

Introduction: the “vigorous entry and low price” phenomenon – how Chinese industries have developed

Mariko Watanabe

INTRODUCTION

More than 30 years have passed since China started its economic reform and open door policy, and it is now the factory of the world. Mobile phones made in China are presently in the hands of many African people; electric rickshaws and electric motorcycles with Chinese logos are operating in Bangladesh; in the United States and Japan, food and clothing made in China are purchased daily by consumers. With the world's largest production capacities in several industries, China delivers inexpensive products throughout the world. This situation is the complete opposite of that 30 years ago when there were shortages of everything in China. What has enabled these drastic changes?

Previous literature on the development processes of individual industries has shown that transfers of technology and management methods from abroad spurred the dynamic growth of industry in China. Because of this, some have argued that the experience of Chinese industry has followed a compressed process of industrialization, compared to the lengthier experience in developed economies elsewhere in the world, achieved by merely transferring technology into China. Therefore, the competitiveness and sustainability of Chinese industries are still inferior and are dependent on industries in developed economies. Nevertheless, Chinese firms have overwhelmed foreign brands, at least in terms of shares of the domestic market and in the array of products, such as color TVs, air conditioners, and other electronic goods. Despite this success in the domestic market, some still criticize local firms for their lack of capacity to develop new technology. However, even in the automobile industry, which is a mass of advanced technologies, pure local firms hold more than a small share in the market. Geely, a local private brand, dared to merge with Volvo, a longstanding foreign automobile brand based in Sweden.

The other pure local brand, BYD, is pursuing the acquisition of a substantial market share in the electric automobile market, which is one of the hottest development points in the industry. In examining these facts, we begin to think that we cannot dismiss Chinese firms as “out of date, less competitive, and weak.”

How have Chinese firms been able to triumph over the foreign brands that were predominant in the world’s markets? What strategies, mechanisms, and management methods facilitated this meteoric competitive rise? What policies and institutional settings contributed to realize this drastic change and rapid growth of the industry in China? How will the industries in this developing economy grow to transform China into a developed economy? The aim of this book is to provide inductive reasoning regarding the logic that has governed the development process of Chinese industries; we will argue that a “strategy to save fixed costs,” i.e., a “platform,” generated “vigorous entry and low price phenomenon” and thereby rapid industrial development; policies also encouraged “vigorous entry” and provided “low-priced” production factors. Understanding the logic behind the Chinese experience will greatly benefit development studies.

In the 2000s, China and other emerging economies started to display dynamic economic growth. It is estimated that the total size of emerging and developing economies has already surpassed that of developed economies (IMF 2012). Therefore, what the local firms are doing in the emerging markets deserves more attention. China’s robust economic growth spanning more than two decades has aroused curiosity regarding the key to its high economic growth. For example, *The Economist* featured an article discussing the sources of the competitiveness of enterprises in China and India. The article asserted that the key was “frugal innovation” and referred to it as being just as important as the “just-in-time system” approach in the Japanese experience. How, then, does so-called frugal innovation work? Is it appropriate to call it “frugal,” or should there be an alternative name? These are the main questions addressed in this book.

The authors of this book have engaged in research on Chinese industries for a substantial period, focusing on electronics, automobiles, motorcycles, coal and energy, agriculture, finance and pharmaceuticals. Each industry has a specific developmental setting in terms of technology, policy, and institutions. However, we are aware that a common feature exists across industries: the vigorous entry and low price phenomenon. In other words, this book attempts to provide our definition of the frugal innovation phenomenon in China.

I.1 CONTRIBUTIONS AND METHOD

I.1.1 Research Questions and Contributions

This project was inspired by massive monographs on Chinese industries and on architecture in management studies. Based on this rich accumulation of research, this book attempts to inductively establish a framework to explain how Chinese industries have developed using a simple, basic microeconomics framework, with specific regard to a theory of entry and exit decisions.

The concept of this book is constructed as follows. First, this book sets forth the vigorous entry and low price phenomenon as a common feature in the development path of Chinese industries. The latter part of this Introduction discusses the fact that this characteristic is not a temporal phenomenon but a structural characteristic of Chinese industries. Then, we proceed to explore an appropriate theory to explain why the vigorous entry and low price phenomenon appears. The editor refers to a theory on entry and exit in the market adopted from industrial organization theories (Baumol et al. 1982; Sutton 1991; Besanko et al. 2004; Belleflamme and Peitz 2010). In particular, our argument is mainly owed to Sutton (1991) and Besanko et al. (2004). The theory predicts that entry decisions are mainly determined by the level of fixed costs, whereas exit decisions are affected by the level of variable costs. Then, we proceed to the next step and examine the cases related to vigorous entry and/or to low prices. In Part I, we discuss cases involving the phenomenon of vigorous entry via the strategy of firms and government policy. Part II discusses the environment to encourage this vigorous entry phenomenon, including demand structure and policies related to technology transfer from abroad. In Part III, we present cases where we examine how low factor prices were realized by government policy or by firms' strategy.

Here, we will elaborate on our argument more in detail. Regarding the entry decision of Chinese firms, observations in the accumulated research mention a common phenomenon: Chinese firms often subdivide domains into narrower ones as a strategy for entering a market. We call this phenomenon "vertical disintegration"; it lowers entry costs and induces vigorous entry. We propose the following hypothesis: by utilizing a strategy to save entry costs which is realized by a tendency to be vertically disintegrated or utilizing technology platforms and/or transaction platforms, a strategy to lower entry costs is implemented. This strategy was realized because the Chinese local assemblers have a preference to lower entry costs, and suppliers of technology or services responded to this demand by offering platforms. Demand and supply of technology or

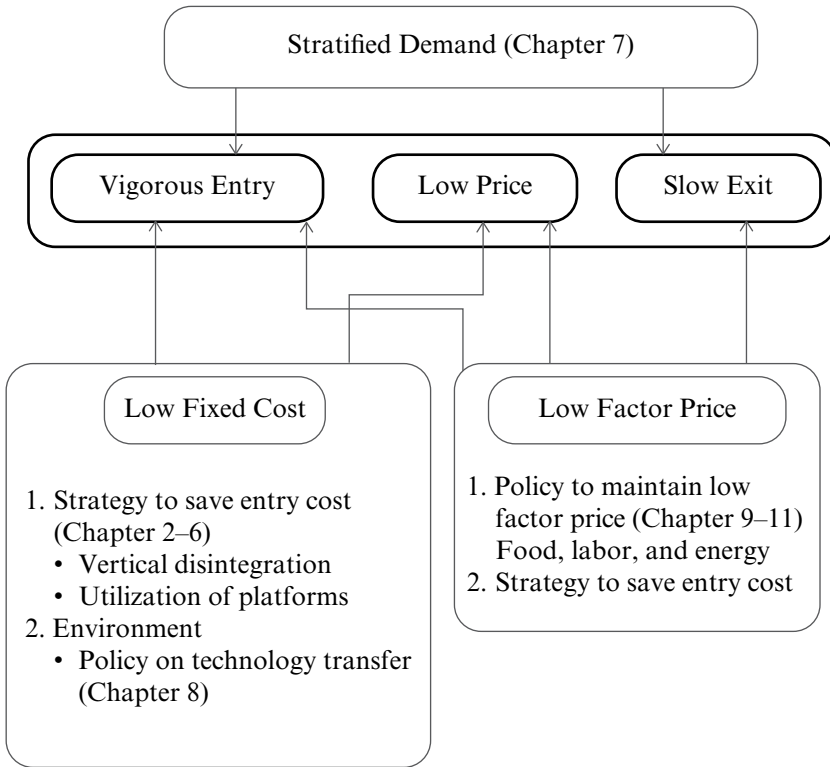
services generated this type of transaction; there is no clear initiative from the government or a “lead firm” (Chapters 1 to 6). Diversified markets offer “seedbeds” for new firms to enter business where there is room for growth without direct competition with international brands (Chapter 7). Low variable costs (Chapters 8 to 11) may have reinforced the vigorous entry phenomenon by lowering the limit for exit from a market, thereby allowing a huge number of firms to remain in the market.

In addition to the strategy of firms, government policy has also played non-negligible roles in realizing low product prices by encouraging supply increases (Chapters 9, 10 and 11) as well as vigorous entry by facilitating technology transfers (Chapter 8). China’s central government had clear intentions to lower the prices of production factors such as food, labor, and energy. This low factor price policy substantially aided the impressive growth of Chinese industries by offering entrepreneurs access to cheap production factors. Vigorous entry in these production factor industries also contributed to lowering the factor prices in China (Chapters 2 and 5). Low variable costs also contributed to slowing of the exit of firms from the market, which is connected with vigorous entry (see Figure I.1 for a graphic explanation of the structure of this book).

I.1.2 Analytical Method

The analytical method employed by the authors of this book consists of using qualitative case studies concerning the experiences of individual industries and some of their features. The topics were assigned according to a framework of entry and exit theory. The aim of this book is to provide inductive reasoning concerning the principle that governs the process of industrial developments in China. Therefore, in order to investigate the related facts, this qualitative approach is suitable and necessary to understand, accurately and in depth, what occurred during the process of impressive industrial growth in China.

In order to provide the inductive reasoning behind the phenomenon, the editor regards examination of the scope of industrial organization as being suitable and necessary. A notable feature of the experience of Chinese industries is the competition and interaction between firms and industries which creates the macroenvironment in which firms operate. In other words, the editor thinks that the secret to growth is not how to manage and control the firm internally but how to compete with other firms. The methods employed in each chapter, however, are more diversified in perspective and include microeconomics, global value chains, and theories on architecture and platforms. As a whole, this study draws on a combination of theories, cross-national comparisons, field studies, documentary



Source: Author.

Figure I.1 How the vigorous entry and low price phenomenon evolved?

research, and technical knowledge to provide a broad, deep analysis of economic and industrial development, and then induces a hypothesis concerning the principles that governed the process.

I.2 THE VIGOROUS ENTRY AND LOW PRICE PHENOMENON

I.2.1 Factors for Rapid Industrialization in the Reform Era

Regarding the determinants of rapid industrial growth in China, a mass of accumulated research points out important factors, including technology transfers from abroad and huge foreign direct investment (FDI)

accumulation (Yusuf and Nabeshima 2010), an enormous domestic market, improvement of efficiency via transition from a planned economy to a market economy and the legacy of technology from the planned economy (Lin et al. 1995; Wu 2008) and industrial policies (Marukawa 2000).

These factors are important preconditions for industrial development. Our interest is how the firms or entrepreneurs utilized these preconditions. What kind of principle dominates the behavior of the firms that actually played a part in these development paths?

1.2.2 Findings of Industry Research on China

Several case studies by researchers based in Japan have focused on the course and events of China's economic reform and the implementation of an open policy regarding industrial development. A wide range of industries is covered by these previous studies, which are informative about China's experience of industrialization. These researchers discovered several common characteristics in the process of China's industrial development.

This book focuses on the following common features which appeared in the monographs: (1) firms enter a market vigorously, and the number of firms operating in the market is large; (2) the progress of oligopoly is slow, and the market share is scattered; (3) Many small-scale enterprises are in operation; (4) price is a main competition device, and non-price competition devices are limited; (5) industrial organizations are often vertically disintegrated. Firms prefer to be disintegrated, to subdivide value chains because they can enter a narrower mode of the chain. They tend to avoid vertical integration (Fujimoto and Shintaku 2005; Marukawa 2007a); and (6) Chinese firms are proactive in their use of platforms and outsourcing (Marukawa 2007a; Ohara 2008; Komagata 2011). Researchers in management studies focus on the architecture of products. They argue that Chinese firms prefer modular technology to integral technology (Fujimoto and Shintaku 2005). Monographs that explicitly mentioned the above points concentrate on the following industries: automobiles (Marukawa 2007b), electric motorcycles (Komagata 2011), motorcycles (Sato and Ohara 2006; Ohara 2008), mobile phones (Marukawa and Yasumoto 2010), air conditioners (Dong 2003), and steel (Kawabata 2005).

Table I.1 summarizes some features of individual industries related to vertical disintegration and entry. If the literature mentioned "inter-firm division of labor" in the target value chain, the industry was recorded as disintegrated. Results show that most industries are vertically disintegrated. Timing or "taking off" by various industries is relatively diversified, ranging from the 1980s to the 2000s. Some industries experi-

enced taking off several times.¹ Specialized markets and agglomerations appeared at the same time for some industries. The government imposed regulations on entry into the market. Our review of the relevant literature confirmed that vertically disintegrated status exists across industries in China. The next section provides a detailed analysis.

In addition to vigorous entry and vertical disintegration, the literature reported other common features across industries: (7) specialized markets for the respective industries and agglomerations specialized for the respective industries are also formed when an industry emerges (Komagata 2011; Marukawa 2009a); (8) homogenization of products was observed (Fujimoto and Shintaku 2005; Ohara 2008, Marukawa 2007a); (9) cash payment is preferred; the size of trade credit is limited (Watanabe and Yanagawa 2011); (10) the central government tends to intervene in vigorous entry into the market; (11) entry of firms from technologically unrelated industries often occurs (the literature on CTV, automobiles, electric bicycles, and pharmaceuticals in Table I.1 mentions active entry from disparate industries); and (12) firms with heterogeneous ownership, such as state-owned enterprises (SOEs) and private and foreign capital, often emerge in mixed markets.

I.2.3 Attention to Vigorous Entry

In this book, we describe the state of active entry and scattered market structure observed in Chinese industries as vigorous entry. We cannot call the phenomenon “excess entry” because we suspect that the number of firms in the market is not always larger than the optimal level. It may sound literary to describe the active entry phenomenon as vigorous since this is not a common term in social sciences; however, we think the word best describes the phenomenon discussed in this book.

The next question is whether the phenomenon of vigorous entry truly is a structural characteristic of Chinese industry. It may be possible to state counter arguments. For example, the large number of firms in the market may reflect the large size of the nation in terms of population and geography. Or, when the market share appears scattered, it may only imply that the total size of the market is expanding and not be due to the strategies that firms take. Both counter arguments claim that vigorous entry is a temporary phenomenon and that it is a very common phenomenon in the early stages of economic growth. It is necessary to distinguish whether vigorous entry is only a temporary, nationwide phenomenon or whether it indicates some structural characteristics of Chinese firms. In order to address this question, let us compare China with other countries and historical situations.

First, we compare India and Japan with China. In terms of population,

Table I.1 Vertical disintegration and integration in Chinese industries

Industry	Taking off timing	Integrated/Disintegrated	Target value chain	Expertized market	Agglomeration	Entry regulation	Literature
Color TVs	Late 1980s to 1990s	D	Panel-Print circuit board (PCB)-body	Zhengzhou (1990s, disappeared now)	Guangdong, Shandong, Sichuan	1998: Regulation on allocation of tube	Hao (1999)
Air conditioners	Early 1990s to 2000s	D (partly I)	Compressor-PCB-body	Exhibitions of cooling technology	Guangdong, Shandong, Zhejiang	2008: Regulation on energy saving	Dong (2003)
Mobile phones	Early 2000s to late 2000s	D	Baseband IC-PCB-body	Shenzhen, Huaqiang North	-	2005: License system	Marukawa and Yasumoto (2010)
Automobiles	1960s, 1980s, 2000s	D (partly I)	Engine-chassis-body	-	-	Industrial policy documents, listing on directory	Marukawa (2007b)
Bicycles	1960s 1990s	D	Break, hub, freewheel-handle, saddle	Tianjin	Tianjin, Zhejiang, Guangdong	-	Komagata (2011)
Motorcycles	1980s 1990s	D	Engine-saddle, spoke etc.	-	Chongqing	Listing on directory, banned from urban areas	Sato and Ohara (2006)
Electric bicycles	Early 2000s	D	battery-motor	Yes	Tianjin, Zhejiang	2011: Banned	Komagata (2011)
Photovoltaic generators	Late 2000s 1980s Late 2000s	D to I	Ingot/wafer-cell-module-system	-	-	2009: No. 38 documents reduction of (over-capacity)	Marukawa (2009b)

Steel	1990s and throughout the 2000s	D	Pig iron (small blast furnace)–casting, steel furnace, pig iron, steel)	–	–	2010: Development policy for steel industry	Kawabata (2005)
Electricity	–	D (1998)	generator–transmission–power supply	–	No	1998: Separation of power generation, distribution, transmission license system	Tajima (2007)
Cement	1980s, 1990s	–	Lime–clinker–powder	–	–	2009: No. 38 documents (reduction of over-capacity)	Tajima et al. (2010)
Pharmaceuticals	Late 1980s, all 1990s	D	Active pharmaceutical ingredient (API)–intermediate–drug	–	Shandong, Zhejiang, Jiangsu	Good management practice regulation	Kubo (2007)
Pork meat	Late 1980s/1990s	D	Fattening–slaughter–processing	City, county, villages	–	Management for slaughter, food processing	Wang and Watanabe (2008)

Note: “–” indicates “no information”. When there was any description of the inter-firm division of labor in a value chain, the industry was recognized as disintegrated.

Source: Author.

Table I.2 Market structure in China, India, and Japan

		China (2005)		India (2004)		Japan (2003)
		Mkt share	No. of firms	Mkt share	No. of firms	Mkt share
Apparel	Top 10	6.8	6130	40.3	466	10.0
Garments	Top 3	11.0	1320	37.0	772	45.9
Air conditioners	Top 3	26.5	195	48.2	40	45.9
TVs	Top 3	28.4	179	55.5	54	49.6
Automobiles	Top 3	27.2	117	79.0	13	55.6
Motorcycles	Top 3	25.2	142	86.0	8	96.9

Source: India and China (Ohara 2011); Japan (Nikkei, Market Share 2003).

the government statistics for 2005 show that India had 1.16 billion people, whereas China had 1.38 billion people (*China Statistical Yearbook 2005; The Economic Survey of India 2005*). In terms of economic size, China's gross domestic product was roughly the same as Japan's in 2009. By 2010, China's GDP had overtaken Japan's. Ohara (2011) compared various perspectives on the differences between industrial development in India and China, and discovered an interesting fact: Chinese markets are much more scattered than those in Japan and India. In order to clarify differences in market structures, the number of Chinese, Indian and Japanese firms in the market is shown in Table I.2.

Compared to India, whose population is nearly as large as China's, the number of firms in the Chinese market is much larger. The data show a difference of one digit. The market structure of China is less concentrated than that of its Indian counterpart. In Japan, the level of market concentration of Japanese industries is more or less on par with India. The market share data indicate that China is unique in terms of market structure and that the structures in Japan and India are similar.

The large number of firms implies that it is easier for Chinese firms to enter the market than for their Indian or Japanese counterparts. A comparison of the market shares of the same industries implies that technological requirements are the same in China, India, and Japan; however, market shares show large differences, and the number of Chinese firms is vastly greater than the number in either India or Japan. Presumably, the reason for this disparity is not an engineering reason because this difference appears at the intra-industry level. The difference can be attributed to other factors, i.e., management or economic factors such as strategy, policy, and institutional matters regarding the cost of entry into and exit from markets.

Table I.3 Market structure: China vs. Japan

Japan	Mkt share (%)	China	Mkt share (%)
Flat panel TVs (2009FY)	78.2	TV (2007)	38.5
Air conditioners (2009FY)	56.8	AC (2007)	47.5
Mobile phones (2009FY)	56.3	Mobile Phone (2008)	67.6
Automobiles (2009)	80.9	Automobile (2009)	27.2
Motorcycles (2009)	95.3	Motor cycle (2009)	24.5
Steel (2009FY)	72.5	Steel (2008)	18.8
Cement (2009FY)	78.4	Cement (2008)	10.6
Beer (2009FY)	87.5	Beer (2008)	43.3
Paper (2009)	61.2	Paper (2007)	12.3
Toilet paper (2009)	37.9		

Source: Japan: Nikkei Market Share (2011). China: Kimura (2010), http://www.ide.go.jp/Japanese/Publish/Download/Report/2010/pdf/2010_407_08.pdf.

A Sino-Japanese comparison using more recent market share data is shown in Table I.3. Here, we confirm with the latest data that the market share concentrations of Chinese industries are far lower than those of Japanese industries.

I.2.4 Evaluation of Vigorous Entry

Regarding this vigorous entry and low price phenomenon, some Chinese economists have argued negatively. Lin Yifu (2007) and Lin et al. (2010) called vigorous entry a “surging phenomenon” and argued that the phenomenon was in fact excess entry, i.e., a larger number of firms than the optimal level operating in the market. Their analysis was based on the Cournot competition model, which is well known in microeconomics. According to this model, when the products are completely homogenous with product prices at marginal cost, firms can only compete with volume. As a result, excess investment will appear. This argument strongly depends on the assumption that products are completely homogenous and no differentiation is observed, which fits only very limited industries. However, as already discussed in this chapter, vigorous entry appeared in differentiated competitive markets. The Cournot competition model that Lin et al. (1995) employed is not fully applicable to the reality of China’s industries. In addition, recent theoretical work has proven that the so-called excess entry theorem, which justified the industrial policy of the Japanese government in the 1970s, is not robust in any of the cases. This will be discussed in Chapter 1.

I.2.5 Government Concerns Over Scattered Market Structure

The “large number of firms in the market and scattered market share” phenomenon was recognized by China’s central government as early as the 1990s, and they showed serious concern.

The *China Industrial Development Report 1997* by the National Planning Committee, Institute for Industrial Economics and Technology, summarized the problems that Chinese industries faced in the mid-1990s as follows: first, there was an inordinately high share of secondary industry. Second, technology levels were low. Specifically, the machinery in which they invested was not technologically advanced. Most of the introduced technologies were duplicated technologies; absorption and innovation of technology was limited. Due to insufficient depreciation, progress in technological development or replacement was slow. Third, firms did not enjoy economies of scale because the size of all firms and their machinery was too small. The report states, “Even in the industries where large-scale firms should presumably operate, the size of the firms actually operating was excessively small” (National Planning Committee, Institute for Industrial Economics and Technology 1997: Chapter 1, Section 2). Fourth, firms could not yet independently execute investments; they needed permission from the government. Fifth, Chinese firms are less involved in the trend of globalization.

Fifteen years have passed since this report was published. Have these factors changed or not? The first point, the high share of secondary industry is lower due to tertiary industry’s growth. The fourth and fifth points, technological progress by firms has improved due to involvement in global economies which has been realized. However, a large number of firms and scattered market shares still exist, as seen in previous sections. Historically speaking, five industries (automobiles, motorcycles, steel, color TVs and mobile phones) saw their top three brands’ market share consistently decline from the 1990s to the mid-2000s. Since the mid-2000s, the market share of the top three brands has entered an uptrend for air conditioners and mobile phones, but the share in industries, such as color TVs, continues to be scattered. There is no clear positive correlation between production volume in total and the market concentration ratio.

When exploring the factors that determine development market share concentration, technology is important. *The Report of National Planning Committee* released in 1997 also referred to the problem of technology in Chinese industries at that time. The report criticized the following with regard to technology: (1) less advanced technology, particularly compared to trends in the rest of the world, (2) duplicate investments in similar low technology, and (3) slow replacement with new technology. Regarding

these three points, (1) and (3) have changed substantially. Now, Chinese firms can access the most advanced technology in the world, and they lead the competition in purchasing technology from around the world. However, they do not mind purchasing the same technology that their rivals purchase. Companies' philosophies on how to introduce other kinds of technology differ from the path the government wishes the companies to follow.

The central government of China traditionally regards the vigorous entry phenomenon as harmful to the Chinese economy. It criticizes the phenomenon as a cause of over-production capacity, and scattered and duplicate industrial organization.

In the late 1980s to the 1990s, competition between SOEs and private enterprises in various industries led to a decline in SOEs. Central government accused the private firms of engaging in duplicate, scattered investment. During this period, private and township enterprises had been increasing in rural areas, but the political foundation of private enterprises was not stable. Central and local governments often gave preferential treatment to the SOEs under their own control and were critical of the private enterprises.

The *China Industry Development Report 1997* also blamed the vigorous entry, scattered market share phenomenon for not making use of economies of scale. The report's analysis of individual industries also mentioned this, referring to "poor use of economies" in the machinery, automotive, high-tech, and coal industries. However, the report's perception was wrong because it confused productivity and economies of scale. Productivity is a concept that refers to measurement of how much output a production factor can produce; for example, labor productivity refers to how much output one labor force can produce. Total factor productivity refers to how much output is generated by a combination of all production factors, such as labor and capital. On the other hand, economy of scale refers to a concept just related to cost. When a fixed cost, i.e., a cost independent of production volume, is large, the average cost per unit of product will decrease as production increases. As a result, the cost of products produced by a large production firm is lower than the cost of a small production firm. This is the economic advantage bestowed by economy of scale and, thereby, a large production firm can set lower prices than a smaller production firm.

However, if any firm figures out a way to enter the same market with a very small fixed cost, that firm can enjoy lower average cost and set a low price even though its production volume is small. In this case, this new entrant firm does not make use of economy of scale, but the firm is efficient (see Chapter 1 for further discussion). This is the strategy that most private enterprises in China adopted, which threatened SOEs. However,

the government confused economies of scale with productivity and prescribed that SOEs suffering from low productivity should boost their economies of scale by expanding their production capacity.

I.2.6 Reason for and Role of Low Price

In addition to vigorous entry, low price is a non-negligible characteristic of industrial organization in China. It is well known that Chinese products are priced very cheaply. Journalistic reports often attribute this low price to exploitative sweat factories (e.g., Harney 2008). As will be shown in Chapter 10, lower wages compared to productivity were confirmed; this result evidenced that Chinese wages are not necessarily getting higher when considering China's productivity. Not only labor, but also other factor prices such as food and energy prices are maintained at a low level by government policies that encourage expansion of production and imposition of price controls. In addition to these lower variable costs, this book will shed light on another factor, which is that saved entry costs generate low product prices. In addition, as already mentioned, low price is not only the outcome of low wages and low entry costs. Low factor prices also contribute to keeping a higher number of firms in the market by lowering the cost of staying in the market.

Why did the vigorous entry and low price phenomenon appear in China? What are the implications for industrial dynamics, social welfare, and economic development? This book attempts to address these questions using the framework above. We hope to succeed in facilitating readers' understanding of industry in China.

I.3 SUBJECT FIRMS AND INDUSTRIES AND STRUCTURE OF THE BOOK

I.3.1 Subjects of Analysis

The subjects of this book are mainly firms and industries that operate in the domestic Chinese market. The industries analysed are automobile manufacturing, consumer electronics, mobile phones, solar power, wind power, energy, and grains. The industries examined in Part I are those where strategies to maintain fixed cost are observed. In Part III, we examine the main production factors of labor, energy, and grains, which determine variable cost levels in Chinese industries.

The majority of the companies covered in this book operate with Chinese capital. We focus on them because they are the drivers of the

economic growth of China. Table I.3 portrays market shares by brand in the automotive, consumer electronics, and mobile phone industries. It shows that local brands have the largest share in each industry. During the 2000s, the air-conditioning market has been completely dominated by local Chinese brands. With respect to color TVs, local Chinese brands maintained the largest share during the 2000s, except in 2007 when Samsung and Sony shared the first and second positions because of the evolution from the CR tube to the flat panel. In the mobile phone market, according to data up to 2007, Nokia's market share was the largest. However, since then, an overwhelmingly large number of local brands has appeared on the market. According to newspaper reports in 2011, the most recent Nokia market share had lost ground, and Chinese brands had become dominant. With regard to the automotive market, the Chinese government only permitted joint ventures of domestic companies and foreign capital in the domestic market. Consequently, many joint ventures ranked in the market. However, Chery and Geely, pure "ethnic brands," have maintained positions in the top 10 since 2001.

Other evidence shows that these industries are the drivers of high economic growth in China. Figure 2.4 in Yusuf and Nabeshima (2010) documented that consumer electronics and transportation industries showed the most prominent growth in the years 1980, 1990, and 2003. In these prominent industries, local brands showed the most conspicuous activity. Thus, understanding the behavior and principles of producers of local brands is an important step toward grasping the mechanism underlying industrial dynamics in China.

It should be noted that the market share of foreign capital has been limited partly because of the government's preferential policy towards local firms. Prior to re-entry to the World Trade Organization (WTO) in 2002, the preferential policy was particularly apparent. However, the policy opposition to foreign capital does not sufficiently explain the dominant positions held by local brands because they also compete with each other in domestic markets. Although the role of foreign capital has been important, the role of indigenous firms also warrants attention. For example, Lin et al. (1995) provided a comprehensive interpretation of the whole process of development in China. They argued that the reform and open door policy is a process of adjustment from the distorted resource allocation in the planned economy to resource allocation according to comparative advantage, export orientation, labor-intensity, and industry-led growth. Li (2009) later supported this argument.

Although the contributions of exports were important, domestic demand has never been negligible. Yusuf and Nabeshima (2010: Figure 2.3) showed that the contribution of net exports (export – import) was far

Table I.4 Local brands and foreign brands

Rank	2001	%	2005	%	2007	%	2009	%
<i>TVs</i>								
1	Sony	12	Skyworth	12	Samsung	11		
2	Changhong	11	Changhong	11	Sony	10		
3	TCL	10	Hisense	10	Skyworth	8		
4	Kongka	9	TCL	9	Hisense	8		
<i>Air conditioning</i>								
1	Haier	20	Haier	16	Gree	17		
2	Media	10	Media	13	Haier	15		
3	Hisense	7	Gree	11	Media	14		
4	Hitachi	6	Hisense	6	AUX	5		
<i>Mobile phones</i>								
1	Motorola	32	Nokia	34	Nokia	40		
2	Nokia	28	Motorola	17	Motorola	18		
3	Siemens	11	Samsung	12	Samsung	11		
4	Sony Ericsson	10	Sony Ericsson	7	K-Touch	8		
5	Samsung	8	Bird	6	Sony Ericsson	7		
6	Alcatel	3	Amoi	5	Lenovo	5		
7	Philips	3	Lenovo	5	Aomoi	4		
8	Panasonic	2	TCL	3	Bird	2		
9	TCL	1	Konka	2	Gionee	2		
10	Bird	1	ZTE	2	LG	1		

<i>Automotive</i>									
1	Shanghai VW	32	Shanghai GM	14	First Motor VW	10	Shanghai VW	9	
2	First Motor VW	19	First Motor VW	11	Shanghai VW	10	First Motor VW	9	
3	Shanghai GM	8	Shanghai VW	11	Shanghai GM	9	Shanghai GM	9	
4	Peugeot Citroen	8	Beijing Hyundai	10	Chery	7	Beijing Hyundai	7	
5	Guangzhou Honda	7	Guangzhou Honda	9	First Motor Toyota	6	Dongfeng Nissan	6	
6	Tianjin First Motor	7	Tianjin First Motor	9	Dongfeng Nissan	5	BYD	6	
7	Changan Suzuki	6	Chery Motor	8	Guangzhou Hongda	5	Chery	6	
8	Chery Motor	4	Dongfeng Nissan	8	Changan Ford	5	Guangzhou Honda	5	
9	China First motor	3	Geely	7	Geely	5	Geely	4	
10	Geely	3	Peugeot Citroen	7	Dongfeng Peugeot Citroen	4	Changan Ford	4	

Note: Market share by unit. Local brands are presented in bold.

Source: TV, AC, Mobile phone: GfK Research. Automotive, *China Automotive Amals*, China Automotive Technology Information

less than private and government consumption. Net exports in the 1990s accounted for 14.4 percent, but only 2.4 percent and 7.4 percent in the 1980s and 2000s, respectively. The rest of the demand was from domestic activities, and the main players in this field were local firms.

The period of the analysis is 1978 to the 2010s, or about three decades. Most case studies focus on the period from the 1990s to recent times because vigorous entry was the most apparent during that period. The other salient feature regarding Chinese firms is the impact of ownership types, i.e., SOEs, private capital, and foreign capital. The government still imposes discriminatory regulations against both private and foreign capital, but this issue is not addressed in this book.

I.3.2 Structure of this Book

This book is composed of four parts. In the Introduction and Chapter 1, we present the setting of the problem and the framework of the analysis. Case studies and discussion related to vigorous entry and vertical disintegration follow in Part I, entitled Vigorous Entry. Part II, Environment, discusses features of the demand and the technology transfer systems. Part III, Low Prices, discusses factors related to low variable costs. A brief summary of each chapter is presented below.

First, Chapter 1 presents the analytical framework of vigorous entry and low prices. Because vigorous entry occurs, scattered market shares appear. When emerging firms find ways to reduce their entry costs, they can then vigorously enter the market. Fixed entry costs consist not only of technology and marketing channels but also of transaction costs, which are the cost burden to start transactions. As ways to reduce entry costs, this chapter refers to the intention of being vertically disintegrated and use of technology or transaction platforms. It further argues that vertical disintegration, vigorous entry and cheap prices are interrelated phenomena.

Part I discusses in detail how the intention of being vertically disintegrated and strategies to save entry costs developed within the process of industrial dynamics. The intention to be vertically disintegrated not only led to the explosive growth of industries but was also accompanied by product innovation. Platforms played an important role in lowering entry costs and promoting innovation at the same time. Chapter 2 discusses features of vertically disintegrated transactions. In order to clarify the difference between US and EU firms and Chinese firms, both transactions are basically open to competing trade partners. This chapter describes the concept of a “supportive value chain” by referring to cases of automobiles and photovoltaic generators. Describing the Chinese transaction system only as “modular” does not capture the real feature: the supplier is more

capable than the assembler, and therefore the former plays the role of the instructor of the latter, which is the opposite of the relationship argued by the global value chain theory. Chapters 3 through 6 present case studies of individual industries. Chapter 3 traces experiences of product innovations that took place in the TV and air-conditioner markets when mature industries in China took off in the early 1990s. Drivers of product innovation and transformation were the technology platform suppliers, mainly of Taiwanese firms. This chapter further points out that innovation by Chinese firms may take place, but it will come up from technology suppliers, not from brand firms. Chapter 4 narrates the dynamic story of the *shanzhai* (gangster) mobile phone industry, which emerged in the 2000s in the Huaqiang North Market in Shenzhen, China. Both technology platforms and transaction platforms play important roles in this story. Chapter 5 presents a case study of the wind-power generator industry, which is newly emerging in China. Although the industry is regulated as a supplier to electricity generators and thus is under an oligopolistic environment, inefficiency due to oligopolies did not occur. Instead, a fierce competition among machinery producers took place. Chapter 6 discusses the role of a specialized market as a transaction platform. This transaction platform lowers entry costs, particularly for small- and medium-size firms, thereby inducing their vigorous entry.

Part II discusses the environment that facilitated vertically disintegrated transactions and vigorous entry. One chapter is about diversified demand; the other is about channels for technology transfer from foreign firms to domestic ones. Chapter 7 documents the existence of differentiated demand across hierarchical geographies. It then presents the hypothesis that this differentiated market might have functioned as a seedbed providing opportunity for the growth of new small enterprises. Chapter 8 describes the role of institutions in technology transfer from abroad into China. In the initial stage of the open door and reform policy, technology transferred from abroad was treated as quasi-public goods. Governments purchased technology from firms abroad and distributed it to domestic firms, which thereby caused vigorous entry. With the growth of industry and progress of marketization, the major form of technology transfer became market-based transactions, such as inter-firm alliances and transactions involving patents or licenses. However, firms are still actively buying technology in order to implement their strategies in the market.

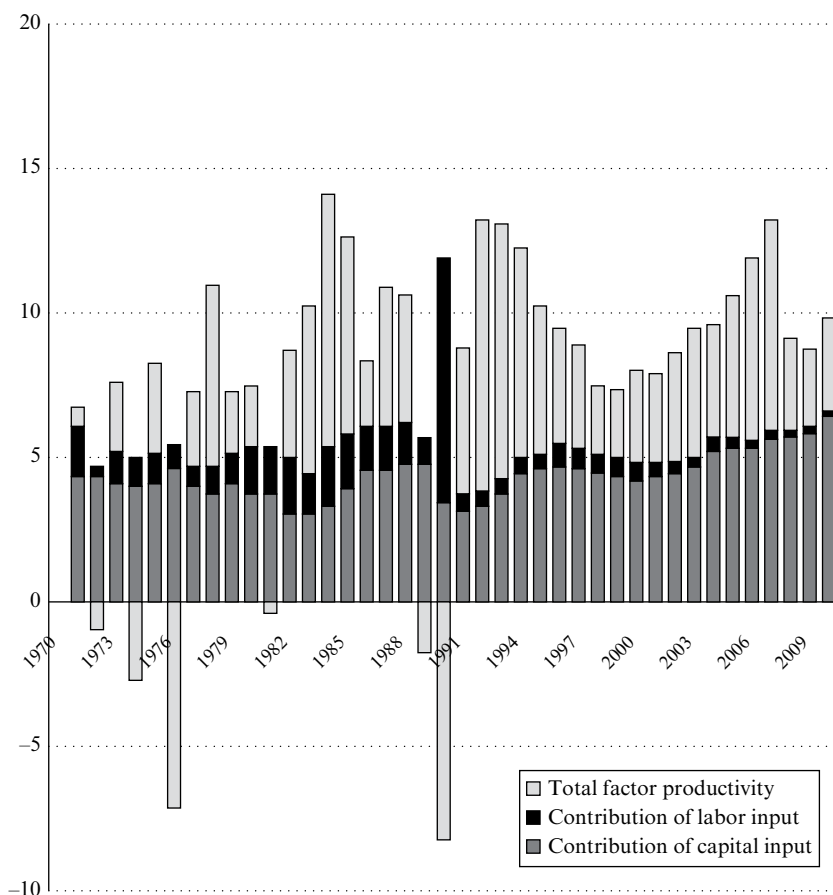
Part III features the factors related to variable costs, such as food, labor, and energy. Chapter 9 discusses the policy and market development regarding food supply. The government intentionally implemented a policy to expand the supply capacity of food and other agro-products

to stabilize food prices. Even with the rapid rise in price of agro-products caused by a labor shortage, the government employed several policies to improve the productivity of the agricultural sector. Chapter 10 describes the development of the labor market and its institutions. Under the planned economy system, a company was responsible for all expenses related to labor, but the level was suppressed in order to finance heavy industrialization. Market reform was accompanied by progress in the socialization of pensions and insurance for labor. At the same time, wage levels were increased through the transforming wage-setting mechanism in which wages were determined by the productivity of labor. Recently, legal protection for labor was strengthened, and expenses related to labor reverted to a fixed cost. Chapter 11 provides an illustration of the policy regarding the supply of energy. The Chinese government intentionally suppressed energy prices to promote industrial growth. With economic and industrial development, the target of energy policy shifted to the control of energy demand. Thus, energy prices are expected to rise in the near future. The chapters in Part III report that the prices of production factors (food, labor, and energy) were suppressed partly by enhancing the supply capacity or by artificial measures in order to promote economic development. However, prices are expected to rise across all production factors. Hence, factors that facilitated low prices via variable cost are now changing.

I.4 PROSPECTS FOR CHINESE INDUSTRIES IN THE HIGH FACTOR PRICE ERA

The analysis in this book points out that the vigorous entry and low price phenomenon in China may have ignited rapid industrial development. Furthermore, the phenomenon can be attributed to an intention to save entry costs and a policy to lower factor prices. Low entry costs were realized mainly by the strategies of firms, whereas low factor prices were dependent on the policy. In addition to this basic structure, analyses in Part III imply that the policy to lower factor prices is about to end, and then prices of production factors that constitute the variable costs of firms will definitely rise. What will happen to Chinese industries if production factor prices rise?

In considering this question, Figure I.2 provides information on basic conditions. The graph shows the contribution of labor, capital, and total factor productivity to output growth. What should be noted here is that the contribution of labor has been very limited, particularly in the late 2000s. On the other hand, the contribution of total factor productivity acted particularly as a driver of growth, and economic reform accelerated,



Source: Asian Productivity Center, APO productivity database, http://www.apo-tokyo.org/about/measurement.html#apo_database; accessed on 15 March 2013.

Figure I.2 Contribution of capital, labor, and total factor productivity to output growth

for example in 1978, 1984, and 1992. Strategies to save entry costs may have been contributing to the growth of total factor productivity (TFP).

The limited contribution of labor implies that the impact of factor price increases on economic growth may also be limited. At the same time, this would make TFP growth very critical.

Will the strategy of Chinese firms to save entry costs contribute to or sustain economic growth? To answer this question, let us examine factors

related to how the market price will be determined. As we have seen, observable market prices are determined by price offerings that are determined by actual market competition. Assume that the price the firm offers is equal to or higher than the average cost, and the average cost differs according to the strategy of the individual firm.

$$\text{Price} = \text{Average cost} \equiv \text{fixed cost} / \text{quantity} + \text{variable costs}$$

In this formula, if more than three firms with heterogeneous average costs compete with each other, firms with higher average costs will be pushed out of the market. In this situation, an individual firm in the market would not be able to raise fixed costs indiscriminately. If variable costs are universally raised, differences in fixed cost levels will exert more control on differences in product price. In this case, the pressure to save fixed costs will be enhanced. This means that the demand for platforms, whether technology platforms or transaction platforms, will expand. One potential way to enter the Chinese market might be by providing platforms that can save the transaction costs or fixed costs of the assemblers of Chinese firms.²

As the case studies in Chapters 2 and 5 show, some firms choose to integrate multiple domains vertically. If the advantage of vertical integration, which surpasses the cost reduction advantage of vertical disintegration, becomes robust, then vertical integration will prevail, even in China. In Chapter 5, it is demonstrated that vertical integration has contributed to improving product quality. However, the case studies in Chapters 3 and 4 indicate that product innovation, quality and functional improvement have been feasible and more effective under the vertical disintegration transaction system.

Can Chinese firms be innovative? This is another frequently asked question. It is difficult to say whether the answer is yes or no. However, based on the analysis presented in this book, we can predict that innovation might occur in a vertically disintegrated system and that the innovator would be the supplier, not the assembler. Alibaba, a transaction platform provider on the Internet, is an excellent innovative Chinese company. They provide transaction platforms, particularly for small- and medium-sized enterprises in China.

The analysis in this book will give an insight into the development strategies in other developing economies. Platforms can be igniters of industrial development. In most economies, domestic firms are better at local marketing and sales than foreign firms. Providing technology or transaction platforms to these local firms would enable them to lower their entry costs. The potential platform provider could be a firm, but governments

are also candidates, as in the case of the Chinese government. Indeed, promoting industrial development by using platforms to reduce entry costs is a potential development strategy.

NOTES

1. An intermediate report on this project provided historical data on these industries. See Kimura and Watanabe (2011) at http://www.ide.go.jp/Japanese/Publish/Download/Report/2010/pdf/2010_407_02_01.pdf.
2. This is what Qualcomm is actually doing in a project called “Qualcomm Reference Designs” which started in 2012. A platform provider of mobile phones is about to replace MTK for 3G phones with Qualcomm for smartphones (<https://qrd.qualcomm.com/>).

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