterogeneous in India) both within the same sub-sector and between different sub-sectors.

![Figure 7](image)

**Figure 7:**
Different KL Ratios within and between Sub-Sectors of the Manufacturing Industry (USD1,000)

Note: The figures beside the bars show the gap between the largest and smallest in the country’s industries: the value of the largest/the value of the smallest

Source: For China, Oriana, for India, ASI
3.2 Homogenization of Technological Capability: The Case of Automobile Sector

The East Asian experience shows that there is a tendency wherein, as the industry as a whole upgrades its technological level during the course of industrialization, homogeneity among firms increases in terms of their technological capability. Figure 8 compares the changing technology gaps between large and smaller firms in the automobile industry in China, India, and the three other East Asian economies, during the 1960s to the 1990s.\(^{18}\) This figure shows that, in the most advanced economy, Japan, the KL level is the most homogeneous. In Korea and Taiwan, the ratio became homogeneous after the 1960s. In China, the KL level was already fairly homogeneous in the 1990s as in the other East Asian countries. In particular, the gap between large and very small (50 to 99 employees) firms was even smaller than in the case of Japan. As far as the automobile sub-sector is concerned, technological capability has been as homogeneous in China as in other aforementioned East Asian economies, whereas it remains fairly heterogeneous in India.

The important point to be noted here is that, in China, the KL (technology) gap between large and small firms had already become smaller and nearly reached the level of the other East Asian economies in the late 1990s, when its total KL ratio started to increase rapidly, as we have seen in Figure 4.

3.3 Catching up in the Retention of Engineers

To supplement the evidence that verifies the smooth technological catching up of subordinate firms to superior firms in China during the 1990s, the data on changes in the ratio of engineers out of total employment (“engineer ratio”) in the Chinese automobile industry will be introduced (since this kind of statistical data is only available on the Chinese automobile industry).

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\(^{18}\) Since the statistics of Korea and Taiwan do not distinguish among the firms whose size is more than 500 persons (meaning that the size category “more than 500” is largest in their statistics), in order to make a comparison with Korea and Taiwan, we used the value of the firm size “more than 500” as the standard (=1, Figure 8(1)). For firms of larger sizes, we used “more than 5,000” as the standard for Japan, China, and India (because of the data availability) and compared the firms of the size 500 to 999 (Figure 8(2)).
There was a wide gap in the engineer ratio in various categories of employment size in the mid-1980s (Figure 9). However, as Figure 9 illustrates, the positive correlation between the size of the firm and the “engineer ratio” disappeared until the late 1990s, and it even became negative after 2000. The apparent gap in the “engineer ratio” between superior and Subordinates, or large and small, smoothly narrowed during the 1980s and the early 1990s and then mostly disappeared when the total KL ratio began to rise in the mid-1990s.

This statistic is calculated from data of 600 firms obtained from China’s 1985 Auto Census.
Conclusion

From statistical data, we have confirmed the existence of different orientations in the development paths and in the management of firms in the modernized manufacturing sectors in China and India. Regarding the average firm’s management style, we observe two attitudes: “volume-oriented” (China) vs. “profit-oriented” (India). Regarding the basic competitive environment, we observe “harsh price competition among numerous homogenous firms” in various industries (China) vs. “less-harsher competition among heterogeneous firms” (India). We may attribute the gap to the different conditions of their economic growth after the 1980s, in particular, to the different directions of technological choice (labor/capital-intensity) and the pace of homogenization of technological capability among manufacturers.

Figure 9: Correlation between Firm Size and Engineer Ratio (vertical axis: engineer ratio, %; horizontal axis: Firm size in number of employees)
Source: CAIY various years
The reason why we witnessed harsh price competition with low profitability among numerous firms in China in the 1990s may be attributable to their highly homogeneous nature featuring labor-intensive technology. The main reason of it is the rapid catching-up (homogenization) of “subordinates” to “superiors” while they remain the nature of high labor-intensity as a whole during 1990s in China. This inclination toward price competition remained following the upgrading of their technological capability after 2000. In contrast, in the case of India, firms have existed in a competitive environment characterized more by heterogeneity rather than homogeneity in terms of the technological capability among firms, and the number of firms has been relatively limited in capital intensive sectors, so that competitive pressure has been relatively weak. That is considered to be the reason for their higher, stable profitability, which probably has enabled them to steadily invest in their technological development but has left us with an impression of less dynamism.

Reference

Statistics

<China>
Oriana: Bureau Van Dijk, Oriana (Data Base of China’s Industrial Enterprises for 2005)
CIEY: National Bureau of Statistics of China, China Industrial Economic Yearbook
CAIY: Zhongguo Qiche Jishu Yanjiu Zhongxin and Zhongguo Qiche Gongye Xiehui (China Automotive Technology Institute and Chinese Association of Automotive Industry) ed., China Automotive Industry Yearbook, various years

<India>
IMSS: Center for Monitoring Indian Economy Pvt Ltd., Industry Market Size & Shares, CMIE, 2004
MSPI: Ministry of Statistics & Programme Implementation, Website: http://www.mospi.nic.in/stat_act_t3.htm

<Japan>
JSYB: Statistical Research and Training Institute, Ministry of Internal Affairs and Communications, Japan Statistical Year-book
Japan Census: Cabinet Office, Minister of International Trade and Industry, Census of Manufacturers: Report by Enterprises, Tokyo, Printing Bureau, Ministry of Finance

<Korea>
MSKE: Economic Planning Board, Major Statistics of Korean Economy
KSY: National Statistical Office, Government of Korea, Korea Statistical Yearbook, various years
Korea Census
Economic Planning Board, Republic of Korea, 1970, Report on mining and manufacturing census ’68,


<Taiwan>

TSDB: Council for Economic Planning and Development, Executive Yuan, *Taiwan Statistical Data Book*

Taiwan Census


Executive Yuan, 1998, *The report on 1996 industrial and commercial census Taiwan-Fukien area, the Republic of China*

Executive Yuan, 1993, *The report on 1991 industrial and commercial census Taiwan-Fukien area, the Republic of China*

Executive Yuan, 1988, *The report on 1986 industrial and commercial census, Taiwan-Fukien area, the Republic of China*

Executive Yuan, 1978, *The report on 1976 industrial and commercial census, Taiwan-Fukien District, the Republic of China*

Executive Yuan, 1968, *General report on the third industrial & commercial census of Taiwan, Republic of China*
1. Data

In 2001/02 small scale industries (SSI) compose 40% of industrial production, and 35% of total exports. SSI includes 10,521,190 firms, out of which 4,445,868 firms are in industrial sector. Among them, 3,544,577 firms are unregistered. With respect to those unregistered firms, the average number of employees is 2.05, and the average size of fixed capital is Rs.68,000, implying US$ 705 per employee. If we take this into consideration, the average capital/labor ratio of Indian manufacturing firms should be smaller. Moreover, authors compare the data at the firm level of China and that at the factory level of India. The claim that capital/labor ratio of Indian firms are larger should be more carefully examined. Thus some conclusions are yet to be confirmed.

2. Technological Level

Authors should examine capital deepening and technological improvement separately, which are not identical. It is desirable to examine TFP, in addition to capital/labor ratio, in order to see technological improvement. Authors may conduct growth accounting to see how much TFP contributes to growth, using the data at the industrial sector level.

According to Bosworth and Collins (2008), output per worker of Chinese industry is 2.2 times as large as that of India. Out of 7.0% annual growth rate between 1978–2004 of Chinese industry, 4.3% (=61%) is explained by TFP, while out of 2.5% annual growth rate of Indian industry 0.4%(=24%) is explained by TFP.

To explain the gap in the industrial growth between China and India, we cannot ignore the contribution of TFP. One of the authors’ main conclusions is that Chinese firms are getting homogeneous in terms of technology. Authors could estimate stochastic
frontier model and compare the level and the standard deviations of technological efficiency, using firm level data. Using World Enterprise Survey, I obtained the following results.

Incidentally, I regressed log TFP on various relevant variables including firm size, and obtained the following results.

<table>
<thead>
<tr>
<th>Industry</th>
<th>India Obs</th>
<th>India Mean</th>
<th>India S.D.</th>
<th>China Obs</th>
<th>China Mean</th>
<th>China S.D.</th>
</tr>
</thead>
<tbody>
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<td>Food</td>
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<td>0.382384</td>
<td>0.173675</td>
<td>1314</td>
<td>0.570977</td>
<td>0.095442</td>
</tr>
<tr>
<td>Textile</td>
<td>376</td>
<td>0.570977</td>
<td>0.114561</td>
<td>1098</td>
<td>0.641511</td>
<td>0.085261</td>
</tr>
<tr>
<td>Leather</td>
<td>44</td>
<td>0.985273</td>
<td>0.000103</td>
<td>137</td>
<td>0.981712</td>
<td>0.000247</td>
</tr>
<tr>
<td>Chemical</td>
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<td>0.983136</td>
<td>0.000115</td>
<td>1962</td>
<td>0.543629</td>
<td>0.110921</td>
</tr>
<tr>
<td>Metal</td>
<td>210</td>
<td>0.453977</td>
<td>0.139235</td>
<td>1132</td>
<td>0.636449</td>
<td>0.075364</td>
</tr>
<tr>
<td>Machinery</td>
<td>139</td>
<td>0.984174</td>
<td>0.000148</td>
<td>1480</td>
<td>0.59271</td>
<td>0.094514</td>
</tr>
<tr>
<td>Electrical</td>
<td>170</td>
<td>0.493392</td>
<td>0.120264</td>
<td>1377</td>
<td>0.640302</td>
<td>0.073354</td>
</tr>
<tr>
<td>Transportation</td>
<td>178</td>
<td>0.992424</td>
<td>2.93E–05</td>
<td>922</td>
<td>0.510058</td>
<td>0.140558</td>
</tr>
</tbody>
</table>

Incidentally, I regressed log TFP on various relevant variables including firm size, and obtained the following results.
## China: total factor productivity

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
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<td>R&amp;D dummy</td>
<td>0.03803</td>
<td>1.77</td>
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<tr>
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<td>-0.008188</td>
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<tr>
<td>age$^2$</td>
<td>0.0000661</td>
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</tr>
<tr>
<td>small&amp;medium dummy</td>
<td>0.127707</td>
<td>4.69</td>
<td>0</td>
</tr>
<tr>
<td>GM from Govt</td>
<td>-0.099019</td>
<td>-2.99</td>
<td>0.003</td>
</tr>
<tr>
<td>edu1</td>
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<td>-0.77</td>
<td>0.439</td>
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<td>0.476</td>
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<td>-0.171127</td>
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<td>edu5</td>
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<td>caputiliza-n</td>
<td>0.0050962</td>
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</tr>
<tr>
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<td>0.2613219</td>
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<td>0.1985325</td>
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<td>ownership5</td>
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<td>ownership6</td>
<td>0.0964668</td>
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<tr>
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<td>0.306754</td>
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<td>ownership9</td>
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<td>2.22</td>
<td>0.026</td>
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<td>loan_bribery</td>
<td>-0.036175</td>
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<td>-0.006827</td>
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<td>0.632</td>
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<td>0.043</td>
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<td>0.534</td>
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<td>-0.00603</td>
<td>-2.02</td>
<td>0.043</td>
</tr>
<tr>
<td>communication as obstacle</td>
<td>0.0200301</td>
<td>1.26</td>
<td>0.206</td>
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<tr>
<td>access to finance as obstacle</td>
<td>-0.030992</td>
<td>-3.66</td>
<td>0</td>
</tr>
</tbody>
</table>
As is more or less consistent with authors’ claim, small and medium size dummy has a negative coefficient at 5% significance level in India, indicating that as firm size gets smaller, TFP tends to be smaller.

On the contrary, the dummy has a positive coefficient at 1% level for China, indicating that smaller firms have higher TFP.

### 3. Technological Catch–up

Another important conclusion is that in China small firms are rapidly catching up with large firms in terms of technology. Authors compare correlations between the size of firms and the ratio of engineers in Chinese automobile industry across periods. I did a similar exercise for automobile industry in India using firm size and R&D/sales ratio. For India I could not find any clear relationship from the data of PROWESS.
1993

\[ y = 6 \times 10^{-7}x + 0.0017 \]
\[ R^2 = 0.0018 \]

1998

\[ y = 1 \times 10^{-6}x + 0.0046 \]
\[ R^2 = 0.0062 \]

2003

\[ y = 1 \times 10^{-6}x + 0.0043 \]
\[ R^2 = 0.0126 \]
Using WES I obtained the following result.

India

Heteroschedasticity - robust regression

Dependent Variable: R&D Expenditure/Sales

<table>
<thead>
<tr>
<th></th>
<th>coefficient</th>
<th>t</th>
<th>p - value</th>
</tr>
</thead>
<tbody>
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<td>1037.969</td>
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<td>agesq</td>
<td>-25.52731</td>
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<td>0.409</td>
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<td>Labor</td>
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<td>1.01</td>
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<td>union</td>
<td>13.40863</td>
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Obs 1036
F 0.03 (1)
R2 0.072
Therefore, firm size in terms of the number of employees does not have explanatory power for R&D expenditure/Sales ratio.

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<p>| Obs        | 11172 |
| F(p – value) | 11.93 | 0    |
| R2         | 0.0916 |</p>
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</table>

Obs                              | 11074       |
Wald Chi2                        | 1613.64     |
Pseudo R2                        | 0.1661      |
However, in order to explain whether a firm conducts R&D activity or not, firm size has positive coefficients at 1% level both for China and India. Thus, at least, with respect to R&D activity, large firms conduct it more than small firms.

4. Concentration

Authors claim that the market shares are more concentrated in India than in China. The authors’ table 1.1 is not persuasive, mainly due to the data problem mentioned above. One question is whether small firms are catching up with large firms, and taking away their market shares.
According to *Industry: Market Size and Shares* (2009), out of 261 products; 

<table>
<thead>
<tr>
<th>HHI changes between 2001 and 2007</th>
<th>Number of products out of 261</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased</td>
<td>164(14)</td>
</tr>
<tr>
<td>Decreased</td>
<td>86(4)</td>
</tr>
<tr>
<td>The same</td>
<td>5</td>
</tr>
<tr>
<td>n.a.</td>
<td>6</td>
</tr>
</tbody>
</table>

Market shares became more concentrated in 63% of markets during this period in India, as more or less consistent with authors’ claim.

5. Growth Story

Authors seem to assume different stories about development paths of Chinese and Indian manufactures as follows.

For China and India, authors explain the development paths of manufactures by factors including labor, demand, technological capability, technological progresses, choice of technology, competition, and growth performances. These factors are allegedly interacting in the two countries as the following figures.

(1) Story (China)
However, at least, for India, more factors should be included to explain the growth path of manufacturing sector. My suggestion is depicted in the following figure. In addition, concerning Chinese growth path, if Chinese market is more segmented, the paths of firms should be more differentiated.
The authors claim that the characteristics of Indian manufacturing sectors are summarized as:

1) More concentrated
2) Less sales
3) More profits
4) More capital/labor ratio

What are happening behind this? 1) – 3) are typical phenomena resulting from monopoly. 4) seems to be more or less independent of the rest.

I do not believe that Indian manufacturing firms produce more diversified products in terms of product quality. Each local market might be more segregated in India due to inefficient distribution system, and low – quality infrastructure. Indian firms explicitly or implicitly collude. Collusion might be assisted by SSI policy or licensing policy.

Under Story 1, smaller firms may make profits as well as large firms.
There may be a huge asymmetry between large firms and small firms. Large firms may make large profits because of vertical differentiation, while numerous small firms make little profits due to keen competition. Still average profit rate could be higher in India than in China.

Under Story 2, large firms make greater profits than small firms.
Authors seem to suppose this story.

5 year annual growth rate of top firms

| TABLE 5: Grouping of Companies by Sales and Net Profit during 1995-96 to 2000-01 |
|----------------------------------------|-----------------|
| In per cent Top Sales | 5 year CAGR Net profit |
| 1-100 | 16.80 | 8.09 |
| 101-200 | 9.89 | -1.41 |
| 201-300 | 7.61 | -11.48 |
| 301-400 | 9.73 | -10.93 |
| 401-500 | 6.53 | -21.07 |
| 501-600 | 4.31 | Net loss |
| 601-700 | 5.91 | Net loss |
| 701-800 | 5.54 | Net loss |
| All Groups | 14.1 | 3.3 |

**Source:** Business standard, March, 2002-05-03
I regressed profit rates on various combinations of variables including firm size, using World Enterprise Survey data for both countries, and PROWESS for India. However, I have not obtained any significant coefficient on firm size so far. This seems to indicate some support for story 1, which is inconsistent with authors’ claim. Of course, it is not conclusive at all.

6. Ambiguous Use of Some Terms

Several terms in the papers are ambiguous and the usage of them shall be misleading. For example,

   Do authors indicate that these orientations are inherent in managers’ personal characteristics, or optimal response to business environments? It seems to be the latter. Then don’t Chinese firms expand volume in order to maximize profits?

2) “Price competition,” vs. “Non – price competition.”
   More precise explanation is required.
   Moreover, Indian people are generally considered to be very price sensitive. If so, price competition would be naturally induced, regardless of managers’ intentions. Thus, I doubt that more environmental factors might be the reasons behind higher profit rate, rather than managers’ inherent orientation or intentions.

7. Concluding Remarks

Having said these, main conclusions are very interesting, really inspiring, and important for policy making. We would like to know much more about the details of the phenomena observed by the authors.
Two Tales of Agro-Industrial Transformation:
State Capacity in India’s and China’s Textile Industries
Two Tales of Agro-Industrial Transformation: State Capacity in India’s and China’s Textile Industries

Mark Dallas

1 Two Tales of Agro-Industrial Transformation: State Capacity in India’s and China’s Textile Industries

It is widely appreciated that the textile industry historically has established the link between primary agricultural production and industrialization (Farnie and Jeremy 2004, Anderson 1992). While the industry was central to the early phases of industrialization in Britain and Europe, the same can also be said of late developers. In Japan, textiles were critical to the country’s early industrial development and it was further built up into a globally competitive industry in the interwar period (Smitka 1998, McNamara 1995, Lockwood 1965). In the immediate post-World War Two era, trade frictions between advanced economies first erupted over textiles exports – a harbinger of subsequent trade conflicts (Aggarwal 1985). While Japanese and British colonialism in East Asia planted the seeds of multiple industries, early post-war industrialization in the East Asian NICs, including South Korea, Taiwan, and Hong Kong, has similarly been dominated by textiles (McNamara 2003, Hsueh, et al. 2001, Inoue, et al. 1993).

Interestingly however, with the exception of the United States, none of these countries possess any significant natural raw fiber base, most crucially cotton. In Western and East Asian countries alike, cotton was acquired almost entirely through imports, often from colonial possessions. With the invention and spread of man-made fibers in the early 20th century, all of these textile powerhouses developed extensive synthetic fiber industries, an offshoot of the rising petrochemical industry. In essence, a division of labor existed between the cotton fiber producing countries of the developing world and the largely fossil-fuel based fiber producers of advanced countries.

This division contained a distinct political logic. Lacking a cotton farming population, the process of establishing a man-made fiber industry in the advanced countries was made politically innocuous. With nearly all raw cotton sourced through imports, there simply was no population of cotton cultivators whose livelihood was
threatened by a competing industrial source of raw textile fibers. In the core countries of Western Europe, Japan, South Korea, Taiwan, Hong Kong and more recently Thailand and Indonesia – all major producers of synthetic fibers – there has been no political resistance from agricultural cultivators to the establishment of a domestic chemical fiber industry. Because cotton is mainly imported, any impact of the changing composition of fiber consumption by domestic mills was simply externalized to their suppliers, colonial or otherwise.

In fact, there are very few examples of major cotton cultivators developing extensive man-made fiber industries (Figure 1). The three critical cases are the United States starting from the early 20th century, and China and India since the late 20th century. Other major raw fiber producing countries, such as Brazil or Pakistan, have sizeable cotton farming but minor synthetic fiber industries, at least relative to the importance of their cotton cultivation.

![Figure 1: Major Raw Fiber Producers (1999-2000)](image)


In contrast to the U.S., however, China and India can be further singled out because they face a particularly challenging population dilemma. While the U.S. enjoys a
relatively sparse population living off of abundant arable land, China and India have historically faced severe food security dilemmas due to very high population-to-arable land ratios.\textsuperscript{1} Similarly, both countries in the post-war period have made both food and clothing self-sufficiency crucial political and nationalist goals, refusing to rely on imports. This has created a development problematic between the planting of food grains and major cash crops, like cotton on limited per capita acreage of farmland.

Given this dilemma, man-made fibers would appear to be the saving grace. In theory, cotton acreage could be replaced with grain acreage, and synthetic fiber factories could replace the lost cotton fibers to continue to feed their textile factories. While a sensible strategy, there is a political dilemma: both countries possess hundreds of millions of agricultural cultivators, a significant portion of who grow cotton. Such a transformation has proven to be both politically risky, and in terms of food security strategically uncertain.

2 The Dual Dilemma, State Capacity and Policy Choice

In spite of their common dilemmas and the promise of man-made fibers in solving them, China and India have adopted widely different policy approaches to the cotton and man-made fiber nexus. This is well reflected over the past 30 years in the transformation of each country’s textile industry from an overwhelming reliance on cotton to the building of substantial man-made fiber industries. In the mid-1970s, both countries largely clothed their populations with cotton textiles, accounting for over 80% of total cloth production, the vast majority of which was consumed domestically. Then, from the mid-1970s to the mid-1980s, China rapidly transformed its textile fiber composition and with it Chinese consumption patterns. For instance, between 1977 and 1984, the share of pure cotton cloth to total cloth production rapidly declined from 80% to 50%. Although this rose back to 60% after 1984, since the mid-1990s it has remained at 50%, which is comparable to global averages.\textsuperscript{2} By contrast, since the passage of India’s 1985 Textile Policy, which initiated important reforms in the industry including greater inter-fiber flexibility, India’s shift into man-made fibers has been gradual and the country’s production composition still remains heavily tilted towards cotton fibers, especially in yarn production. For instance, pure cotton yarn as a percentage of total production fell

\textsuperscript{1} In 2005, India was ranked 98\textsuperscript{th} in per capita area of arable land and permanent cropland, while China was ranked 125\textsuperscript{th}. World Resources Institute: Earth Trends Environmental Information Database online.

\textsuperscript{2} For a year-by-year tally of cotton cloth and pure cotton cloth production figures in China, see the following sources: \textit{Zhongguo Fangzhi Gongye Nianjian} (various years), \textit{Zhongguo Fangzhi Gongye Fazhan Baogao} (various years), \textit{Huihuang de Ershi Shiji Xin Zhongguo Dajilu: Fangzhi Juan 1949-1999}, and CEIC Global Database.
from 86% in 1985 to slightly over 70% by the late 1990s and this share has increased slightly since then, whereas the proportion in China is 50%, similar to its production of cloth.3

Given the overwhelming promise of man-made fibers in solving their food and clothing security dilemmas, why have two countries taken such different approaches in developing man-made fiber industries? For one, in the period prior to economic reforms, political and policy-making elites in these two countries had very different perceptions of the man-made fiber industry. While the Indian government consistently perceived the industry as a ‘threat’ to agriculture, the Chinese government enthusiastically grasped it as an opportunity. But why did their perceptions differ so dramatically if the dilemmas facing them were so similar?

It is too simplistic to say that Indian policy-makers somehow made the ‘wrong’ choice and the Chinese made the ‘right’ one. Nor is this simply a case of a ‘messy,’ gridlocked democracy in which the influence of interest groups blocks government from pursuing some kind of national interest, while an ‘efficient’ authoritarianism is able to.4 Rather, as argued below, these two states had very different institutional capacities by which to solve the dual dilemma of food and clothing constraints, and large cotton cultivating populations. As I show below, the Chinese government used its prodigious institutional powers across agriculture, industry and commerce to foster a synthetic fiber industry, at the same time that they ensured cotton farmers enjoyed a significant rise in real prices for cotton. Thus, while Chinese reformers were instituting market reforms, they were simultaneously availing themselves of the institutional legacies bequeathed from their socialist past to foster a major agro-industrial transformation. On the other hand, given India’s comparably free commercial markets and its greater permissiveness towards private industrial capital (relative to China at least), it was hard for policy-makers not to perceive synthetic fibers as a ‘threat’ to cotton cultivators. This is because they lacked the institutional capacities to enact the sort of transformation that the Chinese government was able to engineer. Consequently and until recently, Indian political elites have consistently worked to restrict private capital through common policy levers at their disposal.

Apart from their food and clothing dilemmas and the impact on their large agrarian populations, policies affecting upstream raw materials are also very important to the development of their textile industries, a critical industry to the Chinese and Indian economies, particularly in terms of employment and foreign exchange earnings. Due to

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3 India’s figures are calculated from Soundarapadian 2004: 63, 85. For China’s figures, see references in footnote 2.

4 The edited volume by Friedman and Gilley 2005 similarly resists these commonplace analyses.
its upstream position in the value chain, the influence of raw fiber agro-industries reverberates along the entire downstream chain through to garments. Its effects are reflected in the possible range of products available for domestic consumption and, by extension, for export markets. In both fabrics and garments, India’s much narrower range of export competitive products compared to China is influenced by the centrality of cotton as a fiber in the subcontinent, compared to China’s well-developed synthetic industry. In the late 1990s, just prior to the beginning of the phasing out of the Multi-Fiber Agreement (MFA), cotton textile fabrics accounted for 38% of India’s total textile and garment exports in US dollar terms, while man-made fiber fabrics accounted for less than 10% (Saksena, 183). Among its garment exports, which accounted for the vast majority of the remaining total exports, 70% of them were cotton-based (Saksena, 196).

While such fiber narrowness can theoretically be overcome through imports of synthetic tow or yarns, concerns over India’s foreign exchange limitations and their own nascent fiber industry have led the government to severely restrict their importation. Only in the past decade has the Indian synthetic fiber industry really attained government support and made advances in the domestic and export markets.5

Furthermore, unlike China, India cannot as easily rely on imports of synthetic fabrics to supply its garment manufacturers because it is substantially removed from the dense commercial ties that characterize East Asian global production networks.6 Given India’s physical distance from East Asia (and other centers of synthetic fabric manufacturing), as well as the ever increasing importance of delivery times in the global garment sourcing business, India’s lack of a well-developed domestic man-made fiber industry has placed limits on its ability to enter and compete in non-cotton garment export markets.

Lastly, and an important focus of this paper, the pricing of raw materials serves as a critical source of competitive advantage, especially among developing countries in which the costs of labor are more similar compared to advanced country manufacturing. This is particularly the case in the upstream fiber and spinning sectors which are among the most capital-intensive along the value chain. Further, the costs of raw materials relative to other costs of production are very high in textiles, so fiber prices reverberate strongly along the downstream value chain.

5 It might be argued that the earliest signs of change can be dated to as early as the mid-1970s. In 1976, the Indian government tentatively adopted a ‘multi-fiber’ policy to overcome cotton shortages and re-categorized viscose filament yarn imports under the Open General License (OGL) by which quantitative restrictions were withdrawn. With the rising imports, however, the government returned to a more restrictive stance over the next couple of years, by raising customs duties to 40% by 1983. See Uchikawa 2002, 66-67.
6 These ideas are developed in Gereffi 1999 and Gereffi and Memedovic 2003.
3 A Comparison of Production Costs in Upstream Textiles

In highly competitive light industries, such as textiles, the costs of production are central to manufacturing competitiveness. A careful comparison across countries can reveal much about their industrial environments and shed light on how countries compete based on different aspects of production. For instance, in fieldwork interviews of textile entrepreneurs and officials in India and China, the perceptions of the opposing country’s competitive advantage often rested along the axis of ‘raw materials versus capital costs.’ Managers of major cotton spinning firms in Shandong province, China’s second largest cotton producing province, argued that Indian spinners were fortunate to have access to cheaper, domestic cotton.7 Conversely, Indian export association officials believed that India’s competitiveness suffered because of the large differences in interest rates (and energy costs) between the two countries.8

These general observations are supported by more systematic data comparisons derived from factory surveys conducted by the International Textile Manufacturers Federation. The importance of the price of raw materials is undeniable in both pure cotton yarn and textured polyester yarn production. Using the average costs of production across five years of surveys between 1999 and 2008, studies have estimated the relative contributions of raw cotton costs and manufacturing costs to the total costs of production of pure cotton yarn across eight countries. In these surveys, manufacturing costs include labor, energy and utilities, buildings and maintenance, depreciation and capital interest rates (Anson and Brocklehurst 2009: 67). Predictably, only in the two advanced countries surveyed (Italy and the United States), do the manufacturing costs substantially exceed raw material costs due to the higher costs for labor and power.9 For India, South Korea, Brazil and Turkey, the two costs are about equal, while China and Egypt are distinctive in that their cost for raw cotton is quite high.10

When we narrow our focus to just China and India, the importance of raw material costs takes center stage.11 The average cost of production of pure cotton yarn across three years of surveys in China was $3.00 USD/kg, which is substantially higher than

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7 Interviews Dezhou City, China and Shanghaim, China.
8 Interview Coimbatore, India.
9 In Italy in 2008, labor represented 35% of the total manufacturing costs and power represented 26% for cotton yarn. Ibid.: 68.
10 Although one might think that Egypt’s costs are higher due to the extra long staple which is grown there, this is not the case since the surveys utilized the same staple lengths of cotton to avoid introducing incongruence across the surveyed countries.
11 For the following data, see Anson and Brocklehurst 2009.
India’s $2.51 USD/kg over the same three years. Remarkably, this 49 cent difference is almost entirely due to differences in cotton prices. India’s cotton costs are about 52 cents less than China’s, while China’s manufacturing costs are only 3 cents less than India’s. This differential is particularly significant given that for many countries, cotton costs constitute only half of total costs; yet for China and India, their cotton industries appear to compete largely on the basis of the price of raw cotton.

The role of raw material prices is even more central to synthetic yarn production given that for advanced and developing countries alike, raw materials constitute between 70-80% of total costs. In the comparison of China and India, however, the trends are reversed as China enjoys on average a 14 cent cost advantage over India with fully 12 of those cents derived from lower raw material costs. This difference would have been much greater in the 1980s and 1990s, before India’s policy shifts towards promoting synthetic fibers.

It appears that the capacity of countries to manage raw material costs is perhaps the single most important area in which advantage can be passed to domestic textile firms. In cotton-based production, India’s low cotton prices are a key advantage over other major cotton producing countries like China, Turkey and Brazil, as well as countries like Indonesia which fully depends on cotton imports and by extension the global price of cotton.

Nevertheless, there are other areas of advantage. The other major category considered here, manufacturing costs, covers a wide range of factors. For instance, the cost of capital (interest and depreciation costs) in China is far below those of other developing countries, while India tops the scales (Figure 2).

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12 Since the cost of cotton is particularly sensitive to uncontrollable factors such as climate, the purpose of taking averages over multiple years is to remove some of this stochastic variance. Since China has been surveyed only in three years (2003, 2006 and 2008), I compare these same three years with India.

13 Anson and Brocklehurst 2009

14 In comparing cost of production data, it is important to match products as similar as possible. China’s cost data in Figure 2 are from 1998 and consist of 30 count cotton yarn, while the data for the other countries are for ring-spun cotton yarn from 1997. While the yarn count for the later figures is not known, in the case of India, about 90% of its yarn production in the late 1990s consisted of less than 40 count yarns so the comparison is quite fair. See data from Soundararapandian 2004: 84. That said, in 1998 when these data were gathered, Chinese firms were enjoying heavy reductions on bank loan interest rates, so their capital costs are perhaps artificially low. India adopted a similar scheme, but only in 1999. See discussion below.
This reflects the common understanding of China’s reliance on state banks as conduits in providing cheaper credit to targeted and local industries.\textsuperscript{15} In the late 1990s, when these data were collected, the textile industry was one of these targeted industries in China, as the government sought to modernize and restructure the industry in preparation for the gradual unwinding of the Multi-Fiber Agreement (MFA) between 1999 and 2005 during which quantitative restrictions on global trade in textiles and apparel ended.\textsuperscript{16}

Finally, the costs of labor and power consist of smaller portions of overall costs. In the relatively capital-intensive spinning sector, and especially in developing countries, labor costs predictably compose a smaller share of total costs and thus are not a real point of competitive difference between them.\textsuperscript{17} In power costs, however, India clearly lags the other countries in spending substantially more, a point made clear during interviews in India when the electricity regularly shut down in the middle of the day. Power outages in India affect large and small enterprises alike, and according to

\textsuperscript{15} Mukerji (2008) sees India as just the opposite, ‘fiscally weak and financially strong’ in the sense of chronic budget shortages which inhibits, among other things, infrastructure development, while the banking system is quite competitive and extensive.

\textsuperscript{16} Interviews Dezhou City and Gaomi City, China.

\textsuperscript{17} By contrast, this is an important competitive difference between advanced industrialized country yarn producers, like the USA, Italy and Korea, and these developing countries.
interviews, energy from private power generators, required to keep the factories running, costs about twice the already high fees of public electricity.\textsuperscript{18} By contrast, some of the major spinning firms in Shandong province, such as Weiqiao’s industrial complexes in Zouping City and Binzhou City possessed their own independent power generation plants.\textsuperscript{19} In their Binzhou plant, electricity was generated not only to power their spinning and weaving operations, which employed close to 30,000 workers, but also their aluminum plant with enough electricity remaining to sell into the state grid. In smaller textile factories which do not possess independent power plants, like the spinning factories of the Demian Group, managers said they had no concerns over the consistent provision of power even though they relied fully on the state grid.\textsuperscript{20}

The above discussion makes clear that on the one hand India enjoys substantial advantage over China in the costs of raw cotton; while on the other hand China rapidly expanded its chemical fiber industry which today has grown to many times larger than India’s. I argue that it is difference in state capacity which accounts for their differences. In the 1950s, China built up and fortified an extensive system of state ministries regulating the economy. Although not nearly as comprehensive as the Soviet version in heavy industries, China’s command economy exercised even more control than the Soviet Union in agriculture and commerce in consumer goods, like textiles.\textsuperscript{21} While many of these have been gradually disassembled over the reform era since 1979, they have remained robust in the regulation of certain agricultural commodities, including cotton, and were critical in building China’s chemical fiber industry. By contrast, the policy levers and state capacities available to Indian bureaucrats are far fewer and their power relative to private commercial and industrial capital has been far less.\textsuperscript{22}

4 State Capacity and Policy in Cotton Agriculture

In terms of domestic sources of raw materials, China and India share quite similar features. Historically, they are both among the largest producers of raw cotton, a trend which continues today as they annually rank first and third in world cotton production, respectively. While China’s per hectare cotton yield has generally been two to three
times higher than India’s, India devotes far more of its arable land to cotton cultivation. Until the ending of the MFA, both countries remained relatively self-sufficient in cotton production, only turning to global markets for relatively small amounts of imports or exports each year (at least as a percentage of total domestic production).

Differences in the price of similar cotton varieties in China and India compared to the Cotlook A Index (a common measure of global cotton prices) illustrate well the relative advantage which agriculture bestows on India’s textile industry (Figure 3). The Cotlook A Index provides a baseline of global prices by calculating the five lowest priced cotton varieties from among a basket of nineteen major traded cotton varieties produced in different countries around the world. For China and India, I utilize monthly price averages of the two cotton varieties which the Cotlook A incorporates as representative of middling cotton varieties and qualities for China and India. Figure 3 leaves little doubt that Indian spinners have consistently enjoyed lower prices than their Chinese counterparts. At no point has the price of Indian cotton exceeded Chinese cotton and in most periods Indian cotton remained cheaper than comparable global prices. This difference is perhaps slightly exaggerated since Indian cotton is among of the most contaminated in the world, adding some additional costs to the price of spinable cotton for Indian spinners (Landes, et al. 2005, 32).

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23 Even in the 2008-09 growing year, after years of improving yields in India, this statement remains true. In that year, India grew cotton on 2,041,000 hectares and achieved a yield of 2,400 kg/hectare. China grew cotton on only 1,295,000 hectares and achieved a yield of 6,019 kg/hectare. Calculated from USDA Cotton: World Markets and Trade, September 2009.

24 Of course, in actual quantitative terms, both countries can be quite large importers of cotton when domestic supplies fell short in supplying the massive needs of their spindle capacity.

25 Specifically, the Cotlook A-Index is the average of the cheapest five out of 19 quotations from a selection of the main upland cottons traded internationally. They are in Memphis/East, California/Arizona, Orleans/Texas, Tanzania, Turkey, India, Uzbekistan, Paraguay, Pakistan, Côte d'Ivoire, Burkina Faso, Benin, Mali, Greece, Australia, Mexico, Syria, Brazil, China. See USDA Cotton: World Markets and Trade, September 2007, Table 8.

26 To be specific, these are Grade 329 in China and H-4 cotton in India.
Much of the difference in cotton prices between China and India is the result of government policy goals and state institutional capacities. In the case of China, for much of the reform era, the central government continued to impose strict controls on the domestic trade of cotton and key food grains. Only in the late 1990s has China appreciably begun to liberalize its controls over the cotton sector (Alpermann 2010). Although prior to the late 1990s China attempted to liberalize cotton markets twice (in 1985 and 1992), during most of the reform era, the central government has maintained and utilized many of the institutional structures built up during the Mao era, including a variety of production quotas, state prices and different incentives for the delivery of cotton, such as free or underpriced chemical fertilizers, diesel fuels and a complex array of price bonuses. As a result, the dramatic peaks and dips in cotton production in China quite consistently mirror the relative state prices and bonuses offered to farmers for the production of Northern grains versus cotton. For instance, the major peaks of cotton production in 1983-85 and 1990-91 were also the only periods when the cotton-grain state price ratios exceeded ten-to-one.27

Although collective farming was disbanded and usage rights were returned to farming families between 1979 and 1982, the state continued to maintain Mao era controls over production quotas, pricing, bonuses and markets in core agricultural industries. Much of the control over cotton has been retained, and the state continues to influence the market through both quotas and price bonuses.

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27 The cotton-grain price ratio has been commonly used by the Chinese government in balancing these two critical groups of crops. The grain price is an index of prices of the main grain varieties in China.
commodities. Relative to other agricultural commodities, commerce and pricing remained quite state-controlled in food grains and cotton. The unprecedented rise in harvests and yields between 1978 and 1984 mirrors the major increments in state prices, which for cotton were raised 10% in 1978, 15% in 1979, and 10% in 1980 with an additional 5% price bonus for northern cotton regions. On top of these baseline price increases, the government offered even higher ‘bonus’ prices for above-quota sales to the state which were priced at 30% above the average prices offered from 1976-78.

This new pricing system, a radical departure from the anemic pricing of the Mao era, was rigged for explosive growth. This is because it operated in a way precisely opposite to market forces. Since the government paid higher prices for above-quota quantities, average prices continued to increase as output expanded. Since the state guaranteed the purchase of the entire cotton crop, the state incentivized ever-increasing output, regardless of demand requirements (Kelliher, 1989). In addition, in order to ensure quota fulfillment, the state offered between 80 to 100 kg of chemical fertilizer for every 100 kg of cotton delivered, as well as diesel fuel and guarantees for the provision of rationed grains, which allowed farmers to specialize in cotton. Although this pricing system was modified in 1983, the basic incentive structure for farmers remained quite similar until China’s first attempt at the liberalization of cotton in 1985.

Although strict controls over agricultural commerce and the new state pricing system were quite effective in transforming agricultural cultivation, they also led to enormous inefficiencies and contributed to large fiscal deficits. While the specific prices and incentives varied slightly each year, the rigged pricing system caused cotton production to skyrocket from 2.17 million metric tons (MMT) to a record 6.26 MMT between 1978 and 1984. By 1984, cotton output severely exceeded the planned levels, so much so that China lacked the capacity to store, process or use it. In September 1984, General Secretary Hu Yaobang estimated that 3.5 million metric tons of cotton was unable to be stored and lay rotting in the open air. In addition to raw cotton, an additional five million metric tons of cotton cloth was laying in warehouses. By the end of the harvest season, China had 18.1 million bales of cotton in stock which was twelve times more than in 1979 and accounted for 47% of the estimated world stocks of raw cotton!

Since similar policies were instituted to stimulate grain production, the burden on fiscal expenditures became unbearable. Consequently, in 1985, the central government

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28 Zhongguo Wuji Wenjian Xuanbian 1979-1983: 211
30 Textile Asia, August, 1985, p.166.
decided to alter its system of procurement and purchasing prices by switching to ‘contracted’ quotas which imposed a defined upper limit on what the state was willing to purchase each year. Once quotas were filled, excess cotton was allowed to be sold on newly freed cotton markets. This was the first opening of cotton markets in China since 1954, a momentous but quickly reversed experiment in agriculture market liberalization.

In addition to changes in fixed state contracts, state prices were also reconfigured in 1985 which reduced marginal prices by between 7% and 14% in 1985 and another 2.4% in 1986. Subsidies and grain provisions were also reduced making cotton far less attractive to farmers. Sown areas along with output fell off, causing serious supply shortages in these years. Unnerved by such dramatic shifts, the government quickly reversed course between 1987 and 1990 by once again closing cotton markets, raising baseline prices, offering bonuses and re-establishing fertilizer, fuel and grain incentives (Blecher and Wang 1994). Predictably, sown acreage and production recovered, reaching a new peak in 1991 at 5.68 MMT. These new record peaks in the cotton harvest inspired state leaders to make a second attempt at liberalization in 1992 which, similar to the 1985 attempt, also failed. As a result, government controls remained until the end of the 1990s when a degree of liberalization was achieved, partly due to China’s WTO accession.31

If China’s domestic production and marketing has been tightly controlled by the government, its cotton trade policy has been even more strictly controlled during this period. In fact, up through WTO accession, the China National Textiles Import and Export Corporation has been the sole agent for all global trading of cotton for China and has maintained strict import licensing procedures for domestic firms, along with various tariffs.32

While China’s influence over agricultural commerce is hardly perfect and at times have been undermined by the interests of local governments (Wedeman 2003), the central government’s controls have ensured that to a substantial degree, China has ably balanced the conflicting interests of agricultural cultivators and spinning mills. At times this has strongly favored Chinese cotton cultivators and at other times worked against them. As we will see shortly, these same policy levers proved crucial as China built up its man-made fiber industry, the industrial counterpart to cotton in the raw fiber node of the textile value chain.

In contrast to China, the Indian government largely lacked these institutional capacities to maintain tight controls over cotton markets. India does maintain minimum
support prices (MSP) for cotton and other strategic agricultural commodities, and utilizes strategic reserves through the Cotton Corporation of India (CCI) to stabilize market prices and defend its MSP, when necessary. However, unlike with other agricultural commodities like rice and wheat, MSP interventions in cotton are rarely acted upon in India. In general, MSP in cotton have been set substantially below actual market prices, and the CCI has rarely had to defend them (Saksena 2002, 241). That said, when MSP are raised, they can have some marginal impact on market activity, particularly for the lower quality cottons.

While the MSP and the Cotton Corporation of India’s strategic reserves are crucial pillars for maintaining a minimum protective floor on cotton prices, a range of other policies and institutions generally work to suppress cotton prices in India. Overall, policy levers have been directed towards influencing the behavior of private commodity merchants in India, precisely the commercial functions which China’s government-run Supply and Marketing Cooperatives’ (SMC) fulfilled, such as local procurement and a national delivery system.33 Over the period of time addressed here, many of these policies traditionally aimed to limit private merchants’ capacity to manipulate prices by speculating on, storing and transporting large quantities of commodities. For instance, India placed restrictions on commercial credit supplied to traders in order to limit the quantity of working capital they can muster at any one time as a way to prevent hoarding and market manipulations. A long-standing ban on futures trading in cotton has placed similar restrictions on private traders. Finally, India’s Control and Transport Order permits the Union government to intervene in the inter-provincial flow of critical commodities.

In terms of external trade, Indian cotton exports are handled by a relatively limited number of market agents and federations, most importantly the CCI and the Maharastra federation.34 Cotton has long remained on the Negative List of Exports which entails the imposition of export quotas, contract registration and minimum export prices (Saksena 2002, 238). Over the past decade, India has somewhat liberalized its cotton markets as many of these policy tools have been loosened or eliminated. Unfortunately, its system of agricultural extensions services has also been progressively disassembled, leaving agricultural cultivators increasingly reliant on private merchants for information, advice and technical assistance.35

33 These SMCs were still government-run during the period covered here, though there have been important reforms of these government entities too.
34 See Saksena 239 for the quantities of cotton exported by various federations.
35 Interview Coimbatore, India.
5 Threat or Opportunity? The Man-made Fiber Industry and State Support

Although cotton is a crucial raw material in textiles, it is impossible to fully appreciate the role of the upstream fiber industry without considering the man-made fiber industry, an industrial product which is simultaneously competitive and complementary with cotton agriculture.\(^{36}\) While there is wide variation between countries, from a global perspective, man-made fibers compose about half of the total raw fiber consumption in apparels and quite a bit more in home furnishings and industrial usages.

Despite similar population pressures and threats of grain shortages, the two governments have taken opposite approaches to the man-made fiber industry. China and India have approximately the same absolute quantity of arable and permanent cropland. While China has about three times India’s land mass, India is one of the most arable countries in the world with over half of its land considered arable and permanent cropland, compared to China’s 15%. Thus, they end up having quite similar quantities of total arable and permanent cropland, with India slightly above 1.5 million square kilometers, and China slightly below (though China must feed approximately 30% more people off of this).\(^{37}\)

In addition, given the long-enduring struggles of these two nations in maintaining self-sufficiency and security in food production and clothing, the man-made fiber industry offers a potential alternative by which cotton acreage can be replaced by synthetic fiber factories, thus reserving more acreage for food production. For instance, a 300 acre synthetic fiber factory is capable of replacing about 600,000 acres of cotton fields (Kadolph and Langford 1998, 69). By this means, they would be more capable of maintaining self-sufficiency in food production and clothing, enduring nationalist goals for both countries. While some man-made fibers use non-chemical feedstocks, such as wood pulp, most are derivatives of fossil fuel by-products composed of synthetic chemical polymers. Although derived from fossil fuels, they are by no means intensive consumers of fuels and so fuel supplies and costs are generally not reason enough for governments to inhibit their development.\(^{38}\)

Despite these similar structural factors and nationalist goals, however, China and

\(^{36}\) While it is often noted in the United States that chemical fibers have undermined cotton agriculture over most of the 20th century, through blended fabrics, chemical fibers have also expanded the scope of usage of cotton in textiles.

\(^{37}\) To be more precise, India has 1.65 million square kilometers of arable land and permanent cropland, while China has 1.35 million. Calculated from CIA World Factbooks and World Resources Institute data.

\(^{38}\) For instance, the United States traditionally has been the world’s largest chemical fiber producer in which nearly two-thirds of its total fiber production is some form of synthetic fiber, but the industry consumes less than one percent of total annual petroleum. Kadolph and Langford 1998: 95.
India could hardly have taken a more different approach to the man-made fiber industry. In contrast to the Chinese government which has used extensive controls to develop man-made fibers as a solution to their severe arable land constraints, until quite recently, the Indian government has consistently perceived the man-made fiber industry as a ‘threat’ to agricultural cultivators and has successfully circumscribed its development.

While it may be easy to draw the conclusion that India took the ‘wrong’ approach to the synthetic fiber industry and China made the ‘right’ decision, a more nuanced comparison highlights the fact that the transition to man-made fiber usage is more complex. Similar to cotton agriculture, China was institutionally far more equipped to make the transition to build a synthetic fiber industry. China’s version of state socialism gave it institutional controls to transform the upstream fiber sector while at the same time shielding cotton farmers from the impact of this new and competing source of textile fibers. By contrast, the Indian government had far fewer policy levers at their disposal to aid in the successful rise of a synthetic fiber industry while also protecting the interests of cotton farmers. Seen in this light, the Indian policy-makers’ perceptions of the synthetic industry as a ‘threat’ to agriculture appear to be quite understandable, once we consider the policy levers available to policy-makers in guiding this transformation. By examining state capacities, overly simplistic and voluntaristic arguments concerning the political choices among politicians and bureaucrats can be avoided.

In China, the man-made fiber industry was established extremely rapidly and very early during the reform era, though its initial planning and investments pre-dated the reform era by many years. In a few short years, between 1978 and 1983, China’s domestic consumption patterns swung from one quite similar to India’s, based overwhelmingly on cotton fibers, to a mixed combination of pure cotton, blend, and pure synthetic fibers, similar to consumption patterns found in many advanced industrialized countries (Figure 4). Crucially, at the same time that China built was building massive petrochemical industrial complexes, cotton farmers’ real profits rose very dramatically, from 12.5 Yuan/mu of land to 101.4 Yuan/mu (one mu is 1/15th an acre) (Figure 4). How was such a dramatic shift towards man-made fibers affected so rapidly, while at the same time cotton farmer’s livelihoods witnessed dramatic improvements?

China’s shift to man-made fiber manufacturing and consumption exhibited none of the ‘threats’ to cotton farmers, which Indian policy-makers have feared. Chinese economic policy elites, including then Premier Zhao Ziyang and the once minister of

39 See data for these years in Zhongguo Fazhan Gaige Wei Jiage Si 2003.
China’s textile ministry, Hao Jianxiu, expressly perceived the development of chemical fibers as crucial in achieving the multiple, often incompatible goals of food and clothing security. According to Zhao, it was the government’s intention to stop relying on expanding cotton acreage to clothe its growing population, and sought a shift of farmland from cotton to grains as a critical government goal.\(^{40}\) The chemical fiber industry was seen positively as the solution to China’s structural problems.

As state elites adopted a positive attitude towards the new industry, its initial foundations were built through heavy state involvement, utilizing a range of policy tools largely unavailable to Indian bureaucratic elites. In the late 1970s and early 1980s, China shifted its overall state industrial investments from a focus on heavy industry to light industry and agriculture (Solinger 1991, Naughton 1995). Man-made fiber factories were uniquely positioned between heavy and light industries and thus became a favored industry. Chemical fibers was one industry which bridged the light and heavy industry divide, and thus benefitted both light and heavy industry ministries with infusions of state capital.

Starting between 1973 and 1975, six major state-financed petrochemical fiber plants (mostly polyester) were planned and financed by Beijing using limited foreign exchange earnings. Their construction was engineered by major textile firms from

Japan, France and Germany using imported technology. While the first ones to come on line in Shanghai, Beijing, Tianjin and Liaoning were smaller, having annual capacities of between 25,000 to 87,000 metric tons, two additional, massive plants were built in Shanghai and Jiangsu which ranked among the largest complexes in the world at the time with capacities of 200,000 MT and 533,000 MT, respectively.\(^{41}\) The quantity of investment devoted to chemical fibers was staggering. In the 1980 state plan for textiles, 21 of 34 new mills approved under the Ministry of Textile Industry (MOTI) plans were devoted to increasing China’s production capacity in a wide range of synthetic fibers and these projects absorbed no less than 80% of the entire fiscal allocation for the textile industry.\(^{42}\) In addition to the above factories, these included smaller plants located in both inland and coastal regions and in more minor urban centers.

While MOTI and other ministries were building up production capacity, the Ministry of Commerce and China’s State Price Bureau were busy at the opposite end of the production chain ensuring that the output from these factories would ultimately be absorbed by Chinese consumers. In November 1981, these ministries cut state retail prices for polyester-cotton and polyester-viscose fabrics by an average of 0.66 Yuan/meter, the equivalent of an 8.25% to 22% price decline (depending on fabric type).\(^{43}\) As the larger plants’ synthetic fiber production came on line, they instituted a second, more dramatic price reduction in January 1983 on blended and pure synthetic fabrics, ranging from between 20 to 30%. At the same time, they doubled the attractiveness of synthetic fabrics to Chinese consumers by also increasing the price of pure cotton fabrics by 20% on average.\(^{44}\) The resulting shift in consumption patterns was rapid as pure synthetic and blended cloth rose from 20% of total purchases in 1978 to nearly 80% in 1983! Once the State Council realized it had overshot its initial targets, it re-adjusted the cotton-synthetic balance once again to support cotton (Figure 4).

At the same time that these different channels of investments and subsidies were rapidly changing consumer purchase habits away from cotton and towards synthetics, farmers were enjoying rising real incomes on the sale of cotton. As mentioned earlier, cotton farmers were earning record profits because the state automatically purchased as much as they produced, and through the above-quota bonus pricing system, farmers earned higher prices the more they produced. Ultimately, the state treasury financed these cotton imbalances as well as subsidies to the urban consumers via retail price

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\(^{41}\) *Textile Asia*, January, 1982, pp.54-55.


modifications. China’s ‘smooth’ transformation was accomplished through state engineering utilizing the institutions and policy levers developed under the statist institutions of socialism, including state price-setting and the state-run commercial system. This coordinated and rapid transformation in China’s raw material base was enacted by means of large infusions of state capital which flowed through its industrial and commercial ministries in the form of support to state textile firms, farmers and consumers. Of course, with the many reforms of state institutions and the disbanding of most industrial ministries, it is unlikely that the Chinese state today would be able to engineer such a transformation.

A comparison with India is instructive. In contrast to China, India has had to work with far fewer of these institutional and policy options, particularly with regards to controls on commercial transactions and prices. Given the much more delimited breathing space to simultaneously foster a synthetic fiber industry, ensure a ready market for it, and protect the interests of cotton farmers, it is perhaps little wonder that Indian politicians and bureaucrats perceive the man-made fiber industry as a ‘threat’ to agriculture, and have often worked to restrict its growth and development.

Given this perception of threat, not only was public funding not forthcoming, but the state often hindered private capital investments in the industry. These restrictions were accomplished through many of the Indian government’s commonly used policy levers. High excise duties were imposed on domestic production across the value chain, including raw synthetic fibers, yarns and fabrics. In stark contrast to China’s massive plants, licensing of man-made fiber factories (like in most industries in India) was limited to relatively small plants, which are uneconomical in a capital-intensive industry like chemical fibers in which minimum scale is critical. Furthermore, imports remained limited through quantitative quota restrictions and mills were restricted from sourcing viscose yarn in order to ensure India’s relatively small available supplies flowed to handlooms.

Of course, the promise of man-made fibers in alleviating India’s food security and clothing problems was hardly lost on policy makers. In the late 1970s, when cotton was in shortage, there were tentative movements to adopt a multi-fiber policy approach and viscose fibers were re-categorized as an Open General License item after which quantitative import restrictions were lifted. However, as imports rose and threatened both the domestic viscose industry and cotton farmers alike, customs duties were quickly increased and the effective rate reached 40% by 1983.\textsuperscript{45} Subsequent textile reforms, including the 1985 Textile Policy and the 1992 Textile Development and

\textsuperscript{45} Uchikawa 2002, 66-67.
Regulation Order have unwound some of these restrictions by eliminating licensing, allowing fuller inter-fiber flexibility in factories and eliminating size constraints on new and established plants.

While useful in undoing restrictions, they are hardly ‘positive incentives’ aimed to encourage private capital, to say nothing of the sort of transition that Chinese policymakers were able to engineer. Perhaps the closest India has come to providing incentives in India’s domestic market has been the relatively recent reduction in excise duties. When added together across the raw fiber, yarn and fabric links of the value chain, they totaled more than 70% in the mid-1990s. Between 1998 and 2004, these were reduced to around 50%, which still remained quite a bit higher than the 20% for pure cotton products (Landes, et al. 2005: 10). Of course, for firms with an export orientation, a much larger range of policies and incentives applied.

By the mid- to late-1990s, these policy changes were beginning to realign India’s domestic industry. Larger firms with economies of scale were established as textile interests took heart from lowered excise duties by entering the market. This has reduced the costs of production and hence the prices of Indian output in comparison to equivalent imports. These same policy changes also apply to the various chemical feedstocks which serve as the main petrochemical raw materials for chemical fibers production. Thus, as an entire industrial chain, inflated domestic prices of both petrochemical feedstocks and synthetic fiber production have substantially declined compared to their equivalent global prices.46

While clearly signaling a change in orientation, the industry remains relatively delimited in India, particularly compared to China. Even after a decade of rapid development in synthetic fiber manufacturing, the gap with China increased substantially since the ending of the MFA. While in the mid-1990s, China’s synthetic capacity was several times more extensive than India’s, by 2008 it was over ten times larger, and Chinese firms were maintaining only slightly lower rates of utilization than Indian firms.47

While these differences in the raw material node remain true today, there have been some areas of limited policy convergence. As mentioned, since the late 1990s, China has been increasingly liberalizing cotton commerce at both the national level and at the procurement level where it directly engages with farmers. In 1997, it established a commodity exchange for cotton, allowing a limited but wider range of state and non-

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46 For instance see Saksena 2002, 130, 133 to compare the prices of Indian and global polyester as well as DMT PTA and MEG, three major chemical feedstocks which are the primary manufacturing inputs to various synthetic fibers.

47 For India: Datanet India. For China: Zhongguo Fangzhi Gongye Nianjian (various years), Zhongguo Fangzhi Gongye Fazhan Baogao (various years), CEIC Global Database.
state commercial and production units to participate. Between 1999 and 2001, it began to allow textile firms, largely medium and large state-owned firms to purchase directly from cotton growers and farmer’s associations, as well as from local state SMC procurement stations. Similar to commodity regulation in other countries, the central government has bolstered its strategic reserves and uses more indirect means through market interventions to influence prices. To meet the requirements of WTO accession, China has also been obligated to partially open its tight trade regime through the establishment of tariff rate quotas, which started at 740,000 MT and rose to 890,000 by 2006. More importantly, considering China’s rapid cotton imports, China was required to reduce its non-quota tariffs from 76% in 2002 to 40% in 2006. While China has twice before attempted to liberalize its cotton sector, this third attempt seems to be more permanent.

Although there is some policy convergence in cotton, the ending of the MFA has created a new divergence in their cotton economies. Traditionally, both countries maintained largely closed, domestically-oriented cotton agriculture economies and entered global markets to export or import simply to balance periodic shortfalls or surpluses. However, since the early 2000s, China has become a consistent and massive importer of cotton and India has become a major exporter. For instance, since 2003 China has been importing over 1.5 million metric tons of cotton per year (and over 4 million in 2005!), while its previous record import load never exceeded 850,000 metric tons, which occurred between 1994 and 1996. By contrast, between 2005 and 2008, India began exporting on average a million metric tons per year, far above previous years. It is clear that the transformations occurring through the phasing out of the MFA have worked their way back along the chain into agriculture, transforming what used to be quite similar protective agricultural strategies into divergent strategies of global integration.

6. Conclusion

This paper is limited to a comparison of divergent policy paths in the raw fiber sector of these two textile giants. A more thorough study of the electoral and party politics behind India’s policy-making would likely reveal that Indian government elites have also been influenced by the potential of political reprisals from agricultural and textile interests. Similarly, a closer investigation of the intricacies of China’s inter-ministerial

48 Interview Shanghai, China.
49 See United Nations Commodity Trade Statistics Database.
bureaucratic politics, especially during the first half of the reform era when most industrial line ministries still existed, would offer a more nuanced political understanding of the origins of state policy. However, the argument presented here highlights the fact that more overtly political factors must be tied to the historical institutional capacities available to their respective government and ministerial elites. The presence or absence of certain policy levers and institutional capacities shapes the contours of the political game, whether democratic or authoritarian, as well as the perceptions of those who wield these tools. China’s capacities to shape agricultural procurement and commerce and influence retail prices in the early reform era were particularly critical in creating a synthetic fiber industry and at the same time protecting cotton farmers. Indian bureaucrats simply were not bequeathed these sorts of controls from the era prior to economic reforms. In turn, their more delimited capacity to shape the Indian economy has influenced their perceptions and approach to synthetic fibers vis-à-vis India’s cotton economy.

Furthermore, although many of the changes narrated in this paper occurred over a period of two decades, there is strong path dependence from earlier periods. For instance, it is hard to deny that China’s very rapid and early transformation into man-made fiber production strategically positioned it many years later, as it grew into a garment exporting powerhouse. China’s first mover advantage among the most recent generation of late developers has likely made it more difficult for India and other countries to reach the frontiers of export competitiveness across different product categories. This is especially the case in chemical fibers, an industry that China has developed very aggressively and continues to do so with the ending of the global system of textile and garment quotas.

References


Cotton Corporation of India Ltd. Online statistical data.

Datanet India. *Indiastat*. New Delhi, India: Datanet India Pvt. Ltd.


ISI Emerging Markets. *CEIC Global Database*.


Comments on
“Two Tales of Agro-Industrial Transformation”
by Mark Dallas

Shuji Uchikawa

Dr Dallas’s very interesting argument depends on the assumption that there exist “food-security dilemmas” in both China and India. Let me start my comment in focusing on the assumption.

Dr Dallas started his argument by stating that India enjoys substantial advantage over China in the cost of raw cotton while China rapidly expanded its chemical-fiber industry. For this, Dr Dallas assumes three points.

Both China and India have faced severe food-security dilemma; “food grain VS cash crops” problem. Firstly, in both countries, major choice of the agricultural administration and farmers are between food grain and cash crops. Secondly, if cotton cloth is replaced by synthetic-fiber cloth, cotton acreage can be converted to grain acreage. Thirdly, Indian government has perceived the man-made fiber industry as a threat to agricultural cultivation.

I would examine the three points, as followings.

![Graph showing area and production of food grains and cotton over time.](image-url)
Firstly, as the Figure shows, although area has been constant, production has increased in both food grains and cotton. Figure: Area and Production in India

Production of food grains has increased due to introduction of high yield varieties (green revolution) since the mid-1960s.

Per capita net availability food grains per day increased from 394.9 gram in 1951 to 510.1 gram in 1991. It declined after 1991 onwards. Per capita net availability of food grain reached peak in 1991. It suggests that enough food grain is supplied. This means that, at least up until now, food supply is secured. India does not need to import food grains at present.

Secondly, cotton production has more than doubled between 2000-01 and 2008-09 due to introduction of BT (bio-technology) cotton seeds. This figure only shows the situation until 2001. However, after 2001, the cotton production doubled. Cotton production increased without affecting food grain production.

Thirdly, in 1985, India government started new textile policy, “Multi-Fiber Textile Policy”. Before 1985, it is true that Indian government took policies against man-made fiber. However, it is also true that there existed a gigantic man-made fiber company in India before 1985. Reliance Group is an example.

Reliance started with production of polyester in the late 1970s and diversified their man-made fiber production by making an alliance with French MNC, Du Pont. It pursued a strategy of backward vertical integration in polyester, fiber intermediates, plastics, petrochemicals, petroleum refining and oil and gas exploration and production. The private sector had developed the synthetic industry in India.

<table>
<thead>
<tr>
<th>Plant at Patalganga</th>
<th>Process Licensor</th>
<th>Start up date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyester Filament Yarn (PFY)</td>
<td>Du Pont</td>
<td>Oct.1982</td>
</tr>
<tr>
<td>Polyester Staple Fiber (PSF)</td>
<td>Du Pont</td>
<td>Mar.1986</td>
</tr>
<tr>
<td>Purified Terephthalic Acid (PTA)</td>
<td>ICI (U K)</td>
<td>Feb.1988</td>
</tr>
<tr>
<td>Paraxylene Plant (PX)</td>
<td>U.O.P (USA)</td>
<td>Nov.1988</td>
</tr>
</tbody>
</table>

While Reliance had a very large influential power to central government, small cotton farmers had a very week power in influencing Indian government.

Considering these three, we need more careful examination to verify the assumption of “food security dilemma”.

This is my comment.
The Institutional Milieu of Skill Formation: A Comparative Study of Two Textile Regions in India and China
The Institutional Milieu of Skill Formation:  
A Comparative Study of Two Textile Regions in India and China  
M. Vijayabaskar

1. Introduction: Local Labour Markets in Global Worlds of Production

Growth has been increasingly found to occur in regional agglomerations of firms producing inter-linked goods and services. Such dynamic agglomerations/clusters in the ‘developing’ countries have gained more visibility recently among policy makers and global capital looking for ‘effective’ locations. The growing recognition of such phenomena along with a perceived reduction in the role of the nation-state has led to scholars arguing a case for rescaling of economic regulation (Peck 2002). Since then, the ‘regional agglomeration’ has emerged as a prime target for intervention, to improve the ability of these agglomerations to compete in global markets. Critical to the dynamism of such clusters is an array of institutions ranging from those that reduce transactions costs, to those that help them dynamically compete like provisioning of credit, technological capabilities and market information. A vital component of this local institutional milieu is a dynamic labour market that fosters skill formation and diffusion across firms. Creating such conditions for skill formation and social upgrading is a key challenge for policy makers in the developing world as they seek to negotiate the imperatives of production for global markets and move into more value-adding segments of global value chains.

As is well known, a primary route through which processes of globalization influence low income regions is via the labour market. Arguments of ‘immiserising growth’ jostle with ‘levelling up’ arguments pointing to the range of possibilities that globalization can generate. Actual outcomes, it has been pointed essentially depend on the institutional mediation between global product market impulses and local labour markets. Many scholars like Ettlinger (1999) argue that it is possible to envisage a positive relationship between a cluster’s competitiveness and worker well being.

Another domain of contention concerns the nature of labour market intervention that can sustain the dynamism of these agglomerations. While neoliberal orthodoxy argues for a deregulation of labour markets that can enable firms to take advantage of a
flexible workforce and keep costs down, others point to the need to ensure the provision of skills in a dynamic fashion to ensure that the cluster can take advantage of any upgrading opportunities that it is likely to confront. It is also believed that the provisioning of skills is critical not only for competitive dynamism, but for improving labour welfare as well. Once the clusters move into more value adding segments, there will be a greater demand for skilled workers so as to produce more skill intensive or technology intensive products. The greater demand for skilled labour will in turn lead to better wages for workers. This argument is further strengthened by the growing amount of evidence on the skill bias inherent to recent technological change (Pavenik 2000).

Further, the ability of labour to improve its conditions of work even when there is product market dynamism is critically dependent upon a set of local institutions that ensure a fair distribution of the higher returns generated by moving up the value chain. The vagaries of the global product market also tend to aggravate labour market insecurities leading for calls to ensure that workers are insulated from such negative impacts.

China and India are two countries that are increasingly seen, albeit to very different degrees, to benefit from the recent processes of globalization of production and outsourcing. Among the various sectors that have grown in both the countries, textiles and clothing is one sector common to both the countries that are and have been the forerunners in the process of global market integration. Though China’s share in the global textile and clothing trade at over 20 per cent is much higher compared to India’s (about 4 per cent), there is a consensus among academics and policy makers that these two countries will be the biggest gainers of the expiry of the multi-fibre agreement in 2005. The growth spurt in the exports of the textile and garments from both these countries after the expiry of the MFA is highly suggestive of this possibility.\(^1\) Despite common grounds for optimism like a good raw material base in cotton, availability of frontier technologies in spinning and infrastructure, differences in performance have been observed between the two regions. A recent study by Aark et.al, shows that the productivity levels of China has increased and higher than India in most industries including textiles and clothing (2008). Further across most provinces in China and main states in India, labour productivity has registered much higher increases in China. Obviously, this brings the issue of skill formation, labour welfare and the contributing labour market institutions to the forefront. Several important questions arise in this context: To what extent are labour market institutions geared to take advantage of new

\(^1\) In the quarter after the phasing out of the MFA agreement, imports of Chinese apparel into the US increased by 60 per cent compared to the previous year (ElSayed et.al., 2006, 17).
market opportunities by ensuring appropriate skill formation? How do labour market institutions mediate between global product market pressures and local labour outcomes? Are there lessons to be learnt from China in the realm of labour market regulation to improve skill formation?

In this paper, we explore these questions through a comparative study of the nature of these institutions in two dynamic textile producing regions in India and China, the Tiruppur-Coimbatore region in Tamil Nadu, southern India and the Shandong province in eastern China, embedded as they are in a set of different national level regulatory institutions. In doing so, we make a case for the following arguments. First, differences in basic educational levels of workers (pre-entry skill formation) between the two regions, an outcome of macro-policy regimes, influence the extent to which workers can be trained subsequently on the job. This difference leads to differential incentives and returns for firms and workers for skill acquisition and forging career paths. Further, in the case of textiles and clothing production in the Tiruppur region, there has been an institutional lock-in into ‘low-road’ labour practices that prevent firms from investing in labour market upgrading. This lock-in has been aided by larger policy shifts that favour deregulation of labour markets to avoid rigidities that may impair competing in global product markets. Under such conditions, even product market upgrading has been accompanied by poor working conditions and lack of investments in skill formation. Finally, even the limited attempts to introduce cluster level and firm level initiatives for skill upgrading suffer from poor standards and adequate buy-in from firms.

2. Method

The study of regional learning and skill formation in China is based on fieldwork carried out in the Shandong province, one of the major centres of textile and garment production in China. Shandong province, a centre of cotton cultivation, is home to several fast growing small towns whose growth is largely premised on a thriving garment and textile industry.² In 2006, the province was the second highest producer of raw cotton but ranked first in terms of output of cotton and cotton blended cloth and fourth in output of garments (National Textile Industry Statistics Annual Report 2006). In terms of exports, the province accounts for nearly 12% of exports of yarn, fibre and other textile products (68.3 million USD) and 5.9% of exports of garment and apparel (64 million USD) from

² However, many of these small towns have firms specializing in other sectors too.
China during 2008-09. Though most exports are directed towards Japan and South Korea, firms do export to the US and EU markets as well. Our fieldwork consisted of a series of detailed semi-structured interviews with top level officials of about 15 textile and garment factories, detailed interviews with local government officials including those involved in industrial and infrastructural development in the region. We also importantly studied a set of training institutions involved in the textile industry ranging from colleges offering degrees in various branches of textile sector to vocational training institutions catering to the textile sector among others. Information from India is based on several rounds of fieldwork in what is arguably the most dynamic textile and garment producing region in the country, the Tiruppur and Coimbatore districts in the state of Tamil Nadu. Tamil Nadu is a region long known for the development of the textile industry and at present accounts for India’s one-third of textile output, 45 per cent of yarn production, 70 per cent of yarn exports and more than 50 per cent of cotton knitwear exports.

Fieldwork in this region also consisted of detailed interviews with workers in addition to interviews with officials in different kinds of firms. Issues regarding changes in the labour markets could be captured better in this case. Our discussion in this paper is however confined to firms specialising in spinning and cotton knitwear production (starting from knitting mills to final finishing also called cutting-making-trimming (CMT)) factories. Importantly, our interviews with the workers helped us to validate the information provided by the employers and vice-versa in Tiruppur whereas that was not possible in Shandong. We could also cover a range of firms from big direct exporters to smaller subcontractors and job workers. In Shandong, we could access only the bigger, vertically integrated firms. Though it is true that firms in China tend to be large and vertically integrated, there are also several smaller firms linked to the global market in myriad ways. We do not have information on the labour market characteristics of workers in such firms. There are also likely to be regional variations in the dynamics of production and labour markets. However, even a comparison of this nature with uneven information between the two regions, as the paper shows, does yield insights for appropriate interventions in the labour market. Further, it is important to take on board the fact that the success of Chinese textile and clothing industry are an outcome of such large scale production. In addition to material gathered from fieldwork, we make use of secondary literature wherever available and required.

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3 Data has been computed from the National and Province-wise statistical yearbooks for years 2008 and 2009. Detailed references are provided in the References section.
4 Interview with Dr. Selvaraju, South Indian Mills Association, June 10, 2009
5 The Responsible Supply Chain Association (2007)
In discussing the labour markets of a region or a cluster, it is important to understand the policy and institutional developments that have influenced the growth and structure of the textile industry in a particular country/region. This can be seen as an interactive process between local/national institutional developments and global institutions like fashion trends, buyer characteristics, etc. In the next section, we provide an overview of the Indian and Chinese textile and garment industry.

3. The Indian and Chinese Textiles and Garment Industry: Structure, Performance and Sources of Learning

The textiles and clothing (T&C hereafter) industry is one of the major contributors to the Indian GDP in addition to being the largest employer after the agricultural sector. It accounts for “1.9 percent of gross domestic product (GDP), 11.5 percent of the manufacturing value added in 2004–2005 (National Accounts Statistics, NAS, CSO, 2006), and 16.5 percent of total export earnings (Directorate General of Commercial Intelligence and Services, Ministry of Commerce, 2006-07).” Direct employment generated in the industry outside cotton cultivation, was estimated to be about 12.4 million in 2000-01. In addition, it generates large numbers of indirect employment. In China, the share of the T&C sector has declined over time from about 17.7% of gross value of industrial output (GVIO) in 1980 to about 6.5% in 2005 (L Brandt, T.G Rawski, and J Sutton (2008, 588)). The sector employed about 9.8 million in 2005 and accounted for over 15% of the total exports in the same year. Thus, in comparison with India, while the sector’s contribution to the manufacturing sector is lower, in terms of export earnings, it plays an equally important role in both the countries. However, as the following table illustrates, there are differences in the relative export performance of the two countries in the T&C sector (Table 1).

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6 Bedi and Corotonan (2008, 47).
<table>
<thead>
<tr>
<th>Year</th>
<th>1980-84</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>9.60</td>
<td>19.70</td>
</tr>
<tr>
<td>China</td>
<td>25.7</td>
<td>29.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>1990</th>
<th>2000</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>2.1</td>
<td>3.8</td>
<td>3.9</td>
</tr>
<tr>
<td>China</td>
<td>6.9</td>
<td>10.3</td>
<td>20.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2005</th>
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</thead>
<tbody>
<tr>
<td>India</td>
<td>2.3</td>
<td>3.1</td>
</tr>
<tr>
<td>China</td>
<td>8.9</td>
<td>18.2</td>
</tr>
</tbody>
</table>

Source: Adopted from Bedi and Cororaton 2008, Tables 2.4, 2.10 and 2.11

While in terms of exports of cotton, China’s share has declined in the global share to 0.1% in 2005 from 1.4% in 1980, India’s share has increased to 12.2% starting with a similar share. On the other hand, China’s shares in both textiles and clothing exports has increased enormously during the period whereas India’s share has increased only marginally. What can possibly explain such differences in performance?

Analysts of the transformation of the south-east Asian economies into exporters of manufactured goods have pointed to the critical role played by skill formation in this transformation (Ashton et.al 1999). They argue a case for ‘developmental skill formation’ where the states (to varying degrees) directed the provisioning of a matching supply of skilled labour in response to the changing needs of the growing productive sectors. Apart from investments in broad-based primary and secondary education, they also highlight the mechanisms through which the state created appropriate institutional incentives for firms to invest in specific sector level learning and skill formation. In the case of Singapore for instance, the government paid lot of attention to on the job training (OJT) supported by the respective employers (pp. 23-24). On the other hand, there are also instances, like in the case of Malaysia and Thailand where the government continued to create conditions to compete on the basis of low wage costs by suppressing collective bargaining and keeping wage costs low (ibid.). Such ‘low road’ policy moves prevent the development of pressures to build other competencies that not only sustain competitiveness but also help economies realise better returns to participation in global trade. Given such strong empirical bases for the importance of skill formation systems to a globalizing region, it is important to look into the processes that enable or prevent the formation of requisite skills to move from competing merely on the basis of low wage costs to competing through more value addition and skill upgradation. As a prelude to our analyses of the processes unfolding in the Indian T&C sector, we
delineate some of the key features of the sector and changes over time in the next subsection.

As has been described in several studies, the Indian T&C industry has been the site of several state interventions leading to the formation of a production structure that is unique in several ways. The strategy of import substitution based industrialisation, with emphasis on growth of heavy industry has exerted a strong influence on prospects of the garment industry. Since heavy industries are capital intensive, the huge labour surpluses in India forced the state to assign a few light goods industries including the garment sector, the role of a labour absorber. Further, since a strong traditional artisanal garment sector already existed, it was felt that it needs protection from competition by the more ‘efficient’, modern capital. Consequently, sectors like the garments were reserved for firms that fall under the ‘small scale’ sector with various incentives for such firms.

Firms with a capital investment limit of less than Rs. 10 million were categorised as ‘small’ and any firm with greater investment need to commit to export more than 75 per cent of its output. Small firms therefore found it difficult to upgrade their technology, as this would invite a movement beyond the capital ceiling fixed for the small-scale sector. As a result, the Indian garment sector is dominated by clusters of smaller firms as compared to other exporting low-income nations (Chatterjee and Mohan 1993, M 116). Such policy moves to protect small scale producers in different segments of the apparel value chain has led to the rise of a large-scale spinning sector, a highly fragmented and small-scale weaving and knitting sector, and again a fragmented clothing sector (Bedi and Cororaton 2008, Tables 4.7, 4.8 and 4.10).

Studies argue that the resultant fragmentation process prevent firms from realising scale economies and consequent efficiency. Further, it is also believed that this predominance of small firms prevented investments in processing techniques when compared to other exporting countries (Kathuria and Martin (2000). To illustrate, in the weaving segment, India’s average ratio of shuttleless to shuttle looms is only 3% whereas the global average is 16% indicating the prevailing technology gap. Despite such limitations, Ramaswamy and Gereffi (1998) point out that India has improved its market share in 9 out of its 17 main product categories (p.129) and further that, there has been an increase in the unit values realised. This appears to have been possible due to the advantages derived from such a decentralised and networked production structure, which enable firms to compete in low-volume segments with greater fashion content as compared to say, China or Bangladesh where the minimum efficient scale of operation

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7 The investment limit for being designated as ‘small’ has been regularly revised upwards and now it stands at 10 million INR in plant and machinery.
is much higher. In fact, Kathuria and Martin (2000), quoting Khanna (1990), point out that while Indian firms subcontract 74 per cent of their output, countries do not subcontract more than 36 per cent of their output in all other cases.

Thus, while government policies have constrained garment producers from competing on the basis of scale economies, they have fostered a structure, albeit indirectly, that facilitates production for a more flexible product market. Some of the effects of reservation have been undermined since 2000 with a series of policy reforms aimed to improve the competitiveness of the industry. In 2000, the National Textile Policy dereserved the garment industry, paving way for large scale expansion in capacities, and importantly modernise segments that were backward. Reforms also included “(1) the removal of restrictions in loom capacity, (2) the use of automatic looms, and (3) the elimination of regulations that allowed only small-scale firms to produce garments and hosiery.”8 Incentives and concessions were also offered to exporters for creation of export zones and technology parks, concessions for purchase of land, cheaper credit and permission for entry of FDI. Another important policy intervention aimed at technology upgradation was through the Technology Upgradation Fund Scheme (TUFs) that offered loans to producers to upgrade their technology on very subsidized terms. The removal of reservation for the small-scale sector has opened up possibilities of movement into large-scale production. Aided by a good domestic production base in cotton fibre and lack of import restrictions to upgrade process techniques, Indian garment producers have begun to enter mass markets as well though as Kannan points out, export shares of specific garment segments have declined and a few have gained since 2000 (2010). Importantly however, until very recently, none of these interventions has been directed towards skill upgradation or any other intervention in the labour market.

Accompanying these changes in the policy framework has been a steady increase in the exports of garments. While textiles and clothing exports grew from 5.2 billion USD in 1990 to 21.5 billion in 2007, its share in merchandise exports rose from 0.3 per cent in 1960/61 to 29.1% of total exports in 1990 and declined to around 15 per cent in 2007 (Chatterji and Mohan 1993; Kannan 2010, p.17). However, India's share in global exports has been relatively slow, having moved from 1.5 per cent in the 1970s to 2.6 per cent by 1994 (Ramaswamy and Gereffi 1998) and now to 4.3 per cent in 2007. India's market segments continue to "mainly fall in cotton, semi-fashion, middle price segment with main product category being T-shirts, men's shirts, ladies' blouses, ladies' dresses and skirts" (Tait 2001, p.44). Tiruppur’s product markets too fall under this category and

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8 Bedi and Cororaton (2008, 48)
there is evidence of investments in process upgrading and also improvements in unit values realised over time as well as a simultaneous movement in lower value mass produced products.

China’s T&C sector is dominated by large firms, with joint ventures accounting for a larger share of the export market. Over a period of time, there has been backward integration of firms into processes like spinning, dyeing and also forward integration like design and branding. Joint ventures facilitated learning through training of workers in parent countries particularly in the domain of quality. Such product and process upgrading is evident in the case of textile and clothing factories in Shandong as well. We also observed that several factories undertook in-house R&D and also interacted with machinery producers and suppliers for better utilization and incremental innovations. Thus, despite successes in the global textile and clothing trade, India’s performance in relation to China is much less spectacular despite having substantial presence in the various segments of the apparel value chain including cotton cultivation. While this can be partly attributed to the industrial structure, an important component of China’s success has been its labour productivity.

Though hourly wage compensation is higher in China than India and other competing countries, labour productivity is much higher (United States International Trade Commission (2004). The Global Competitiveness Report 1999 points out that wage rates adjusted for productivity is one of the highest in India. While India ranks extremely low at 51 out of 59 countries, China ranks fifth. Though these indicators are only representative of the entire workforce and may not hold true for the garment sector, it is quite likely that some of the differences would favour China even within the garment sector. In fact, though the data on wage rates would indicate that Indian wage rates are not too different from other low-income economies, it is found that the cost per standard minute in India is higher than that of Indonesia, Thailand and China (Majumdar 1996). While investment in modern technology is definitely a factor, literature shows the importance of skill formation and organisational innovations in this regard (Ashton et al 1999). A decade ago, a Chinese firm, on an average, provided about 70 hours of training per year to its workers and managers compared to only 10 hours in India (Chandra, 1998 cited in Tewari, 2006). Studies also point to lack of adequate skills at the managerial and intermediate levels. What explains this difference? It has been pointed out that globalization fosters skill biased technological change and thereby provides incentives for skills training. Studies also show that that despite increases in pre-entry training, there has been considerable in-firm investments globally in training (Gersbach and
Schmutzler 2006). The importance of on-the-job learning in the context of growing skill bias on the one hand and the growing recognition of tacit learning on the other warrants this training. Further, it is said that increased skill bias creates incentives for individual workers to invest in training (ibid.). Prior to studying the processes of skill formation and diffusion, in the following section, we provide a comparative profile of the labour market in the two regions so as to understand the factors conditioning the processes of skill formation.

4. Labour Markets in Shandong and Tiruppur⁹:

Given the fact that considerable section of Indian garment industry is confined to the 'unorganised' or 'informal' sector, conditions under which workers labour is hardly subject to the legal realm. Given the predominance of 'informal' sector activity, formal interventions are less likely to be enforced as compared to other economies. In China, on the other hand, the dominance of large firms implies that labour can be subject to greater regulation. Though the decline of state owned enterprises and the rise of joint ventures and other private ventures have led to a gradual deregulation of labour markets, the regimes of labour control and skill formation are likely to be different.

4.1 Access to Labour, Segmentation and Conditions of Work

The global product markets have influenced the labour market in Tiruppur in 2 ways. One, the growing demand for labour has been met through incorporation of both women and migrant labour into the workforce. Initially drawn from neighbouring villages and towns, over time migrant labour from different parts of the state and from other regions of the country has been employed. In the earlier phases of the industry's growth, the presence of women was marginal, especially when compared to other important centres of knitwear production during that period. Since then, women workers have catered greatly to demand arising due to both increases in the quantum of existing jobs as well as in the new jobs created since export orientation. Checking of stitched garments for faults, a new job associated with quality requirements of the export market is undertaken solely by women.

In Shandong, women account for more than 80 per cent of the workforce in most of the factories that we visited. A large share of the workers comes from within Shandong province, primarily from nearby villages or towns. A small proportion is from

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more interior villages and they tend to be housed in quarters provided by the firm. There are also differences in the nature of gender based segmentation in the two clusters. In Shandong, we find that since most workers are female workers, there is hardly any gender segmentation in the nature of jobs undertaken. It is true that there are more male workers in the spinning department and much fewer in the stitching departments. The segmentation happens only as we move higher up the job ladder with fewer women represented in the managerial levels. However, even among supervisors (line or team leaders) there are many women holding such positions. In Tiruppur, there are hardly any women employees in the higher levels.

The volatility in export product markets and seasonality in demand has led to the rise of 2 segments within the migrant labour force. One section of the workers consists of permanent migrants. They come as entire families with each member taking up various kinds of jobs in the industry. The other set of migrant labour, which would account for at least 20-30 per cent of the migrant population, is constituted by more temporary migrants. They come to Tiruppur during peak season and return to their native villages or towns only to return the next year. Coupled with the informal nature of small scale production, there has been a rising ‘impermanence’ of the workforce as a result. Such incidence of ‘impermanence’ is much less in the Shandong T&C sector. Workers work for longer periods in these firms with mobility more internal than external. This is in marked contrast to the workforce in Tiruppur.

Secondary literature on China and India, and our fieldwork in Tiruppur show that export factories are marked by high levels of work intensity including lengthy work days. Respondents in Shandong report only six days of work in a week and a maximum of 1.5 shifts in a day. However, studies show that workers are forced to work overtime, stretching to even 12-14 hours or overnight to cater to the delivery schedules of the buyers, even as the buyers force suppliers to comply with their codes of conduct. As a result, supplier firms tend to fudge time sheets to comply with the codes of conduct imposed by the buyers. Such work intensity is observed in Tiruppur as well. In fact, it appears to be even more intense given the nature of segments that firms in Tiruppur specialize in. Driven by fashion trends, buyers increasingly place orders closer and closer to the season giving the suppliers lesser time to complete the orders and ship them. This forces supplier firms to employ larger numbers of workers for shorter periods to complete the orders. Use of just-in-time recruitment through labour contractors and employing workers for three shifts a day are therefore more frequent.

Casualisation of the workforce is therefore a phenomenon common to both the
regions though there are variations in the nature of state intervention between the two regions. In Shandong, there has been a gradual casualisation of the workforce with the privatization of the State Owned Enterprises (SOEs) and allowing of entry of foreign capital into garment production. At present, except for a few SOEs, all firms recruit labour on a casual basis. However, the state has recently introduced a nation wide policy since 2008 that mandates all firms to provide 5 types of social security benefits in China like accident and health insurance and unemployment insurance. This follows the earlier formulation of “China Social Compliance 9000 for Textile & Apparel Industry" in 2005, a national standard for labour welfare, which mandates rules on working hours, wages and safety by the China National Textile & Apparel Council (ElSayed et.al 2006).

In Tiruppur, except for a few top export firms numbering about 40, probably employing a core workforce of about 25-30,000 workers, the rest of the blue collared workers are all casual workers without social security entitlements. Such big direct exporters can ‘afford’ to have a ‘permanent’ labour force by virtue of their ability to offer continuous employment throughout the year. Being ‘permanent’ entitles the workers in these units to Provident Fund and Employee State Insurance (ESI) benefits for healthcare, and above all a security of employment denied to most workers in the industry.

Flexible employment practices do aid capital in Tiruppur to competitively cater to a highly seasonal and flexible product market. Of late, there have been moves by the export firms to comply with the buyers’ codes of conduct and this has pushed them into employing a permanent workforce with all the attendant social security benefits in at least some of their factories. Also, there is a restraint on them to outsource operations. This move has been undertaken completely under pressure from the buyers with no active efforts undertaken by the state. Even the auditing of the working conditions is done by independent private firms. Such enforcement of codes of conduct is also reported in Shandong particularly with regard to overtime work. The implications of this new mode of labour market regulation however need further examination.
4.2 Processes of Skill Formation and non-Formation

Skill formation, through formal education, apprenticeship training and on the job training, is increasingly seen as an important aspect of building up competitive capabilities in the global economy. As Peck points out, “Skill formation and its accompanying system of social regulation seems to be one of the decisive factors in determining whether economies take the high road or the low road” (1992, p.328). How local institutions influence this process is very critical to firms’ access to skills necessary to not only compete but importantly to move up the value chain.

The key feature of skill formation in Shandong is the higher levels of formal educational qualifications as compared to the workforce in Tiruppur. This is primarily due to the drive towards universal education by the Chinese state. Enrollment rates in senior secondary schools have increased from about 26 per cent in the 1980s to over 60 per cent at present. Participation in higher education increased from a little over 3 percent in 1990 to 22 percent in 2006. Enrollment rates in India compare very poorly with these figures though the state of Tamil Nadu has one of the highest rates in the country. Importantly, in China, at present, the formal schooling system has also gradually re-oriented from focusing exclusively on academic training to a combination of academic and vocational training. Xiao and Tsang, in their study of human capital development in the fast growing Shenzhen economic zone provide a succinct picture of the formal schooling system in the region.

“Currently, the education structure consists of nine-year compulsory education (five/six years of primary education and three/four years of lower-secondary education), a three-year upper secondary education with academic and vocational/technical tracks, two/three-year junior colleges, four-year universities, and adult-education at various levels.”

Vocational training begins at the upper secondary school. “Upper- secondary vocational/technical education is provided in three types of schools: secondary vocational schools run by education bureaucracies, skilled-workers' schools run by the Ministry of Labour, and secondary specialized schools run by various line ministries. They also point out that the vocational content in schooling has not only increased over time from the mid 1980s, but has also proved to be an attractive option for students. For instance, “In 1995, out of 16.5 million students in upper-secondary education in China, 57 per cent were in vocational/ technical education.” Outside these early learning

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10 Asuyama (Chapter 5 of this volume) provides a detailed comparative account of the macro skill formation systems in China and India.
systems are the adult education programmes both inside the workplace and in formal institutions. While they point out there are no proper estimates of the numbers being trained by firms in their workplaces, they point out that there are “2.57 million participants in adult education at the higher-education level, 56.94 million at the secondary level and 7.78 million at the primary level.”(Xiao and Tsang 1999, pp.74-75).

Most firms report the employment of many workers who have attended junior college. Students are eligible to go to junior college only after upper secondary education (after completing 12 years of education). Definitely, the educational levels of the workers in Chinese garment factories are much higher given the prevalence of universal compulsory education of a minimum of 9 years. Importantly, through a survey of workers in the province, they conclude that this enables workers to upgrade their skills later in their work lives. This compulsory education, they point out, has served the firms in the province to access a workforce capable of enhancing their skills either through workplace training or more formal adult educational programmes.

In contrast, most workers in Tiruppur are poorly qualified though 90 per cent of them have attended school for at least a year. 60 per cent of them have not gone beyond the primary stage. Women and long distance migrant workers who account for a growing share of Tiruppur’s workforce constitutes a greater section of the lesser educated segment. This lack of formal education appears to be a major deterrent to acquire job or firm specific skills through training in the workplace. In Shandong, respondents from local government and in the colleges and technical training institutions do concede that in the past, there was a much bigger disjuncture between content and forms of training provided in these institutions and the demands of the industry. However, in recent years, with the growing realisation of this gap, there have been sustained efforts to reduce this supply-demand mismatch. This has led to revision of the syllabus to cater to the changing requirements. Importantly, there is constant interaction between the industry and these institutions through their adult education programmes. Firms send employees to these institutions for short term programmes ranging from a few days or weeks up to even a year. Also, faculty from these institutions are called upon to take classes for the employees inside the factories.

Such interaction is yet to find its way into the garment and textile factories in Tiruppur. There are a few exceptions however of late. The NIFT-TEA floated by the Tiruppur Exporters Association (TEA) has sought to offer courses that are more directly linked to the needs of the industry. Offering courses in merchandising and quality control, garment making technology and textile processing, the institute also requires
that students have hands on training in the garment factories in the cluster. For the three year course, for instance, offered to students who have completed 12th standard, students are expected to work in the factories after 1 PM on all working days during their final year in the institute. Since the institute was started by the exporters association, many firms do allow for such hands on experience. The placement officer says that about 20 per cent of the students do not even seek placement in these factories but try to set up firms of their own. Of course, it needs to be stated that such moves are possible only among students who also come from families already with a business background. Many in fact are from families who already run garment factories or related ancillary units. To this extent, such formalized training also allows for inculcation of skills required for entrepreneurship though not as broad based as it ought to be.

In addition, the government through its Ministry of Rural Development and in collaboration with TEA has set up a training centre to train rural youth looking for jobs in basic entry level skills like sewing. The extent to which those trained have been able to get jobs however needs to be studied. Recently, another industry association the South Indian Hosiery Manufacturers Association (SIMHA) has set up an institute to train entrants in textile technology and another association the Tirupur Industries Federation (TIF) has set up a fashion design centre as the exporters realize the shortage of trained designers in the cluster. These associational activities are clearly the hallmark of a dynamic cluster with well functioning inter-firm networks and associations. Simultaneously it also reflects the lack of adequate state intervention in the realm of skill formation in Tiruppur. Further, the absence of clear standards and benchmarks for such private initiatives has undermined the quality of training and its suitability for enterprises thus far.

In Shandong, we find a more active role assumed by the local and provincial government in the realm of training. There is also more basic research being undertaken in textile departments of colleges which may not directly feed the immediate requirements of the industry. There is also collaborative work undertaken by faculty in some of these departments with foreign firms and R&D divisions to develop new fibres. Some of them publish in leading global textile journals and some even have filed for patents for new processes and products. One respondent said that their department is currently undertaking cutting edge research on sea-weed based fabric development. Blending of natural and synthetic fibres, mixing of different kinds of natural fibres to produce varied fabric is done by faculty in collaboration with large textile firms in the region. Some of them have their own internal R&D divisions as well that seek to
develop incremental innovations to improve quality of processes and also the time and effort taken for completion of orders. Such focus on building up R&D capabilities is not evident in the Tiruppur cluster.

It also appears that in-plant training is another important source of productivity improvements in Chinese textile factories. Apart from periodic training given to existing workers to upgrade their skills, all factories provide anywhere between three months to six months of training for new recruits. Sewing machine operators, for example, are taught to sew in at least two types of machines. Such basic training also enables firms to move workers from one production line requiring one kind of stitching to another line that uses another kind of sewing machines. Combined with the emphasis on compulsory schooling, the workforce in China tends to be better placed to adapt to changing skill requirements. It also appears that they are better placed to take advantage of the increasing importance of cognitive skills as opposed to craft-based skills due to the higher levels of basic education.

In Tiruppur, on the other hand, due to the high inter-firm mobility of labour, there is little incentive for the firms to offer in-plant training. All but a few factories report an attrition rate of over 50 per cent within a year. One leading export firm in fact reports an attrition rate of 90 per cent in a year for workers at the entry level. For an individual firm, it therefore becomes extremely difficult to benefit from the training that it provides. As a result, the entire skill acquisition process is an informal process with inter-firm mobility allowing for workers to move from entry level jobs like helpers to relatively more skilled jobs like tailors, fabric cutters, knitting machine operators, printers or dyers. Even the government supported skill training initiative is not supported well by the export firms. The head of the institute feels that there is no incentive for firms to sponsor their workers for such training programmes.

Earlier, when the cluster was characterised by a lesser division of labour and greater levels of vertical integration, workers tended to learn a number of other jobs than the one they specialised in. Thus, a cutting master would also know stitching and packing whereas a tailor would not only help to cut or pack but even run a knitting machine when required. The formation of such a ‘multi-skilled’ labour force appears to have diminished with the greater division of labour\footnote{The ‘deskilling’ resulting due to greater division of labour is discussed by Krishnaswamy (1989).} and the spatial separation of different functions like knitting and stitching. Acquisition of specific skills, however, continues to be an informal process for the industry as a whole. Apart from jobs in dyeing and printing firms and in fabrication, where workers with formal technical qualifications are employed in recent years, blue collared jobs in the knitwear industry
need no formal educational qualification. Traditionally, local workers and later, migrants, enter the finishing units as child workers and take up unskilled work like folding, trimming and work helping. Soon, due to their spatial proximity to the tailors, the child workers tend to pick up stitching skills. This process continues for one to two years after which the child workers move to other firms either through contractors or directly, claiming experience in stitching and seeking jobs as tailors. Over a period, they become full-fledged machinists. Now, with the growing pressure from buyers and civil society organisations, firms do not recruit child labour anymore. Adolescent men and women join as helpers and within a year try to move to other factories seeking jobs as tailors.

This informal process of skill acquisition to an extent enables those with lower educational levels to learn and acquire a degree of vertical mobility. At the same time as we noted earlier, this process also leads to segmentation across gender and across workers from different economic backgrounds. A formal universal and basic training can undermine such tendencies to an extent. But with the entry of private institutions in the upgrading of skills, the fees charged for training is not affordable to all segments creating new forms of inequities. Formalisation needs to be accompanied by public investments and subsidies that can broad-base the process of skill formation. Further, upgradation of existing workers through continuous training programmes that we observe in the case of Shandong factories is completely absent. Only in the last year or two, in response to the growing shortage of skilled operators, bigger exporters have tried to initiate basic training within the factories for new recruits. By providing them with accommodation, food and a subsistence allowance, they hope to retain them for a longer period. The outcomes of these new initiatives are however not clear yet.

In the case of the spinning segment which is part of the formal sector, there has been a gradual dismantling of the Apprenticeship Act in terms of practice. Whereas, the Act was used to train workers and help them build careers within factories in the past, the Act is used at present by several spinning mills to recruit young girls as apprentices, and pay them wages due to apprentices and hence lower than that paid to regular workers. Further in some of the mills, they are paid most of their salaries only at the end of a fixed term of two or three years of work. They are not eligible for payment if they choose to quit ahead of the fixed period. At the end of the period however, workers are not offered a longer term career in the mill.
4.3 Skill Formation and Labour Market Mobility: Role of Mediating Institutions

The process of skill acquisition is closely tied to the process of mobility of the workforce. In Shandong, given the vertically integrated nature of the firm and the in-plant training offered at different times and the higher formal qualifications of the workers, the process of mobility takes place largely within the firm. There is a clear hierarchy of jobs and prospects for workers to move from one level to the other. Workers at the entry level are likely to become line leaders in about three years and group leaders in about 5 years time. Factory managers and Department managers are the jobs at the next levels. In one of the factories studied, out of the 14 managers, 9 have moved up gradually after having joined as workers.

This process is also facilitated by the relatively lower turnover in these factories compared to that observed in Tiruppur. However, even within the factories in Shandong there has been a greater turnover of workers in recent years due to the multiplying of employment opportunities and perception of work in textile factories as less prestigious. Managers feel that workers prefer to work in services sector like retailing than in their factories. The lower turnover in the past has however paved way for this vertical mobility and career prospects. Over 80 per cent of the workers tend to work for more than three years.

The attrition rate is much higher in Tiruppur and for most blue collared workers there are hardly any prospects for intra-firm mobility. Most workers do not work in the same factory for more than a year. Mobility between firms is quite high which also allows for workers to move from unskilled to semi-skilled jobs. This process of mobility aids the process of skill acquisition, but also acts a disincentive for firms to impart training and offer career prospects. The move from semi-skilled to the supervisory levels and further to managerial levels is very remote though in the past, when investment limits were low, there are several instances of workers starting units of their own.

5. Implications

From the above discussion, a few points emerge. The higher levels of schooling among workers in Shandong allows for the possibility of further training to adapt to changing requirements. This highlights the close synergetic links between formal general training and firm specific on the job learning that workers acquire. Movement into higher value-adding segments like design or into processes that ensure better quality
of output require a set of threshold skills among workers to ensure that such product market upgrading translates into a broad based process of skill upgradation and improved worker welfare. This dimension is completely absent among the workforce in Tiruppur. As a result, the new skill demands are met by a new segment of educated workforce and thereby accentuating segmentation and labour market inequities.

Further, the casualisation of the workforce and high inter-firm mobility disincentivise individual firms from investing in training. This has been compensated to a limited extent by the rise of private and some public-private training institutions in the cluster to cater to the needs of the industry. Even then, firms continue to face strong disincentives to fund training of their workers given the strong possibility of leakages of rents derived from such skills. Further, given the dominance of seasonal and impermanent employment, and the alternating of work in this industry and elsewhere, individual workers too do not have sufficient incentives to invest in training at the entry level Further, the absence of clear cut standards in the quality of training render such training highly inadequate to move the workers onto a high road trajectory. Public investments in generic and sector specific training seem to be definitely of a better magnitude in the Shandong region. We also observe that despite different local level institutions, there are certain global product market imperatives that exert a strong pressure towards pushing labour towards the ‘low road’.

While national policies, in the case of India, have focussed attention on the hardware of capability building, there has been much less recognition of the role of skills formation in capability building in this sector. This appears to be partly due to an institutional lock-in that prevents formal interventions in informal labour markets and partly due to policy shifts that perceive labour market intervention to hamper competitiveness in global markets. As the discussion of the use of Apprenticeship Act in the spinning mills highlight, there has been an undermining of even existing systems of skill formation in the formal sector. The observations also clearly highlight the importance of skill formation and the role of local institutions in this regard in a globalising environment. Importantly, the discussions also hint at a greater need to look into the relationship between national-level policy institutions and the dynamism of regional production systems.

References


— 90 —


<Chinese Official Statistics>


Comments on
“The Institutional Milieu of Skill Formation”
by M. Vijayabaskar

Hitoshi Ota

Prof. M. Vijayabaskar has clearly articulated the current situation of Indian textile industry and the skills formation process there convincingly. His explanation of different characteristics of the skills formation process between Indian and Chinese textile industry is very convincing. And his observation “Long way to go for India to catch up with China” is persuasive.

My first impression is that the situation of low level of skills development opportunities, such as low-level of general education or training school enrollment, is not specific to the textile industry, but also applicable to other industrial sectors in India. Another point that should be mentioned is the appropriateness of textile industry as a representative case to discuss skills issue. Though the industry is important in the early stage of modern industrial development, it is not the main leading sector of the economy in the later stage of development. Moreover, the level of value added of the industry is generally low and the required skills level for the industry is also not high. One labor-union leader in Japan told me once that, in steel industry, it would need 20 years for one to become skilled, whereas in the electronics industry it is 5 years. I suspect it would only require several months or so to be considered “skilled” in the textile industry. Therefore, the message of Prof. Vijayabaskar will be more persuasive if he shall raise the example of other industry that needs more complex and sophisticated skills as well as high skills level which take longer years of training to make a comparison in the future. Another interesting point is his mentioning “management Inability”. I observe that, in India, capability of managing staffs to manage and motivate workers is, comparatively, not well developed, while a reservation of this observation is that some part of management skills are not exogenous to how the rank and file workers are. Training also should be discussed from the point of those who are trained.

Though I agree on the need to enlarge educational opportunity and to level-up the content of education in India, I doubt that the people would prefer entering into the
textile industry once they get more educated, as their preferences currently rather appear to be the industries such as finance and IT etc. where the remuneration is better. And at the same time, upgrading of educational level of the workers in the textile industry would lead to the increase of their wage level, and would deteriorate the international competitiveness of the industry.

I would argue that while the “skills development” can be discussed by and as technical terms, the societal aspects should also be scrutinized when we discuss “skills formation”. For instance, so-called “dual system” is specific to German industrial society and, in other countries, specific ways of forming society are also relevant to their own way of skills formation of labors. It would be very nice if Prof. Vijayabaskar would integrate these societal aspects with his study. China alone may not be the good model for India.

The skills formation process in the textile industry in India may be shown by an analytical framework of game theory’s “Prisoner’s Dilemma”. When the employer side and employee side cooperate through, for instance, the provision of in-house training to worker by employer and providing good commitment from worker to employer, both parties could enjoy highest gains, (20, 20). However, since both sides doubt the other and their final result would be non-cooperative equilibrium enjoying lowest social benefits (10, 10).

Classic Prisoners’ Dilemma Payoff Matrix

<table>
<thead>
<tr>
<th></th>
<th>Employer Cooperate</th>
<th>Employer Defect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers Cooperate</td>
<td>(20, 20)</td>
<td>(0, 30)</td>
</tr>
<tr>
<td>Workers Defect</td>
<td>(30, 0)</td>
<td>(10, 10)</td>
</tr>
</tbody>
</table>

* Workers’ payoffs on the left

The situation in Indian textile industry may be shown in the following matrix, making the highest equilibrium gains, say, (50, 50) by cooperation of both sides as the potential market opportunity is large for Indian textile industry as indicated by Prof. Vijayabaskar. Here, there would be no defection of either side. But interestingly, the actual equilibrium appear to fall to the lowest (10, 10) instead of (50, 50).
The possible future of Indian textile industry might be predicted in several ways. In one scenario, “low road”, is that Indian textile industry exert low wage with low-skilled labor and their product enjoys low value-added, which makes the cooperative equilibrium also as low as 30 or 10, making the cooperative solution not very attractive in view of the non-cooperative solution.

It could be the cases where cooperation be of no use such as in “what if case 1” and “case 2” below. The payoff for the employer to defect cooperative workers is too high in “case 1”, and that for the workers to defect cooperative employer is too high in “case 2”. This in turn could be the reason for the payoff of (10, 10) instead of (50, 50) in the above presented matrix of “Case of Tirupur?”.
The modern factory system, where more organized management including that of training is observed and even necessary, needs the transformation from the household or handcraft industry. This sort of transformation might be a part of what is required for attaining the mutually benefitting situation for both workers and employers. Too much preference to being independent would also do certain harm to the organization if it were capricious in nature. Mutually benefitting situation for both may require the change in work culture, too. I hope that the high cooperative equilibrium between workers and employers such as below will be achieved in Indian textile industry.

<table>
<thead>
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<th>Employer Providing Training and High Reward</th>
<th>Employer Not Providing (Training and) High Reward</th>
</tr>
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<tbody>
<tr>
<td>Workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization-Oriented</td>
<td>(50, 50)</td>
<td>(0, 30)</td>
</tr>
<tr>
<td>Worker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Oriented/Centric</td>
<td>* What if (∞, 0) ? ?*</td>
<td>(10, 10)</td>
</tr>
</tbody>
</table>

* Workers’ payoffs on the left

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The modern factory system, where more organized management including that of training is observed and even necessary, needs the transformation from the household or handcraft industry. This sort of transformation might be a part of what is required for attaining the mutually benefitting situation for both workers and employers. Too much preference to being independent would also do certain harm to the organization if it were capricious in nature. Mutually benefitting situation for both may require the change in work culture, too. I hope that the high cooperative equilibrium between workers and employers such as below will be achieved in Indian textile industry.

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</tr>
<tr>
<td>Organization-Oriented</td>
<td>(50, 50)</td>
<td>(0, 30)</td>
</tr>
<tr>
<td>Worker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Oriented/Centric</td>
<td>(30, 0)</td>
<td>(10, 10)</td>
</tr>
</tbody>
</table>

* Workers’ payoffs on the left
Capability-building via Inter-firm Relationship and In-house Employment in India and China: A Comparative Study of the Motorcycle Industry
Capability-building via Inter-firm Relationship and In-house Employment in India and China: A Comparative Study of the Motorcycle Industry

Moriki Ohara

1 Introduction

This paper compares the firm-level capability-building systems, both inter-firm and in-house, in China and India by closely observing the operations of major indigenous motorcycle manufacturers (makers) and their major components manufacturers (suppliers) in the two. The study examines how the skill/knowledge formation of both staff and workers has been conducted within firms, and how inter-firm organization of the division of labor supports the upgrading of manufacturing capabilities.

In-house and inter-firm capability-building mechanisms are mutually-complement and composing different systems in both countries1. We will confirm that different nature of systems: in China, firms are not active in firm/transaction-specific investment to create their own “proprietary” assets, or tend to avoid risks by actively utilizing outsourced standardized resources, if compared to modernized Indian firms2 that tend to do more of such kind of investment both in-house and inter-firm institutions.

This paper, after introducing data and background information on the industry, depicts two different sets of socio-economic institutions in the motorcycle industry in China and India, (1) inter-firm relations and (2) in-house skill formation mechanisms, and will show how they are inter-related in a complementary manner in both countries. The field research to tackle inter-firm relations was mainly conducted up to 2004, and in-house skill formation mechanisms were evaluated from the survey conducted from 2006 to 2008, in China and India.

1 As stated in the introduction of this volume, we assume that the way the economic system is constructed influences the nature and manner of building capability/knowledge, and the latter also determines the future direction of the former (North 1990).

2 The Indian firms examined here are modern manufacturers that are registered as formal “factories” as stated in Introduction.
2 Data and Firms Interviewed

Concerning China, we mainly observed Grand River Group Co., Ltd. (hereafter, Grand River), China Jialing Industrial Co., Ltd (hereafter, Jialing), and Chongqing Zongshen Motorcycle Group Co., Ltd., (hereafter, Zongshen), and their twenty-two important suppliers (six for Grand River, seven for Jialing, and nine for Zongshen) that have or had particularly close relationships with them. Grand River is a private manufacturer established in 1991 and has enjoyed the highest production in China successively since 2003. Jialing is a large state-owned maker that has initiated the development of the Chinese motorcycle industry as a pioneer since the late 1970s. Zongshen is a young maker that was established and began motorcycle production in the mid 1990s. It is one of the most typical and successful privately owned makers that grew very rapidly in the late 1990s by purchasing and assembling external standardized parts of existing dominant models. I conducted surveys on Jialing and Zongshen and their suppliers twice, first in 1998-99 and then in 2002-04, and observed the changes during the interval (Ohara 2006). Many of the suppliers that I surveyed at that time now sell the largest part of their production to Grand River by reducing the portion of Jialing or Zongshen in their production for some reason. In the latest survey conducted in 2007-08, I re-organized the survey results into three portions: six for Grand River, seven for Jialing, and nine for Zongshen.

In India, Bajaj Auto Ltd. (hereafter, Bajaj) and its ten important suppliers were surveyed. For comparison, Hero Honda Ltd. (a maker capitally affiliated with Honda; hereafter, Hero Honda) and other suppliers in close transaction relationships with Hero Honda, TVS, and second-tier suppliers were also surveyed.

3 Overview of the Motorcycle Industry in the Two Countries

Almost 90% of the world’s motorcycles are now produced and consumed in Asia (in terms of production unit), and 25 million motorcycles, more than a half of them, are produced in China, and 8 million, about a quarter of them, are produced in India as of 2007. The two countries occupy critical and unique positions in the world motorcycle industry.
It is noteworthy that, in these countries, indigenous makers stand in the leading position in the industry in each country (table 1).

In India, the number of motorcycle makers in the domestic production is less than 10 and 75% of the market share is still occupied by the top three makers (figure 1). Bajaj is India’s leading and oldest motorcycle maker, and, though it was overtaken by Hero Honda in market share from the mid 1990s, Bajaj is still No. 2 and its market share has been increasing steadily in recent years.

Table 1: Motorcycle Manufacturers in China and India (2006-07)

<table>
<thead>
<tr>
<th>#</th>
<th>Main Makers</th>
<th>Foreign Capital Share</th>
<th>Production (1000 unit)</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grand River Group Co. Ltd (Grand River)</td>
<td></td>
<td>2825</td>
<td>11.1</td>
</tr>
<tr>
<td>2</td>
<td>Loncin Holdings Ltd.</td>
<td></td>
<td>1807</td>
<td>7.1</td>
</tr>
<tr>
<td>3</td>
<td>Chongqing Jiasheng Motorcycle Co., Ltd.</td>
<td></td>
<td>1593</td>
<td>6.3</td>
</tr>
<tr>
<td>4</td>
<td>Chongqing Lifan Industry (Group) Co., Ltd.</td>
<td></td>
<td>1571</td>
<td>6.2</td>
</tr>
<tr>
<td>5</td>
<td>China Jialing Industrial Co., Ltd (Jialing)</td>
<td></td>
<td>1481</td>
<td>5.8</td>
</tr>
<tr>
<td>6</td>
<td>Chongqing Zongshen Motorcycle Group (Zongzheng)</td>
<td></td>
<td>1394</td>
<td>5.5</td>
</tr>
<tr>
<td>7</td>
<td>China Qianjiang Group Co., Ltd.</td>
<td></td>
<td>1351</td>
<td>5.3</td>
</tr>
<tr>
<td>8</td>
<td>Luoyang Northern Ek Chor Motorcycle Co., Ltd.</td>
<td>Thai Ek Chor</td>
<td>932</td>
<td>3.7</td>
</tr>
<tr>
<td>9</td>
<td>Sundiro Honda Motorcycle Co., Ltd.</td>
<td>Honda 50%</td>
<td>888</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>about 140 other makers (registered)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Hero Honda Motors Ltd.</td>
<td>Honda 26%</td>
<td>3207</td>
<td>39.3</td>
</tr>
<tr>
<td>2</td>
<td>Bajaj Auto Ltd (Bajaj)</td>
<td></td>
<td>2202</td>
<td>27.0</td>
</tr>
<tr>
<td>3</td>
<td>TVS Motor Company Ltd.</td>
<td></td>
<td>1352</td>
<td>16.6</td>
</tr>
<tr>
<td>4</td>
<td>Honda Motorcycle &amp; Scooters Ltd.,</td>
<td>Honda 100%</td>
<td>883</td>
<td>10.8</td>
</tr>
<tr>
<td>5</td>
<td>Yamaha Motors India Ltd</td>
<td>Yamaha 100%</td>
<td>300</td>
<td>3.7</td>
</tr>
<tr>
<td>6</td>
<td>Kinetic Engineering Ltd</td>
<td></td>
<td>74</td>
<td>0.9</td>
</tr>
<tr>
<td>7</td>
<td>Enfield India</td>
<td></td>
<td>37</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>a few makers</td>
<td></td>
<td></td>
<td>1.3</td>
</tr>
</tbody>
</table>

The picture of the Chinese motorcycle industry is very different from those of India. There are more than a hundred and fifty officially registered makers and their market share is fairly dispersed (table 1). No single firm has a large enough market share to influence the rest. Particularly interesting is the fact that, contrary to the other Asian major motorcycle manufacturing economies including Japan, Taiwan, and India, where the market share concentrated as the industry entered into the full-fledged development stage, only in China the concentration ratio declined as the industry entered into it (figure 1). Jialing used to have as large a share as around a quarter until the early 1990s. At that time, 80% of the market was occupied by the ten largest firms, and all of them were state-owned firms. However, as the domestic market expanded at an unprecedented pace in the mid 1990s, many new makers that were very competitive in price, including Zongshen, emerged and many traditional state-owned makers including Jialing declined in market share. It is after the rapid expansion of Grand River that the share of top producers became slightly concentrated after 2003. Grand River has now become the largest indigenous motorcycle maker in Asia (excluding Japanese makers). It is noteworthy that, only in China, the share of Japanese-affiliated makers is very small (the total sum of the shares of nine Japanese-affiliated makers in China is as small as 10%).

There is a large disparity in the motorcycle industry between China and India in

![Figure 1: Share of the Top Three Motorcycle Manufacturers in Selected Asian Economies (in terms of domestic production)](image)

*Sources: ZQGNNB, SIAM, and Honda (various years), Shih and Chen (2004)*
terms of the harshness of price competition. In India, a sharp drop in motorcycle price cannot be observed during the 1990s. But in China, the average price fell as much as 40% during the ten years from the early 1990s, despite the fact that their main products were upgraded from 100 cc to 125 cc during the same period.

One of the critical technical reasons for China’s sharp drop in motorcycle prices was that, since the 1990s, numerous makers have redundantly produced “imitations” or “minor-change versions” of a few standardized (dominant) models (which were originally developed by Japanese makers) (Ohara 2006). On the contrary, In India, leading makers like Bajaj develop and produce their own models equipped with their originally designed engines, and such blatant and harsh price competition among many homogeneous makers experienced in China has not been observed in the two countries. The status has not fundamentally changed in the latter half of the first decade of the 2000s.

4 R&D Activities of the Motorcycle Makers

This section briefly overviews the different statuses of the innovative activities and capabilities of the motorcycle makers Grand River, Jialing, Zongsheng, and Bajaj. By innovative activities, this paper mainly focuses on their product development activities.

Bajaj started scooter production with technological assistance from Piagio in the 1970s. Well protected by the “license raj” of the Indian government, it enjoyed a fairly preferential competitive environment till economic liberalization. However, after the new competitor, Hero Honda, Honda’s affiliate in India, emerged in the 1980s, Bajaj also started to prepare for a new era of competition by collaborating with another Japanese manufacturer, Kawasaki, in the field of motorcycle products. After the re-organization of suppliers (which will be explained later), it strengthened its R&D capabilities especially after the late 1990s. Now, it enjoys the largest number of R&D staff in Asia, 400 (excluding Japanese makers), which is larger than Grand River’s 260, Jialing’s 250, and Zongsheng’s 300. The outcome of R&D activities is also prominent, releasing a new engine system with the “digital twin spark” engine for more efficient fuel usage in 2005, and other new engines with small displacement under 150 cc. Bajaj is now recognized by Honda and Yamaha as a strong competitor not only in cost and sales, but also in technological frontiers in small-scale engines that are suitable for the Indian market.

Many Chinese manufacturers also have technological collaboration with Japanese
dominant manufacturers. Jialing had technological assistance from Honda since the early 1980s and established with Honda one jointly capitalized motorcycle manufacturer. Grand River also has strong technological collaboration with Suzuki and has established a jointly capitalized R&D center under it. It also launched a new large-scale motorcycle factory with Suzuki in another part of China.

However, in contrast to their Indian counterparts, they are not deemed as technologically (in terms of R&D in products) strong competitors by Honda and Yamaha. For example, Grand River is rather modest in its expansion of R&D capability. It has two R&D centers: one is for the Suzuki brand and the other is for its own brand. The focus of its own R&D center is how to adapt to local markets, especially in rural and small-scale city areas, and it is thus not interested in technologically original engines or other cutting-edge new frontiers.

Jialing and Zongshen are more aggressive in adopting new technology into their products, and the two show apparent interest in larger engines such as 400 cc and 600 cc or racers. They have already started collaboration with European manufacturers and distributors and are trying to expand their exports. However, the outcome of such efforts is not yet apparent. The exports of the two, especially that of Zongshen, are still mainly at the low-end world market such as Africa or other low-income countries and the product is C100, an old and very standardized model of Honda originally developed in the late 1950s by Honda. The size of R&D activities is not large, either in terms of expenditure or personnel, compared to Bajaj.

5 Inter-firm Relations between Makers and Suppliers in the Three Countries

This section compares the mode of production networking or inter-firm relations in terms of how participating firms are trying to build manufacturing capabilities between final motorcycle manufacturers (hereafter, makers) and their important first-tier network firms that supply important parts to the makers (hereafter, suppliers) in China and India.

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3 Compared to Bajaj’s R&D expenditure, 24 million USD in 2007, Jialing spent 8 million and Zongshen 19 million in the same year. Bajaj’s figure is according to its annual report and Jialing and Zongshen by the author’s interviews.

4 In Ohara (2001), I exemplified a clear difference in the patterns of forming inter-firm relations in Japan and China. In Japan, manufacturers have formed “integrated-type” inter-firm relations, whereas in China, major indigenous makers and suppliers have formed “dispersed-type” relations (Ohara 2006). However, the studies did not advance further to explain the causes of this difference. And at the same time, directly comparing firms in Japan, an advanced economy, and in China, a developing country, does not tell us whether this gap was caused mainly by the sheer difference in their developmental stages, or by other factors inherent in their characteristic economic systems or market society. This paper aims to make up for this weakness by comparing China with India, whose stages of economic development are more similar to China’s than Japan’s.
For comparison, we set two ideal types of mode of networking, and compare the realities of different firms with these two ideal types to distinguish their organizational characteristics, similarities, and differences.

An “integrated type” is an organization with division of labor where the core maker sets a common target for suppliers, exerting active leadership over them in managing the mechanisms of incentives and monitoring to enhance the capabilities of the network as a whole. The risk of tackling innovative activities, especially for new product development, is also carefully evaluated by the core maker and distributed within the network. A “dispersed type” is a typical market-oriented organization where the leadership of the core maker is weak, with less sharing of common goals and information/knowledge and suppliers seeking their own upgrading of capabilities. The risk of innovative challenges is also solely borne by participating firms.

The critical points for classifying the two ideal types are the following four: 1) “maker’s outsourcing structure”—how the maker divides in-house and outsourced parts, 2) “multi-sourcing” and “dependency”—how the maker creates competition among rival suppliers that supply identical parts to the maker, 3) “risk sharing,” and 4) “supplier development activities”—how the maker deals with suppliers directly in transactions. Point 3) shows how the risk arising in developing new products is shared between them, and point 4) shows what kind of activities makers are initiating to upgrade suppliers’ capability.

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5 This section is based on the analytical framework of Fujimoto (1999).
5.1 Maker’s Outsourcing Structure

Table 2: Outsourcing Structures of Asian Makers

<table>
<thead>
<tr>
<th></th>
<th>No. of Suppliers</th>
<th>Affiliated Suppliers (cap.relations)</th>
<th>Change</th>
<th>No.</th>
<th>Foreign Collab.</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand River</td>
<td>380</td>
<td>5</td>
<td>↓</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Jialing</td>
<td>350</td>
<td>5</td>
<td>↓</td>
<td>1(cab)</td>
<td></td>
</tr>
<tr>
<td>Zongshen</td>
<td>500</td>
<td>several</td>
<td>↓700(90s)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bajaj</td>
<td>210</td>
<td>0</td>
<td>1400(97)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Honda</td>
<td>200</td>
<td>&gt;30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yamaha</td>
<td>200</td>
<td>several</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Interview by the author, Annual Report of Bajaj Auto Co. (various years)

Tables 2 show the makers’ outsourcing structure, showing the statuses around 2007-08 for China and 2004-05 for India, and the trend of change at that time. The changing direction of China in the tables is judged by comparing the first survey in the late 1990s, the second survey in 2003-04 (for details on China, see Ohara 2006), and the third survey in 2007-08.

5.1.1 Degree of Dependency on Outsourced Parts and Suppliers

The outsourcing ratios\(^6\) of Jialing, and Zongshen are lower than those of Japanese makers. Jialing, as a typical large-scale state-owned enterprise from the planned economy era, has a tendency to produce important parts in-house.

It is noteworthy that Bajaj has a fairly high outsourcing ratio, and this is the result of Bajaj’s drastic transformation in purchasing policy under the “vendor rationalization policy.” Bajaj used to produce in-house as much as 50% of necessary parts and purchase the rest from as many as fourteen hundred suppliers in the mid 1990s. The outsourcing policy at that time was such that it produced as much as possible by itself, purchased critical parts from foreign-affiliated suppliers or imported them from abroad, and used many suppliers to make unimportant parts. However, from the late 1990s, it began to outsource many in-house processes for parts,\(^7\) and re-organized the “flat layer”-type supplier organization into a more “multi-layer” or “hierarchic” type, by selecting capable first-tier suppliers and arranging many others as second- and third-tier suppliers.

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\(^6\) The ratio of purchased material/parts cost to manufacturing cost. I acquired this data though my own interviews; however, some of interviewees may have misunderstood the definition.

\(^7\) Suppliers i-3 and i-5 in this study employed staff who spun off from Bajaj during the process.
under them. The primary aim of this re-organization was to enhance the capability of developing new models (Bajaj Annual Report 2002). By doing so, Bajaj can focus more resources on new model development activities, having more parts development activities outsourced to first-tier suppliers. With such arrangements, Bajaj put emphasis on initiating activities to upgrade the technological capabilities of suppliers.

Outsourcing structure of Grand River and Jialing is almost the same as their Japanese counterparts. Zongshen has a fairly strong in-house policy at present. However, it had an outsourcing ratio as high as 90% until the end of 1990s. As stated above, the high outsourcing ratio was the result of its technological characteristics when it started business in the 1990s. It started business being heavily dependent on the “de facto standardized” parts purchased from a large number of local suppliers in Chongqing. However, it should be noted that, as requirements for quality and new product development increased mainly from 2000, Zongshen has increased the kinds of parts manufactured/processed in-house. In particular, after completing the “Zongshen Industrial Zone” project where it established important parts production bases in 2005, it has significantly increased the in-house ratio to as high as 30%.

However, a common characteristic of the three Chinese makers is that they use more suppliers than Japanese and Indian counterparts. The most recent number of 1st-tier suppliers used by Grand River is 384, by Jialing, 300, and by Zongshen, 500, in 2007-08, compared to 210 by Bajaj in 2007, and around 200 by Honda and Yamaha in 2006, and they used to transact with an even larger number of suppliers in the late 1990s. This is the result of the “multi-sourcing” policy of Chinese manufactures, as will be discussed soon.

### 5.1.2 Affiliated Suppliers: Intention to Build Their Own Technological Bases

Though the three Chinese makers also have a few affiliated suppliers, most of them are nothing to do with foreign companies. The one exception is a carburetor supplier established between Jialing and Japanese Mikuni, which also has a strong expertise in the field. However, according to my interviews, Jialing has had little intervention in the management of the company except for imposing a profit target, and for the company, Jialing is no longer important in terms of volume of transactions. Instead, its most important customer is now Grand River and it recently established a factory near Grand River to assist its new product development.

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8 Supplier i-7 became a first-tier supplier of muffler units during the process.

9 Zongshen used to use as much as 700 in late 1990s.
The intention of Chinese makers to establish affiliated suppliers does not seem to be the result of a strategic decision to have important suppliers assisting their product development. For example, Grand River has five affiliated suppliers in CVT (for scooters), cushions (suspensions), seats, air-cleaning parts, and electroplating processes. All of them are for the purpose of cutting costs by substituting imported parts or parts with domestically unstable supply in terms of quantity and quality, and most of them do not have sufficiently strong enough competitiveness compared to outside expert suppliers.¹⁰ There does not seem to be any intention among Chinese makers to depend on powerful international players for several critical parts, particularly with a view to strengthening their development capability.

In this point, Indian Bajaj is seemingly more similar to its Chinese counterparts, with almost no suppliers capital-affiliated with it. However, as will be analyzed later, Bajaj tends to have close and closed relationship with key suppliers, and, though capital not related, it has several very critical parts suppliers (indigenous) with closed relationships in such areas as cushions (suspensions), clutches, engine parts, and plastic cowlings. Bajaj seems to be trying to be technologically independent from powerful foreign (in the case of motorcycles, Japanese) suppliers. In terms of strong will to have its own supplier base for further capability both in terms of product development and manufacturing (quality control), Bajaj is more similar to Japanese makers, not to Chinese counterparts.

5.2 Multi-sourcing and Dependency Rate

The “dependency rate” in table 3 is the (average) ratio of sales to main transaction partners (five makers in three countries) out of all sales of main products¹¹ of the suppliers surveyed. The average dependency of Bajaj’s suppliers (on Bajaj) is the highest, 70 %, and that of Chinese suppliers is the lowest. Concerning the direction of change in the dependency ratio, the figure is showing a declining trend in China, whereas it is increasing in India. The “number of transaction partners” in table 3 is the number of makers with which the supplier is simultaneously in a transaction relationship. This figure is smallest in India and highest in China, too. In sum, the transaction relationship is closed in India and open in China.

¹⁰ My interview with the president of Grand River.
¹¹ Not the whole sales of the supplier. If the supplier is selling various kinds of products, dependency on the maker in sales will be less than it appears in the figure in the table.
### Table 3: Multi-sourcing and Dependency

<table>
<thead>
<tr>
<th>Source</th>
<th>no. of transaction</th>
<th>dependency ratio (%)</th>
<th>trend</th>
<th>multi-sourcing of identical parts</th>
<th>trend</th>
<th>single</th>
<th>two</th>
<th>&gt;3</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand</td>
<td>6</td>
<td>24</td>
<td>↑</td>
<td>8.5</td>
<td>↑</td>
<td>0</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Jialing</td>
<td>6</td>
<td>15</td>
<td>↓</td>
<td>15.4</td>
<td>↑</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Zongshen</td>
<td>9</td>
<td>22</td>
<td>↓</td>
<td>20.4</td>
<td>↓</td>
<td>0</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>India</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bajaj</td>
<td>7</td>
<td>71</td>
<td>↓</td>
<td>2.3</td>
<td>↓</td>
<td>4</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>(all)</td>
<td>8</td>
<td>75</td>
<td>↓</td>
<td>2.1</td>
<td>↓</td>
<td>5</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Sources: Interview by the author.

As for the situation of multi-sourcing, Bajaj utilizes a single-source policy in most cases. This is noteworthy if we remember the maker’s recent very rapid expansion in production volume. In my interview with them, Bajaj said that they use a single-source policy with suppliers for 80% of parts. From the maker’s perspective, under a single-source transaction, the maker can more easily conduct technical evaluation and monitoring of each supplier, and from the supplier’s point of view, the supplier can make a commitment (transaction-specific investment) with greater confidence. However, since the supplier can enjoy a monopolistic position in transactions for parts, for the maker, there is the risk of a moral hazard problem occurring with the supplier.

In contrast, we observed no cases of single-source-based transactions in China. The top management of Zongshen explained to me that “if we concentrate our transactions on one supplier, it is often the case that we cannot control them. That is why we use two suppliers for every single part.” Jialing also answered in the same way. However, according to suppliers, two makers often purchase an identical part from more than three suppliers. This is probably because the two-source policy of the top management has not completely penetrated coalface staff in charge of purchasing for some reason. However, we can also observe the trend where makers are concentrating transactions on a smaller number of suppliers in comparison to the late 1990s, and there is now a higher ratio of two-source transactions.

12 The maker can secure “traceability” of problematic parts, as well.

13 According to suppliers, such cases sometimes happen where the maker’s staff in charge of purchasing pursue personal benefit (are open to bribery) and arbitrarily change the transaction partners.
5.3 Risk Sharing

Table 4 shows the way of sharing development costs of new products (motorcycle parts). For the sake of convenience of observation, we mainly discuss the sharing of die/mold costs that occupy a significant part of development costs. In this table, “fully paid by the maker” means that the maker ensures the depreciation of all die/mold costs. “Fully paid by the supplier” means that the maker does not ensure depreciation. In this case, if the product does not sell well, the loss will be borne fully by the supplier. In this sense, all the development risk is borne by the supplier. “Sharing” means that, by providing advanced payment or ensuring payment of part of the mold/die costs, they are sharing the risk.

Table 4: Risk Sharing

<table>
<thead>
<tr>
<th>n</th>
<th>Dev't cost (die/mold)</th>
<th>Risk of dev't failure</th>
<th>Unpayment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>fully paid by maker</td>
<td>sharing</td>
<td>fully paid by supplier</td>
</tr>
<tr>
<td>China Grand River</td>
<td>6</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Jialing</td>
<td>6</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Zongshen</td>
<td>9</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>India Bajaj</td>
<td>7</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>(all)</td>
<td>8</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Interview by the author.

My previous research result shows that Japanese motorcycle makers have institutionalized the mechanism of maker’s risk absorption, under which suppliers are expected to make greater commitment to product development, which is the same as automobile industry (Asanuma 1997, Ohara 2006). Such a system can be managed only in a situation where makers and suppliers share information/knowledge on the technology that suppliers use, and the maker can make a proper evaluation of the concrete costs of development based on the shared information.

On the other hand, Chinese makers force suppliers to shoulder most of the risk. When development fails (meaning that the product does not sell well in the market), the suppliers take all the risk.

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14 The analytical framework of this section is based on Asanuma (1997).
15 Even when the depreciation of die/mold costs is not ensured by the maker, if the new product sells in large enough volume, the supplier can complete the depreciation by adding it to the selling price.
The failure rate of development is high in China. In particular, in the late 1990s, many suppliers answered that the rate of success (meaning the possibility that the supplier can depreciate the development costs) was around 20%. Despite the high failure rate, during that period, since there were so many suppliers seeking business opportunities, makers did not have difficulty in finding transaction partners. In practice, suppliers also had measures in place to reduce their risk. Since their products were imitation or minor-change versions of dominant models, suppliers could find other makers who would buy them. In addition, suppliers transferred their risks to their own (second-tier) suppliers in the same way. In the 1990s, non-payment behavior was very widespread over the business. When makers do not pay their first-tier suppliers, those suppliers do not pay their second-tier suppliers. Under such circumstances, both makers and suppliers were reluctant to make “transaction-specific” investments, and their products became more and more “homogeneous” at the parts level. Makers and suppliers were reluctant and actually unable to share technological information/knowledge between them. When defective parts were “found,” makers simply returned them without analyzing true causes of the defect (meaning without knowing whether the parts were really defective) and even asked suppliers for compensation. However, it is noteworthy that, in 2003-04, the second survey in China revealed that more firms were beginning to share development costs compared to the late 1990s. Firms were more deliberate and used more systematic methods to implement development projects, which reduced the rate of development failure as well as the risk to the supplier significantly. It is considered to be the reaction of overall industry after they experienced the dead-end of the profit decline in the late 1990s. Grand River is famous for its most deliberate attitude of not transferring risks to suppliers by deceiving them.

Concerning India, according to table 4, Bajaj’s suppliers are also bearing die/mold costs as in the case of Chinese firms. The difference from China is that the failure rate of development is very low and non-payment behaviors were not observed in Bajaj’s case. In reality, it would safe to say that the development costs were virtually borne by Bajaj, but the method of sharing was not as well institutionalized as in Japan.

5.4. Nurturing Suppliers

Makers can practice supplier nurturing (“supplier development”) activities, by which the maker takes various kinds of measures vis-à-vis suppliers to promote their capability upgrading in directions that the maker expects (Krause 1997). Supplier nurturing
activities include direct measures to enhance transaction-specific capabilities and indirect capabilities to develop infrastructural (multi-purpose) capabilities, including technological/financial assistance, personnel exchange, information sharing, stabilization of transactions (for example, concentration of orders on specific suppliers), etc.

As mentioned above, under the “vendor rationalization policy,” Bajaj began to concentrate transactions on a smaller number of first-tier suppliers that have development capabilities. Since then, Bajaj has practiced several activities to nurture them. All the suppliers surveyed for this study participate in TPM (total productivity maintenance) activities that Bajaj has initiated since around 2000. A typical case of Bajaj’s supplier nurturing activities observed by the study is muffler supplier i-7. Before the policy change, Bajaj used to purchase parts related to the exhaust system from about a hundred suppliers. However, from the end of the 1990s, Bajaj designated five suppliers from them as unit parts (first-tier) suppliers, and supplier i-7 came to manage the integration of many second-tier suppliers. Along with the change, i-7 accepted financial support at the initial phase and technical support from Bajaj including personnel exchanges. Bajaj also initiates technological training of second-tier suppliers using i-7 as an example.

An interesting point found in the survey about Bajaj’s suppliers is that all the six metal-processing suppliers surveyed emphasized their efforts in raising their own closely related second-tier suppliers, and they say some of the second-tier suppliers only transact with them. It is their endeavor to become a superior first-tier supplier with stable quality and delivery. The effort to raise second-tier suppliers was not heavily emphasized in the survey in China. This may suggest that in India, suppliers become technologically weaker as the tier descends in the hierarchy, compared to China.

Concerning the three Chinese makers, not many concrete cases of supplier development were observed during the survey, particularly in the late 1990s. Until the 1980s, Jialing had ever provided support for the fixed cooperative suppliers (mostly state-/collectively-owned) including technological training opportunities (via Honda) and financial support. Jialing tried to nurture capable suppliers that could manufacture parts based on the design drawings developed by Honda for the purpose of substituting the imported parts (designated by Honda) in a planned manner. However, in the 1990s, as many suppliers (mainly privately-owned) who had this type of capability newly emerged, Jialing came to find little necessity in raising such suppliers by themselves. In the former half of 1990s, such cooperative relationships between Jialing and former
cooperative suppliers disappeared.

Grand River, on the other hand, was more active than Jialing in the 1990s. Grand River’s basic attitude to supplier development was “to wait patiently until they become competent.” The strength of Grand River, according to the president of the company, is that it directly applies what they learnt from Japanese manufacturers, especially Suzuki and Honda, and does not pursue rapid expansion but tries its best to maintain the quality level. That was considered as the main reason why the company was not one of the largest during the 1990s.

Zongshen started to manage a “quality assurance system” with its important suppliers with whom they established the “Zongshen Group.” Under this scheme, Zongshen in collaboration with suppliers’ standardized operations, and engineers of Zongshen routinely circulated among suppliers and monitored whether or not they were operating properly as designated in the standard. However, in the second survey in 2004, such circulation had been interrupted except for c-13. The reasons for interruption was that, since the capability raised by such a system is an infrastructural (multi-purpose) capability such as production management, and since suppliers supply similar parts to Zongshen’s many rivals, Zongshen found it does not need to pay for them. In 2004, however, Zongshen started a few new collective schemes in cooperation with important suppliers, including a market (dealer) visiting project and discussion with material suppliers. Such collective coordination to enhance technological capability is noteworthy, though at the time of the survey, they conducted such activities as ad hoc projects, not “routine” activities institutionalized in ordinary operations.

5.5 Summary: Modes of Inter-firm Capability Formation

In sum, during 2003-05 and 2007-08 as well, Bajaj formed a cooperative production network with important suppliers, which is closer to the typical “integrated type” than their Chinese counterparts. They shared risks and practiced active supplier nurturing activities and strengthened their integrity during these several years.

On the other hand, the production networks of Chinese makers are the “dispersed” type, particularly in the late 1990s. Their relationship has been more open and unstable, and the sharing of risks has not been practiced. Particularly in the 1990s, this tendency was prominent under the circumstances of very frequent failures of development and

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16 Grand River has had official technological cooperation with Suzuki since the early 1990s and the president was the head engineer of one state-owned motorcycle manufacturer when he was in charge of technical cooperation with Honda in 1991.

17 All the seven suppliers surveyed in this study for Zongshen (c-8-14) were members of the “Group.”
blatant risk transferring and non-payment. However, after 2000, the relationship has been transforming into the “integrated type,” as shown in our observations such as makers’ higher concentration of orders on a smaller number of suppliers, less prominent risk transferring, and the beginnings of more systematic supplier nurturing activities.

6 Comparison of In-house Skill Formation Mechanisms

This section examines the ways of building capability inside firms in China and India. As types of capability to analyze, this section focuses on the skill formation of staff and workers of motorcycle parts manufacturers. The data of this section are collected mainly from interviews conducted in 2007 and 2008.

6.1 Profile of Operations

Firstly, the basic differences in the operation of parts suppliers between China and India are overviewed in this section. This is due to the assumption that internal skill formation processes and mechanisms are considered to be closely related to the basic characteristics of their direction of management.

The average “gross margin rate”\(^{18}\) of eleven Chinese suppliers was 7.3 %, whereas the average “profit after tax” was 14.5 % in case of five Indian suppliers from whom we received answers. It is generally said that, in order to secure positive final profit (after tax) for manufacturing firms, the “gross margin rate” should be more than 10-12 %. In fact, most of the Chinese suppliers that we interviewed said that their final profit was nearly 0 %. The lower profit of Chinese motorcycle manufacturers (and the higher profit of Indian manufacturers) can be examined using larger publicized statistics in similar industrial categories\(^ {19} \).

The average size of the parts suppliers that I investigated by (a) employment size was 1,585 employees per firm for China (twenty-four firms) and 640 employees per firm for India (thirteen firms), and the average size investigated by (b) revenue size was 56.5 million USD for eleven Chinese firms and 56 million USD for their seven Indian counterparts. Interestingly, the revenue size is almost the same, whereas Chinese firms apparently employ more staff. A similar image can also be seen from the data of a larger

\(^{18}\) Gross margin rate = total sales – manufacturing cost. This includes the sales and management costs and taxes.

\(^{19}\) While Indian auto parts manufactures earned as much as 7-11% operating profit during 1993 to 2004, Chinese counterparts earned less than 2-6% for the same period of time (ACMR for China and MOSP for India).
This is partly the outcome of the gap in profit between the two. However, the price (cost) of production and the production size (in units) also seem to be decisive factor in this phenomenon. The cost cannot be comparable between the firms of two countries since their products are not all the same. But for the production size of some similar companies, there is a difference. The largest Chinese engine parts die-casting (aluminum) manufacturers produce as many as 7 to 12 million units, the largest gear manufacturer produces 10 million sets of transmission gear units, and piston suppliers produce 9.5 million units, whereas the production level of their Indian counterparts is somewhere in the range of 2 to 3 million units for crank cases or transmission gear units. The number of production units of Indian first-tier suppliers does not usually exceed 1 million, but many Chinese counterparts surveyed produce more than 1 million. We can speculate that Chinese firms are using a larger number of workers to make a larger number of units, and that the price of one unit is far lower than in India. And from the case of final production (of motorcycles) in the market, Chinese firms produce a far larger volume for one lot (kind of parts) than Indian firms. And it is also easily presumed that workers are engaging in more specialized works than their Indian counterparts in their in-house division of labor, where a far larger number of workers are making fewer kinds of products.

6.2 Wage Rate and Liquidity

The average monthly wage rate for staff and engineers is 420 USD in six firms, and that of workers is 208 USD in seven firms in India. In China, the wage rate of staff/engineers is 370 USD (twenty firms) and that of workers is 213 USD (twenty firms). The wage rate of worker-level employees is almost the same between China and India, but at the staff/engineer level, the wage rate is higher in India than that in China.

There is the difference in the liquidity of labor between the two. In Indian firms, the average attrition rate at the staff level (managers, engineers, and core technicians) is 13.2 % (for six firms) and that at the general operator level is 5 % (seven firms). The latter figure is calculated from the data including those on contracted workers. In China, the average attrition rate at the staff level is as low as 1.4 % (for twenty firms) and that at the operator level is 11.1 % (for twenty firms). In India, staff-level workers have more

sample number\(^{20}\).

While the average size of employees of Chinese motorcycle parts manufactures was as large as 1.7 to 3 times more than Indian counterparts during 1992 - 2004, the average sales size of Chinese was 1 to 1.7 times more than Indians. For China, 763 firms in 1993 and 1462 firms in 2004 (ACMR), and for India, 488 in 1992 and 590 in 2003 (MOSP)
incentives or opportunities to move firms than worker-level employees. On the other hand, Chinese operators have more incentives to change firms than staff. It should be noted that most of the Chinese firms answered that more than five years ago, the attrition rate was far higher than at present, which was 20-30% a year.

Combining the fact that staff-level laborers earn higher wages and have higher liquidity, presumably in India, staff-level labor is scarcer than worker-level labor. In China, on the other hand, worker-level labor is scarcer vis-a-vis staff than in India. This interpretation sounds odd from the viewpoint of the conventional image of both countries, where it is believed that abundant rural workers have been the source of Chinese competitiveness and where there are a large number of elite people produced in India’s education system famous for its historical emphasis on higher education.

However, thinking about the supply side for the respective types of labor, it may make sense. It may be the result of the fact that in India, where highly educated people tend to enter the IT service sector that absorbs many of the graduates of engineering colleges, staff in the traditional manufacturing sector such as the motorcycle industry might be scarcer compared to workers. On the other hand, the manufacturing sector in India has not yet as fully developed as China’s, which might restrict the demand for worker-level labor. In China, since there is also a massive amount of other manufacturing factories with job opportunities, workers of motorcycle parts suppliers can find more opportunities outside than in India.

### 6.3 Career-climbing Opportunities from the Bottom

In Chinese firms, it is not rare to find cases where former line operator-level workers climb up to become management staff. Five firms out of fifteen that were asked the question have factory managers who climbed up from operator level, ten have line chiefs who used to be workers, and most of the unit chiefs used to be workers. In India, two of four firms have a supervisor (equivalent to China’s unit chief) who climbed up from worker level, and four firms do not have section chiefs (equivalent to China’s line chief) from worker level. In India, unit chiefs (heads of the base unit of the operation) are mostly staff (new graduates from higher education), but in China, they are talented persons among workers. The highest position that a worker can generally expect is as a “leading hand,” a multi-skilled supervisor of workers. A supervisor is deemed to be a staff member.

It is true that in China, educational background is very important for climbing the
of the personnel system, especially in large firms, and the chance for base workers to do this is limited. However, compared to the clear divide that is easily observed in India, it seems that Chinese firms, and society, tend to provide more opportunities for base workers to rise in their career. An important reason for this phenomenon is that, since many of the firms investigated have a shorter history than those in India,21 and since many of them started from very small firms predominantly consisting of workers with a low educational background in their early years of operation, such people have now become manager-class personnel in some of the companies observed. However, a large company with long history of operation, Jialing, also had a small number of former workers who climbed up to the position of vice factory manager. This case was not heard of in India.

From this, we can conclude that the in-house labor market is strictly divided in India, whereas relatively speaking, China is less divided and more open to talented workers climbing up the ladder if possible.

6.4 Incentives (Manner of Determining Wages)

The way of determining wages reflects the firm’s attitude toward the formation and evaluation of the skills of its personnel.

In Indian motorcycle parts suppliers, regular staff and workers are employed without an employment period condition. Their wages or salaries are in general determined once a year partly by simply adding the inflation rate or another unified rate for upgrading within the firm, and partly by evaluating performance and increase in skills. In India, there is a difference between “skilled” and “unskilled” workers for each job category. This also reflects the fact that Indian firms try to evaluate the skill level, meaning that they reward partly for the results of work, but also partly for skills. In India, the status of personnel is relatively stable, and the wage level also rises in a stable manner every year.

In China, however, for the management of workers, firms tend to heavily rely on piece-rate wages, a strong incentive. Only one firm out of twenty answering this question had completely given up the piece-rate system. However, this does not mean that firms regard the piece-rate system as the best way for them. In fact, ten firms said that they will decrease the portion of total salary paid by piece rate and increase the portion paid by time or fixed salary. At present, most of them use a mixture of the piece-

21 The average year of establishment of twenty-seven firms in China is 1991, whereas average year of establishment of sixteen Indian firms is 1982.
rate and fixed-salary system, out of which the former comprises as much as 40-100%.

The reason that firms are trying to decrease the piece-rate portion is that they perceive the system as being deficient in motivating workers to maintain the quality level. Obviously, the piece-rate system tends to encourage workers to produce more in number, and it is often the case that workers disregard quality for the sake of increasing quantity. This has become an increasingly serious problem for most Chinese firms who have faced continuous pressure from their customers to increase their quality levels.

However, some firms returned to the piece-rate system after trying a more fixed-wage system for a period of time. Most of them confessed that without the system, it was extremely difficult to maintain worker motivation, and it is often workers that require the resumption of the piece-rate system, since for them it is the most “fair” system.

For them, one solution to the dilemma is to elaborate the design of the piece-rate system where every different job has a different wage rate, which is proper both in the way of reflecting the actual demand-supply gap (of workers) and in encouraging workers to upgrade their skills.

It is interesting that, in China, we seldom find the words “skilled” and “unskilled” in interviews on the wage system. Since the wage rate is mostly determined using the piece-rate system, and skilled workers and unskilled workers are paid differently automatically according to their performance, the management side does not have to evaluate the skill levels of respective workers.

This systematic lack of evaluation mechanism of respective worker’s skill level in many Chinese firms may influence their system of training or nurturing their own personnel. However, they may figure out fairly well-designed piece-rate mapping of jobs after seriously researching samples of workers.22

As for staff-level personnel, Chinese firms widely use the yearly contract system for wages. Basically, the annual salary is determined based on the performance of the previous year. Though not as strong as the worker’s piece-rate system, this is a highly incentive-driven system adapted to staff-level personnel in China.

6.5 Multi-skill Formation

Multi-skill formation is widely deemed to be an excellent practice in the manufacturing sectors of various countries. Both in China and India, firms are generally aware of the positive aspects of this idea, whereas in India, the idea recently came to be generally

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22 Some Chinese firms say their quality level improved after increasing the piece-rate portion.
accepted on the shop floor; however, in China, it is not really practiced widely for their own reasons.

All the Indian firms answered that they are aware of the virtue of multi-skill formation of workers and some have deliberately started a planned job rotation system in some of their shops. Most of the small manufacturers with very limited human resources are doing this naturally in the course of keeping up with daily orders.

The aim of job rotation for most of the firms interviewed is mainly to back up absent workers, and other reasons such as increasing labor productivity by operating different machines by fewer persons are not seriously considered. Upgrading and widening the range of worker’ skills is in general not considered important.

Chinese firms are generally more passive in introducing the practice concretely to their shop floors. They are also aware of the necessity to do this for abrupt job vacancies (due to the high attrition rate in workers). However, since the workers are organized basically using the piece-rate system, it is often the case that workers are not willingly to change jobs for fear of being unproductive (meaning their wage declines) during the period when they are not accustomed to the new job. Another worry about shifting jobs, for the management side, is that workers are aggressive in taking on new jobs with a higher piece rate, and even incapable workers try for such jobs, which will cause some problems in the shop. In particular, firms that are running at full capacity are very passive for fear of such losses. Some firms express their clear preference for confining workers’ job range so that they can maximize their skill level (hence productivity) to the limit.

As for staff-level personnel, both in China and India, they conduct rotation in an ad hoc way to nurture future core personnel candidates. This is not clearly for the sake of widening the range of technical skills, but rather for the sake of wider knowledge of the firms’ management and operation.

### 6.6 Training Activities

The necessity of training activities is well perceived both in China and India, but relatively speaking, the Chinese seem to utilize outside training services more than the Indians, and India seems to rely on in-house training more than China does.

Some Chinese parts suppliers dispatch staff- or engineer-level personnel to school (even at university level), and larger firms even send them on MBA courses. This kind of investment in higher management knowledge may be a specific case for current
Chinese firms, especially for private firms founded by men of low-educational background, but as they grow larger, they are aware of the necessity to participate in school programs designed for contemporary managers.

At the worker level, Chinese firms have also come to emphasize the necessity of training. According to managers, there are two main reasons: (1) in order to catch up with new technology (for example, NC machines), new standards of quality, or new demand for participating in the development of new products, even workers may have to upgrade their knowledge, and (2) to attract workers to the firm (or to discourage them from leaving), they have to be encouraging or at least generous regarding the workers’ desire to improve their skills. In particular, for workers of low educational background, they have to have the qualification of having finished school, for example, polytechnic or an equivalent school. Most firms systematically allow or encourage workers to attend school after work hours or at the weekend. For the past several years, especially after 2004 and 2005, Chinese firms have drastically changed their attitude toward worker training with their upgraded consciousness for higher quality standard, which partly due to the penetration of production management standards such as ISO and TS as a widespread reaction to the severer competition after the late 1990s.

For the supply side, training has become a massively blooming business in China for more than ten years. Not only did the number of schools (polytechnics, junior colleges, and universities) increase, but the schools themselves also came to be more keen on collecting money from outside by providing services. In reality, opening training courses and contributing to society is highly evaluated as a role of schools in China.

Compared to the status in China recently, the personnel of Indian firms seem to have limited opportunities to attend school outside, especially for workers. Indian firms are rather dependent on in-house training activities. The main first-tier suppliers of Bajaj are very keen on practicing TPM (total productive maintenance) activities in cooperation with Bajaj, with most of the firms having specific training facilities inside the firms and practicing team activities.

The aggressive attitude of Chinese workers toward training (including school qualifications) might come from the fact that they have more chances to earn higher wage with the qualifications, whereas in the case of India, there might be less incentive for workers because their chance to do so is less. And the reason that some Chinese firms dispatch core staff to MBA courses is the lower attrition rate that they can accommodate. In India, since the rate is relatively high, such provision of training
opportunities for staff might be risky for firms.

6.7 Summary of In-house Skill Formation

Like inter-firm relations, in-house skill formation mechanisms are also significantly different between China and India. In China, firms are keen on upgrading the skill level of staff or workers. But due to the piece-rate nature of their wage system, which functions well in maximizing production size, firms have faced difficulty in widening the scope of their skills. On the other hand, many firms, and at the same time, many workers themselves, regard confining skills to some narrow range to be beneficial. Mainly due to the rising consciousness of workers, firms are becoming much more generous in offering training opportunities than before. However, it seems that they are better at utilizing outside training courses than developing their own training standards and programs. The liquidity of labor or the greater opportunities outside the firms, including job opportunities and training opportunities, seem critical in forming this status.

On the other hand, Indian firms seem to be more aware of the in-house mechanism of training. Their labor relationship is more stable than China’s, and as the way of evaluating wages shows, firms seem to be more concerned about the level of the workers. However, it is not clear whether this awareness in caring about upgrading in-house skills is mainly the result of the firms’ earnest desire to do so in harsh competition, or whether it is the result of workers being more confined in terms of outside opportunities. Rather, staff-level personnel are more liquid and seem to be more conscious about their own skill upgrading.

7 Concluding Remarks

The capability-building mechanisms of both inter-firm and in-house relations share some common characteristics: an organized or “integrated” nature in India and a market-oriented or “dispersed” nature in China. In Indian inter-firm relations, suppliers are guided by Bajaj in terms of the future direction of development (such as quality upgrading via TPM activities) and of providing other resources including manpower and a small portion of financial resources which can be described as a common assets between them. In the case of in-house nurturing of skills, Indian firms are utilizing stable labor relations and evaluation of their skills utilizing long-term labor relations. In
both in-house and inter-firm relations, there is common set of principles in their systems: in China, firms are not active in firm/transaction-specific investment to create their own “proprietary” assets, or tend to avoid risks by actively utilizing outsourced standardized resources, if compared to Indian firms that tend to do more of such kind of investment both in-house and inter-firm institutions.

One of the socio-economic backdrops that may explain the creation of such different nature is that, in both cases, compared with Chinese counterparts, Indian firms are facing limited opportunities to find other transaction partners for suppliers and individual workers (but to lesser extent, for staff-level personnel). In the case of China, though suppliers and workers are trying to figure out ways of survival in a more “dispersed” manner, there is a different backdrop; both suppliers and workers find themselves with more choices of transactions and courses for upgrading their skills.

A prominent characteristic of China is its strong incentive orientation in both inter-firm relations and labor relations. The piece-rate system is widespread in their transactions to the degree that both many firms and workers are accustomed to this, and it seems that some of them are constructing unique ways or methodologies to solve problems such as quality control and labor incentives by elaborating the mapping of skill chains that workers follow under the piece-rate mechanism.

It is interesting that the development path of Indian firms seems more similar to Japanese experiences, and Chinese system seems unique when compared to the two countries. The reason for the emergence of the gap in the growth mode among the economies cannot be solely attributed to the sheer difference in their “developmental stages,” since China and India should be counted as similar rather than distinguishable in terms of stage of development of the motorcycle industry, at least compared to Japan.

References


Chunghua Minkuo Chiche Yenchiu Fachan Anchuan Tsuchin Hsiehhsui (CCYAH), ed. 1998. Taiwan jiche shi [The history of Taiwan’s motorcycle industry]. Taipei: Chunghua Minkuo Chiche Yenchiu Fachan
Anchuan Tsuchin Hsiehhui (Chinese).
Ministry of Statistics and Program Implementation (MOSP), Annual Survey of Industries (Factory Sector), various years, Kolkata: MOSP.
## Appendix: List of the Parts Suppliers Surveyed

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Main Transaction Partner</th>
<th>No. of Employees</th>
<th>Year of Establishment</th>
<th>Capital Relations</th>
<th>Year of Observation</th>
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<tbody>
<tr>
<td>c-2 Carburetors</td>
<td>GR (Jialing)</td>
<td>300</td>
<td>1994</td>
<td>Jialing</td>
<td>○ ○ ○</td>
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<td>c-3 Valve, FWM</td>
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<td>1964</td>
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<tr>
<td>c-5 Brake</td>
<td>Jialing</td>
<td>400</td>
<td>1983</td>
<td></td>
<td>○</td>
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<tr>
<td>c-6 Handling bars</td>
<td>Jialing</td>
<td>200</td>
<td>1970</td>
<td></td>
<td>○</td>
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<tr>
<td>c-7 Mufflers</td>
<td>Jialing</td>
<td>500</td>
<td>1982</td>
<td>Jialing</td>
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<td>1993</td>
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<td>c-9 Cylinder</td>
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<td>1998</td>
<td>Jialing</td>
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<td>c-10 Shock Absorbers</td>
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<td>c-16 Crank Shaft</td>
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<td>1995</td>
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*GR=Grand River, ZS=Zongshen*
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<th>Product Type</th>
<th>Main Transaction Partner</th>
<th>No. of Employees</th>
<th>Year of Establishment</th>
<th>Capital Relations</th>
<th>Year of Observation</th>
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<td>i-1 Ignishon Coil</td>
<td>Bajaj</td>
<td>500</td>
<td>1971</td>
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Comments on
“Capability-Building via Interfirm Relationship and In-House Employment in India and China: A comparative Study of the Motorcycle Industry” by Moriki Ohara

Jun Otahara

My expertise is in the management history and I have studied the history of motorcycle industry with special reference to Honda Motors Co. Ltd. Some past literatures have done comparative studies of motorcycle industry of India and China but they are not beyond telling the authors’ “impression”. On the contrary, Professor Ohara has made a substantive comparison, based on his own data from field survey, of supplier-system, skill formation, wage determination, etc. I have taken notice of Professor Ohara’s works for more than 10 years, and I have enjoyed with respect his new study that focuses on the organizational factors such as skill and wages which are not apparent in his previous works.

Particularly, recent changes of technology and the possibility of the shifting of technological leadership from Japanese manufactures to those of emerging countries are very significant issues, not only for motorcycle industry, but also for other manufacturing industries in Japan. Modes of the business organization mutually influence to the technological changes, and Prof. Ohara has described clear differences of the internal organization in terms of employment and skill formation. In this respect, his study has a significant contribution.

Today, I would like to make two questions to Professor Ohara.

First question is the rigidity of their respective characteristics of the two countries. Do you think the organizational characteristics you described is a kind of rigid one that do not change in the long run? Or are they are ones of flexibility and they may converge into a certain common type if environments changes? I understand that Professor Ohara has conducted the study from the viewpoint of “area studies”, which methodologically emphasize categorizing areal characteristics. However, in my perception, in the long run, I believe societies do change their characteristics. I just wonder Professor Ohara’s perception on this.
Second question is innovation capability, or competitive advantages of these motorcycle firms in India and China. Professor Ohara pointed out the high profitability of Indian firms and low profitability of Chinese firm. However, it does not necessarily means that the former have higher competitive advantage and the latter do not, since the former is rather the result of closed market or oligopoly than of their competitiveness. In the future, do you think there will emerge from India or China globally competitive firms that will threaten Japanese incumbent firms? If so, what kind of innovations they will undertake or what kind of innovative capability they are most likely to possess, which will finally lead the shifting of industry leaderships from Japan to India or China?

These are my comment and questions.