Supporting Industrial Development in Africa

JSPS Evening Lecture

28 February 2006

New Hunts House Lecture Theatre 2
Kings College London, Guy's Campus

Contents

Cluster-based Industrial Development: A View from East Asia

Professor Keijiro Otsuka

National Graduate Research Institute for Policy Studies (GRIPS)
Professional Fellow, Foundation for Advanced Studies on International Development (FASID)
Board Chair, International Rice Research Institute

In this lecture I attempt to formulate an endogenous model of cluster-based industrial development, based on case studies in Japan, Taiwan, and China, where the initiation phase is followed by the quantity expansion phase through imitation and subsequently by the quality improvement phase through innovation. We argue that such a process of industrial development is supported by the development of market transactions among assemblers, parts-suppliers, and merchants, and the stimulation of innovation made possible by the benefits of industrial clusters arising from the geographical concentration of a large number of enterprises and a variety of human resources in a small geographical area.

1. Introduction

Responding to increasing international concern for poverty reduction in low-income countries, both policymakers and researchers have begun the quest for appropriate development strategies. Aside from short-term relief measures such as the provision of safety nets, policy focus has been placed primarily on agricultural development, particularly in Sub-Saharan Africa, which has begun to experience chronic poverty and food insecurity (e.g., Otsuka and Kalirajan 2005a, 2005b). While we agree that agricultural development is necessary, we do not agree that this strategy is sufficient to reduce the widespread poverty in low-income countries. Indeed, it has become clear that, in Asia, it is an increase in non-farm income, rather than farm income, that has pulled the poor farm population out of serious rural poverty (e.g., Quisumbing, Estudillo, and Otsuka 2004). In our view, it is essential to develop labor-intensive industries which provide the poor with employment opportunities, in order to reduce the widespread poverty.

A major question is how to develop labor-intensive industries. Considering the utmost importance of developing such industries to reduce poverty, the strategy of industrial development ought to be a major theme of development economics. Indeed, it was a central theme in the earlier literature, such as the labor surplus models of Lewis (1954) and Fei and Ranis (1964) and the industrial growth linkage model of Hirschman (1958), among others. These studies, however, did not undertake detailed empirical research, nor did they explore the mechanisms underlying industrial development.[1] Since then,

[1] Although Hirschman attempts to identify industries whose growth has large impacts on the

there have been a relatively small number of solid studies on the industrialization in developing countries, with only a few notable exceptions (e.g., Ranis and Stewart 1993).[2]

To explore the process of industrial development, we have conducted case studies of the garment and motorcycle industries in Japan (Yamamura, Sonobe, and Otsuka 2003, 2005), the machine tool and printed circuit board industries in Taiwan (Sonobe, Kawakami, and Otsuka 2003; Sonobe, Liu, Kawamaki, and Otsuka 2005), and the garment, electric machinery, motorcycle, and printed circuit board industries in China (Sonobe, Hu, and Otsuka 2002, 2004, 2005; Sonobe, et al. 2005). In each case, enterprises in the same industry are concentrated in a small geographical area, i.e., an industrial cluster. We are interested in industrial clusters because they play critical roles not only in the historical development of industries in Japan and Taiwan but also in contemporary China and many other developing countries including India and Sub-Saharan Africa (e.g., Whittaker 1997; Levy 1991; Sonobe and Otsuka 2005; Akoten and Otsuka 2005; Akoten, Sawada, and Otsuka 2005).[3] What is striking is the similarity in the patterns of industrial development across the eight clusters; after an industry grows quantitatively through imitation, growth with innovation towards improvement of the quality of products follows.

The purpose of this article is to synthesize the findings of our case studies and the theories of transaction costs and innovation in order to draw lessons that will help design an effective strategy for the industrial development of poor countries. We examine two central hypotheses. The first hypothesis argues that industrial clusters prosper because the geographical concentration of enterprises contributes to a reduction in the costs of recruiting skilled workers and transacting intermediate inputs and final products.[4] The second hypothesis asserts that the industrial cluster becomes the hotbed of innovation because the availability of diverse human resources (e.g., skilled workers and engineers, merchants, and part-suppliers) in the cluster enhances the possibility of a "new combination" to use the term coined by Schumpeter (1912) to denote innovation.

The organization of this paper is as follows. We briefly introduce our study sites in the next section, while in the third section we attempt to integrate the theoretical insights

---

growth of an entire economy through forward and backward linkages, he does not prescribe how to promote industrialization.

[2] Another exception is a group of studies on industrial clusters in developing countries conducted by researchers at the University of Sussex. See Schmitz and Nadvi (1999) for a summary view of their studies. Being interested in the benefits and roles of clustering, however, these studies do not focus on the long-term process of industrial development.

[3] Having completed the data collection, we are currently analyzing the development of the shoe cluster in Addis Ababa, Ethiopia, and the automobile repair cum simple machinery cluster in Kumasi, Ghana.

[4] As will be discussed further in the fourth section, Marshall (1920) considers the development of skilled labor markets, the division of labor among manufacturing enterprises, and information spillover as the three major advantages of clustering.

and empirical findings into a simple descriptive model, which may be termed "an endogenous model of industrial development." In order to corroborate our theoretical discussions, we provide selected statistical evidence in the fourth section. In the fifth section, we re-examine the advantages of industrial clusters in light of our empirical findings. Finally, we discuss the implications of our study for industrial development in other parts of the developing world, such as Sub-Saharan Africa, in the concluding section.

2. Study sites in East Asia

In order to identify the similarities and dissimilarities in development patterns across industries in the three East Asian countries, we have selected cases in such a way that the same industry is compared between two countries as much as possible, i.e., the garment and motorcycle industries between Japan and China and the machinery and printed circuit board industries between Taiwan and China.[5] The actual choice of industries and study sites was made based on a variety of considerations, such as the labor intensity and the success of industrial development, the availability of collaborators for data collection, and fortuity.[6] In China, we selected industries whose development has been driven by private enterprises rather than state-owned enterprises since we are interested in the natural evolutionary process of industrial development governed by the free interplay of economic forces.[7] In each case study, we spent about two weeks on informal interviews primarily with the managers and owners of enterprises to grasp the gist of the development process of the cluster and then conducted formal surveys of enterprises using compact questionnaires.

There are remarkable similarities between the garment clusters in Bingo in Hiroshima Prefecture in Japan and Jili in Zhejiang Province in China. First, they were located in rural areas but not so far away from large cities; Osaka in the case of Bingo and Shanghai in the case of Jili.[8] Secondly, because of the poor soil and limited availability of farmland, wives and other members of farm households had to supplement their meager farm incomes by weaving traditional cotton cloth (called *kasuri*) in the case of Bingo and producing pillow-cases and other miscellaneous merchandises in the case of

[5] For the machinery industry, we selected the machine tool industry in Taiwan and the electric machinery industry in China. We decided not to choose the machine tool industry in China, because it is dominated by state owned enterprises (Murakami, et al. 1996; Otsuka et al. 1998), thus precluding us from observing the evolutionary process of industrial development guided by market forces. On the other hand, we found a survey of the electric machinery enterprises in Taiwan too difficult to implement as the firms were reluctant to provide us with primary data.

[6] For example, we were indifferent between the two largest garment clusters in Japan and chose Bingo in Hiroshima Prefecture by chance. After completing the Bingo study, we found by accident a garment town, Jili, when we were driving in Huzhou City, Zhejiang Province.

[7] A possible exception is the motorcycle industry in Chongqing, which was dominated by state-owned enterprises in the earlier period. Since the mid-1990s, however, the accelerated growth of this industry was achieved by private as well as privatized former state-owned enterprises.

[8] Although Jili has become urbanized, it was still a rural area when its successful industrialization began. This is also the case in Wenzhou.

Jili. Thirdly, to sell these products, local merchants traveled around various parts of the country, and thus the tradition of commerce was established in these rural towns. Fourthly, it was these local merchants who introduced the current major products, that is, working clothes in Bingo and infant clothing in Jili. Like rural industrialization in other places (Otsuka 1998, 2005), the development of the garment industry in Bingo and Jili rested on the availability of cheap unskilled labor mobilized by merchants. We call this pattern of industrial development "merchant-led."

By contrast, the development of the motorcycle industries in both Japan and China can be characterized as "engineer-led." It is technically more difficult to manufacture motorcycles than garment products and, hence, it is natural for engineers to take entrepreneurial initiative in this industry. Since engineers tend to reside in urban areas and the production of motorcycles requires parts and skilled workers more readily available in urban areas, these types of industries tend to be urban-based. Yet, the motorcycle industry has not developed in the largest industrialized cities, such as Tokyo and Shanghai, but in local cities such as Hamamatsu and Chongqing.[9] This is likely because these local cities had the tradition of manufacturing and because wage rates were relatively low.

The clusters of printed circuit board (PCB) enterprises are found in suburban areas of large cities, such as Taipei in Taiwan and Shanghai and Nanjing in China. Since this industry emits pollutants such as lead and halogen, metropolitan areas with strict environmental regulations are not suitable locations for PCB enterprises. Since their major customers are large electric and electronics manufacturers located in urbanized areas, however, remote areas are not suitable, either. Thus, the industry tends to be located in suburban or semi-urban areas. In the case of Taiwan, it was initiated in the late-1960s by an American joint venture and a Japanese joint venture located in Taoyuan, a county near Taipei. Subsequently, many workers quit these enterprises and established their own enterprises in the vicinity. Since they were engineers or experienced workers with engineering skills, the development of this industry in Taiwan can be characterized as engineer-led. In China, however, the same industry is merchant-led because the vast majority of private enterprises, which have been the prime mover of the industry's development since the early 1990s, were established by salesmen working at the PCB enterprises owned by the state or local governments. While they recruited engineers from their previous workplaces, they undertook initiatives in the new businesses partly because entrepreneurship with marketing knowledge was a very scarce factor in China and partly because their products were the simplest type of single-sided printed circuit boards.

The machine tool industry in Taiwan was initiated in Taichung City by a Taiwanese airplane mechanic who used to work at a Japanese military base during World War II. As the industry expanded, its location gradually shifted from the central district to

[9] In the late 1940s and early 1950s in Japan, motorcycle clusters were also found in Tokyo and Nagoya, but they declined rapidly compared to the one in Hamamatsu later on.

semi-urban areas of Taichung. Clearly the development of this industry was led by engineers and the story of the initial development is similar to that of the PCB industry in Taoyuan. Like the PCB industry in Jiangsu Province in China, the electric machinery industry in Wenzhou in Zhejiang Province was merchant-led, beginning with the production of simple switches. Similar to the garment town Jili, Wenzhou used to be a poor rural area and had a strong tradition of commerce, in which low-quality merchandise produced by farm households was sold in large cities across the country.[10] Indeed, "made in Wenzhou" used to be synonymous with inferior products for Chinese consumers. The electric machinery enterprises in Wenzhou, therefore, had to overcome this bad reputation in order to market their improved products when consumers with rising income levels became increasingly fastidious about product quality from the late 1980s. Among them, an enterprise managed by a former merchant was the first to succeed in this challenge.

3. An endogenous model of cluster-based industrial development

Although it may be hazardous to draw strong conclusions from only eight case studies, there seems to be a clear relationship among the product type, the characteristics of the pioneer, and the location of the industry when the cluster-based industrial development begins. If products are technically easy to produce, the industrialization tends to be led by merchants and take place in rural and suburban areas that do not have comparative advantage in agriculture but have favorable access to large urban markets. If products are technically difficult to produce, the development is often engineer-led and the industry tends to be located in urban and semi-urban areas where enterprises can enjoy the benefits of urbanization economies arising from the availability of engineers and skilled workers as well as intermediate inputs.[11]

While such regularity is remarkable, the similarity of the subsequent development patterns across the eight case studies is far more striking. Moreover, the similarity has clear theoretical reasons. In what follows, we attempt to construct "an endogenous model of cluster-based industrial development," even though our model remains descriptive at the present stage of our research.

Aside from the initiation phase, there are at least two distinct phases in the course of industrial development: the quantity expansion and quality improvement phases (see Table 2). Pioneers of new industries are those who have acquired foreign technology by working at foreign joint ventures, conducting reverse engineering of imported products, or copying technology already introduced somewhere else in the country.[12] In the

[10] According to our inquiries into the development of the garment cluster in Wenzhou, its development pattern is surprisingly similar to that in Jili, even though Jili's development lagged behind Wenzhou.

[11] Besides these geographical conditions, a determinant of the exact location of an industry is the tradition of commerce and manufacturing. In this sense, industrial location is path dependent, but the path does not seem entirely determined by sheer luck but constrained by the same geographical conditions as mentioned above.

[12] According to our interviews, Japanese motorcycle enterprises conducted reverse engineering

initiation phase, a great deal of trial and error (the so-called learning by doing) is required to produce new products because the availability of required parts, materials, and workers is limited in domestic markets (e.g., Otsuka, Ranis, and Saxonhouse 1988). Systematic knowledge acquired through schooling is not yet relevant in this phase. Markets for parts and components have not developed because many of them are unique to this new industry. Thus, they have to be produced internally by enterprises, which are often small but vertically integrated. The quality of the products is generally low, but owing to the low income level of the economy, there exists a demand for such low-quality but cheap substitutes for expensive imported products.

As Vernon (1966) argues, standardization results from the success of a new business. After learning production and marketing methods at the successful pioneer's factory, a number of workers quit their jobs and establish new enterprises. They are followers in the sense of Schumpeter (1912). They produce the same or similar products by using the same or similar parts and equipment. Since both the final products and parts are highly homogeneous, transaction costs are low in the marketplace for them. Thus, the division and specialization of labor develop between assemblers and parts-suppliers and between manufacturing enterprises and merchants.[13] It should be noted that such a development often occurs in the marketplace, which is usually established near the pioneer's factory. Otherwise, the followers would have the same difficulties in finding suppliers and buyers as the pioneer. New enterprises are located near each other, and consequently an industrial cluster is formed.

The development of the division and specialization of labor makes the entry of new enterprises easier. With materials and intermediate inputs being readily available at the marketplace and the sale of final products being efficiently handled by specialized merchants at another market place, it is now possible even for farmers and others who have no experience in manufacturing to produce the low-quality standardized product. In this way, the number of enterprises and the quantity of production of the industry increase rapidly. We refer to this phase as "quantity expansion" because productivity gains are negligible in this phase. To the extent that the followers are perfect imitators, the productivity of the industry as a whole will be stagnant, and if imitation is imperfect, the productivity can even decline. The growth of an industry without significant productivity gain is illustrated in Figure 1 by the curves denoting changes in production ($\ln Q$) and productivity ($\ln T$).

There are two other important features of the quantity expansion phase. Firstly, because of the initially high profitability, the expansion of production due to the massive entry of new enterprises is so rapid that it surpasses the demand growth,

---

of imported German and American motorcycles, and later Chinese enterprises did the same of imported Japanese motorcycles.

[13] In the machine tool industry in Taiwan, almost all the enterprises produced "Bridgeport" in the 1970s, which is a complete copy of the machine tool produced by an American company in Bridgeport, Connecticut.

which leads to a decline in the product price and an increase in the material price. New entry ceases only when the profitability of producing the low-quality product becomes sufficiently low. Secondly, by the end of the quantity expansion phase, a variety of human resources such as engineers, experienced workers, merchants, and part-suppliers become available.

In our view, the declining profitability and the increasing availability of rich human resources set the stage for new competition where enterprises produce differentiated, high-quality products. If an enterprise continues to produce the low-quality standardized product, the probability of bankruptcy is not low and so the accumulated enterprise- and industry-specific human and physical resources may be wasted. On the other hand, the increased availability of competent engineers and skilled workers in the cluster has improved prospects for quality upgrading. Thus, quality improvement becomes profitable and inevitable.

Even if an entrepreneur succeeds in producing a high-quality product, however, this does not immediately ensure high profits: customers may not be able to distinguish the high-quality product from low-quality products made by other enterprises -- this is nothing but the problem of lemons (Akerlof 1970). In order to solve the problem, the entrepreneur has to establish a brand name and develop own direct marketing channels, such as the operation of own retail shops and the employment of own sales agencies which exclusively deal in the entrepreneur's product. In addition, the production of differentiated and improved products requires the use of special parts not available in the marketplace. The innovative entrepreneur has two options to acquire the desired parts: one is to subcontract the production of such parts to a specific supplier, and the other is to produce them in a vertically integrated production system. As Williamson (1985) argues, the subcontracting arrangement must be longer-term if the risk of a hold-up problem due to the specificity of the parts is higher. The long-term relationship also reduces the risk that the subcontractor steals the new design and sells it to other enterprises. The risk is smaller in the case of vertical integration, but it may be more costly to produce many parts within an enterprise. In any event, quality improvement is likely to be accompanied by significant changes in the production organization.

As is clear from the above discussions, the entry to the quality improvement phase involves multi-faceted innovations. We believe that this is why the definition of innovation by Schumpeter (1912) includes the improvements of products, production process, production organization, and marketing, as well as the discovery of materials. In order for such multi-faceted innovations to take place, competent engineers, merchants, and parts-suppliers must be available to innovative entrepreneurs. In this sense, we argue that an industrial cluster that has accumulated diverse human resources during the quantity expansion phase becomes the hotbed of the innovation.

Note that the "innovation" here does not refer to truly new products or new production methods using the most advanced scientific discoveries and engineering inventions. Viewed from the technologically advanced countries, the innovation in developing

counties is not far from the imitation of the innovation in the remote past. Thus, it may be appropriate to call it "imitative innovation," which less advanced countries can learn from the experience of more advanced countries. Thus, the industries in Taiwan learned a great deal from the Japanese experience and the industries in China took advantage of being latecomers by learning from both Taiwan and Japan.

Innovative entrepreneurs in the quality improvement phase, who can carry out the imitative multi-faceted innovations, tend to be highly educated persons, in contrast to the pioneers in the initiation phase. What is required is the ability to deal with improvements of technology, marketing, and production organization simultaneously, and such an ability is unlikely to be acquired without schooling. It is possible that newcomers with new superior knowledge dominate the industry in the new phase, if they can successfully mobilize knowledge and resources accumulated in the cluster. In our observation, however, it is often the case that the pioneers send their sons to universities and then to other businesses to deepen their knowledge and widen their scope. As a result, their enterprises are often capable imitators, if not innovators, in the quality improvement phase.

The productivity of the industry as a whole increases sharply in this phase partly because of the exit of inefficient enterprises unable to keep up with quality improvement and partly because the surviving enterprises improve products and processes. If our theory is correct, stagnant productivity precedes the spurt of productivity growth, contrary to the pessimistic view presented by Krugman (1994) about the future of the East Asian economies based on the observation of quantity expansion without productivity growth in the past.

Another characteristic of this phase is the emergence of large enterprises. While many other enterprises are still producing poor quality products, the innovative enterprises are producing and selling high quality products with brand names through networks of sales agencies or their own retail outlets. Their expanded scale of marketing activities has the effect of increasing their sales since the demand for their products increases with the increase in consumers' recognition of their brand names. To exploit this size effect, the innovative enterprises begin to form enterprise groups through mergers. In this way, a small number of large enterprise groups emerge and the market structure becomes less competitive.

While the process of industrial development continues, our case studies cover up to the quality improvement phase, except for the garment cluster in Bingo, where the enterprises shifted production base gradually from Bingo to remote areas in Japan and then to China. In our observation, this process seems to be well described by Vernon's (1966) product cycle theory. That is to say, once the innovation possibilities are exhausted, the production technology is standardized, so that the cost of production is determined largely by the cost of unskilled labor. Then, it may well be that production takes place in low-wage countries, like China. It is also possible that after a set of innovations are standardized and widely adopted by the surviving enterprises, another

round of the quantity expansion and quality improvement phases follows. This is what large Japanese manufacturing enterprises have experienced; they have invested heavily in the development of high-tech products and produce them in Japan, while delegating the production of lower-quality, standardized products to ASEAN countries in earlier years and to China in more recent years. The analysis of this phase, however, is beyond the scope of our study.

4. A few examples from East Asia

In order to substantiate our preceding arguments, this section presents some supporting evidence. Cases are taken from the motorcycle industry in Japan (Yamamura, Sonobe, and Otsuka 2005), the machine tool industry in Taiwan (Sonobe, Kawamaki, and Otsuka 2003), and the electric machinery industry in China (Sonobe, Hu, and Otsuka 2004).

Figure 2 shows the changes in the number of motorcycle enterprises in Japan from 1946 to 1964. Clearly the number of enterprises increased sharply up to the early 1950s, because of the sizable entry of new enterprises. Roughly speaking, the annual growth rate of the total number of motorcycles produced was as high as 100% in the early 1950s. According to Figure 3, the engine quality index developed by Taylor (1960) was largely constant until 1953, indicating that this period corresponded to the quantity expansion phase. After the mid-1950s, however, the quality index rose steadily and a number of enterprises that used lower-quality engines exited (see Figures 2 and 3). While the growth rate of production decreased to less than 50% per year, the average size of the surviving enterprises grew approximately ten times in the six-year period in the late 1950s. Genuine innovator, Soichiro Honda, the founder of the Honda Motor Co., played a key role in this quality improvement phase.

Table 3 shows the characteristics of managers of the machine-tool enterprises in Taiwan by characteristics of the enterprises (i.e., innovators and imitators), which roughly correspond to the establishment periods. Among the 43 sample enterprises, seven enterprises are identified to be founders of the industry, which attempted to produce machine tools through trial and error processes in the 1950s and 1960s. Six out of the seven founding managers used to work at other machinery producing enterprises, and five had only primary education. It took them 12.6 years on average to commence the production of machine tools after founding their enterprises. By contrast, most enterprises established in the 1970s and the early 1980s were spin-offs and began producing machine tools immediately after the establishment. During this period, a large number of specialized parts suppliers emerged, and both final products and parts were highly standardized. To keep profitability from declining, the founders of the industry began attempting to produce numerically-controlled (NC) machines, again through trial and error processes.

The major innovation, however, was accomplished in the early 1980s by the two new enterprises, which Table 3 refers to as innovators. Before founding their enterprises, the managers of these two enterprises completed graduate studies and worked for the

founders. They were innovative not only because they were among the first to produce NC machines in Taiwan but also because they introduced a new business model of outsourcing all the parts to suppliers through long-term subcontracting arrangements. Although subcontracting was already a routine in the cluster, nobody else had thought that subcontracting would reduce the production cost of NC machines so drastically relative to vertically integrated production. As soon as they began mass production and drastic price cuts, the innovators overwhelmed the founders and the early imitators. A number of spin-offs from the innovators imitated products but they were not as successful as the innovators. It turns out that the founders were better imitators and the worst imitators in the quality improvement phase were the early imitators.

The last example comes from the case of the electric machinery industry in Wenzhou (see Table 4). According to our interviews with experienced managers, the quality competition began in the second half of the 1980s, when a few enterprises began inspecting product quality and attempting to establish brand names. In 1990, the importance of engineers was comparatively low, long-term subcontracting system did not exist, and marketing of final products through anonymous market places and local merchants was common. These are precisely the characteristics of the quantity expansion phase. Indeed the number of enterprises increased in the early 1990s.[14] Throughout the 1990s, particularly in the late 1990s, the size of enterprises expanded in terms of the real value and the number of employed workers. Also, the ratio of engineers, the number of subcontractors, and the importance of direct sales through sales agencies and own retail outlets increased remarkably. Since large enterprises that established brand names merged unsuccessful enterprises, the number of independent enterprises decreased 25 percent from 1995 to 2000. Note that the average value added shown in Table 4 excludes that of subsidiaries and if included, the average value added of independent enterprises in 2000 becomes 1.6 times as high as the number shown in this table.

While the evidence shown in this section is merely suggestive, it is consistent with the predictions of the descriptive model of cluster-based industrial development formulated in the previous section. Although we do not discuss the other five cases because of the space limitation, they also provide an equally valuable supporting evidence for our arguments.

5. Agglomeration economies reconsidered

Since the seminal work of Marshall (1920), three major advantages of industrial clusters have conventionally been recognized: (1) information spillovers, (2) the specialization and division of labor among enterprises, and (3) the development of skilled labor markets. While we do not have major objections to the importance of these three advantages, our analysis suggests that there is room for reconsideration.

[14] Note, however, that there might be enterprises, which had exited in this period.

We fully agree that the information spillovers are common and important in the cluster. For example, in the garment clusters in both Japan and China, if a new design introduced by an enterprise turns out to be popular, many other enterprises copy it within a few days. But information spillovers, which are essentially imitation, are not always that simple. In our observation, less simple imitation takes place through the spin-offs and recruitment of workers from other enterprises, which is intensively discussed in our study on the motorcycle industry in Chongqing. In the case of the printed circuit board enterprises in Suzhou, a group of spin-off enterprises, whose managers used to work at the same founding enterprises, employ the same technology to produce the same products. Thus, information spillovers in the industrial cluster are inseparably related with the development of skilled labor markets, wherein skilled workers move from one enterprise to another. According to our respondents, assemblers develop long-term contracts with parts suppliers to reduce the risk of parts-suppliers leaking new ideas to other assemblers. If this is the case, the division of labor among manufacturing enterprises is also closely related with information spillovers.

We would also like to call attention to the fact that the industrial cluster reduces transaction costs. Transaction costs have been neglected in the literature on economic geography and spatial economics, where the role of transport costs has been discussed extensively. Transaction costs arising from moral hazard and hold-up problems are low in the industrial cluster because rumors of such opportunistic behaviors become public knowledge quickly by word of mouth in the cluster. We believe that this is the major reason why the division of labor develops in the industrial cluster. To use the term of Hayami and Godo (2005), the community mechanism of contract enforcement, which is originally applied to rural communities, works well in the industrial cluster as well.[15]

It is one-sided to emphasize the importance of information spillovers as an advantage of the industrial cluster if the role of the cluster in promoting innovation is not equally appreciated. Marshall (1920) argues that information spillovers become a source of innovation: "if one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas." Based on our empirical findings, we would like to add to his argument the hypothesis that the industrial cluster provides a hotbed of innovation, as it accumulates a variety of human resources useful for new innovation. We believe that it is worth investigating the validity of this hypothesis in other case studies.

To sum up, our analysis indicates that the major advantages of clusters are: (1) the development of markets, which facilitates transactions among manufacturers, merchants and workers, and (2) the promotion of innovations by attracting useful human resources.

6. Concluding remarks

[15] Hayami and Otsuka (1993) argue that such a mechanism reduces shirking of share tenants, known as the Marshallian inefficiency, to a significant extent.

Policies to promote industrial development have been inactive, if not absent, in many developing countries. The critical question is whether the market works so well in the industrial sector that government intervention is unnecessary. Our analysis strongly indicates that the market works fairly well *in industrial clusters* because moral hazard, adverse selection, and hold-up problems potentially arising from imperfect information are reduced to a significant extent by the informal contract enforcement mechanisms. This explains why industrial clusters are so prevalent in developing countries. It also suggests that the market tends to fail in allocating resources efficiently in the absence of industrial clusters. If so, there are good reasons for the government to support the formation of industrial clusters by setting up model plants for training potential managers and workers, industrial zones for attracting enterprises producing similar and related products, and marketplaces for facilitating transactions of parts, intermediate products, and final products among manufacturers and merchants.

It is well-known in the economics literature that the market generally fails in the transaction of information, particularly if the information is not patentable or the patent protection is ineffective. This is the case for the "imitative innovation," which is critically important for the development of industrial clusters in low-income countries. It is obvious that because of imitation or information spillovers, investment in innovation falls short of the social optimum. Therefore, it makes sense for the government to support activities leading to the innovation in industrial clusters by means of providing training programs for technological, managerial, and marketing advancement. Our analysis strongly indicates that such an attempt is likely to be effective, when the cluster is in transition from the quantity expansion to the quality improvement phases. As our analysis implies, technical training alone is not sufficient to stimulate the transition, because what is required is multi-faceted innovations in technology, production organization, marketing, and so on.

There are a number of industrial clusters in low-income countries including Sub-Saharan Africa. In many cases, however, they fail to enter the quality improvement phase and, hence, remain in the quantity expansion phase. A good example is the garment clusters in Nairobi, where a large number of small workshops, consisting of three to four workers, produce low-quality products (Akoten and Otsuka 2005; Akoten, Sawada, and Otsuka 2005). Another interesting case is the shoe cluster in Addis Ababa, where a handful of educated managers are attempting the multi-faceted imitative innovations by learning from the experience of Italy.[16] In all likelihood, these industrial clusters will be able to take off if appropriate training programs are provided.

In conclusion, we would like to emphasize that appropriate policies to promote labor-intensive industries are badly needed to reduce the widespread poverty in the low-income countries. We believe that the appropriate policies for such industrial development are to support the formation of industrial clusters and their transition from quantity expansion phase to quality improvement phase.

[16] Having completed the data collection, the analysis on this cluster is now under way.

[Question]
My question concerns investors or, if you wish, the foreign direct investment that would go directly into clusters organized by states. It is very profitable for a country to use technology spillovers, management spillovers and everything that can be more or less legally stolen from foreign investors to encourage its own development. However, it is not in the interests of an investor to go into a country knowing that the objective of the country is to steal technology and, eventually, to produce spin-offs and be able to compete with the initial investor. Given this fear of technology spillage and all the spin-offs, what kind of discourse would you have with foreign investors, whether they are multinational companies or small companies?

[Prof. Otsuka]
Thank you very much. In most cases foreign direct investment (FDI) did not play a major role. One exception is the circuit-board industry in China in which the U.S. established China Ventures which allowed development to start quickly. Similarly, if to a lesser extent, motorcycles in China were the result of a joint venture with Japanese enterprises. In other places, however, the role of FDI is not that large yet. This is mostly because the technology is too advanced for investors to be concerned about spillage. In the case of the circuit-board industry in China, the technology used by the FDI is too advanced so that the Chinese cannot use it. However, because of this negative reputation, joint ventures may loose. That is why subsidizing is necessary. As I said, one strategy is to invite joint ventures with subsidies, otherwise joint ventures, good product makers, will not be interested in coming.

[Follow up question]
So you are saying that all the examples of clusters that you mentioned, even the idea of the cluster itself does not necessarily require foreign direct investment?

[Prof. Otsuka]
No. In the case of Africa there is no case in which FDI has played any role. Instead, they are spontaneous projects from native industries.

[Question]
You made no mention of government macro-economic policy throughout this. And it seems to me that the first two stages of your matrix are typically accompanied by protectionist policies to allow local industries to grow to a certain size before opening up to competition from advanced developed countries. That, however, is completely in the face of current IMF policies, as far as development is concerned. Could you talk about the role of government macro-economic policy, and in particular protectionism?

[Prof. Otsuka]
We cannot talk about the matter of policy, because we use progressive data. Macro-policy impacts everyone more or less equally, therefore from the data we have collected we cannot argue in terms of macro-policy; that is very difficult. As for protection, I think it is a good idea to protect industries for certain periods. However, what happens in many cases is that once industries are protected, at the end of the protection period there is an extension. In Japan we protected young industries but always opened up to imports, say, five years later. That stimulated enterprises in Japan to prepare for free trade. That kind of protection works. Also, various supports for the formation of industrial clusters can help, for example, the establishment of model grants, imitation in joint ventures, or the construction of market places to facilitate production. However, even without these supporting policies there are many industrial clusters in sub-Saharan Africa.

[Follow up question]
Yes, but in terms of industrial development, it would be difficult if all the barriers were removed straight-away and African industrial enterprises were asked to compete immediately with developed countries that have economies of scale and quality. I do not see how these industries can get to stage three without stages one and two which require some protection.

[Prof. Otsuka]
As I emphasized there are a lot industrial clusters already in sub-Saharan Africa. However, they cannot move from the quantity expansion stage to the quality improvement stage. The critical policy is to support innovation, so that industries can move from this stage, quantity expansion, the stage which low quality products are produced, to the stage in which high quality exportable products are produced. In order to facilitate this transition governments or international agencies must provide training programs.

Why cannot Africa export manufactured goods?

Dr Francis Teal

Deputy Director, Centre for the Study of African Economies (CSAE), University of Oxford

Thank you very much for inviting me. My talk will attempt to give an overview of one of the fundamental problems facing Africa: namely, its inability to produce in the world economy.

The outline of the talk is as follows: I will first give an overview of how Africa has grown since 1980. Then, I will argue there is a direct relationship between the ability of countries to export and their ability to grow, connected in some cases and in some ways with the growth of manufacturing. Next, I will look into the reasons manufactures have proved so important in so many countries, before discussing the link between exporting and skill acquisitions. Specifically, I will look at whether skill acquisition is needed for exporting or if exporting actually helps in skill acquisition. Finally, I will ask why not Africa; what is different about Africa?

First, to demonstrate just how different Africa is, this chart presents the differences in the per capita incomes of six regions – China, sub-Saharan Africa (excluding South Africa), South Asia, South-East Asia, Latin America, and the Middle East – for 1980 and 2000. International U.S. dollars, which take into account the fact that the dollar buys much more in poor countries than it does in the United States or Great Britain, are used to allow for comparisons between these different places. The scale of China's achievement and the magnitude of Africa's disaster are clearly visible in this chart. In 1980 sub-Saharan Africa, on a per capita basis, had slightly higher incomes than China and South Asia. Twenty years later, per capita incomes in China are vastly greater than those in sub-Saharan Africa where incomes have barely increased. Incomes in South Asia have also increased rapidly, if less spectacularly than those in China. In twenty years Africa has gone from being a poor continent among poor continents to being, by far, the poorest continent in the world.

The picture painted by this comparative data contains both good news and bad news. The bad news is that Africa's position has fallen radically relatively to other regions. The good news, and it is very good news indeed, is that very high rates of growth in very poor economies have proved possible – China has transformed its economy is less than a generation. Thus, there is a precedent for the argument, laid out in the Report of the Commission for Africa, that one of Africa's goals "should be to increase the average growth rate to seven percent by the end of the decade and sustain it thereafter" (p. 211). The comparison of per capita incomes between 1980 and 2000 in this chart shows this goal is possible – it has been done and it can be done again.

The newspapers report that the richest countries are ten, twenty, thirty times richer than the poorest countries; that the gap between the rich and the poor is getting wider and wider. This is both true and untrue. It is true if you look at countries. Today, the gap between the richest country and the poorest country is the widest it has ever been. However, this is not a terribly useful comparison because it is the countries where most people are which are most important. The two big countries in the world, in terms of population, are clearly China and India. As demonstrated by the chart discussed above, these countries are growing; China's success is well known, and India's success dominates South Asian points on the chart. So, while the gap between the richest countries and poorest countries has grown dramatically, at the same time the number of poor people has fallen dramatically, overwhelmingly because of China's success.

What, then, is the key to growth? What is a prominent factor across every successful economy? The Report of the Commission for Africa identifies a large number of possible answers to this question. I want to argue that one of these answers is central and without success in this area all other possible policies will fail. The key to growth for Africa is to export more. The reason for this, in short, is that domestic markets in Africa are extremely small. African economies are rich in natural resources, and while the domestic market for these products is negligible, the world market is huge. The speed of export growth for these economies is limited only by the speed with which they can increase output. When African economies have grown successfully – and it is often forgotten how frequently in the past this has happened – it has been through the use of the world market place to sell products for which there has been no domestic demand.

One African economy that has grown successfully is Mauritius. This chart, covering the period from 1970 to 2000, shows that changes in income per capita have largely matched changes in exports per capita in Mauritius. There have been ups and downs, but the economy in this country has been transformed. While in 1970 exports were about $500 per capita by 2000 they had risen to $2,500 per capita. That translates to a five-fold increase in exports and a three-fold increase in income in the space thirty years. Unfortunately, Mauritius is an exception in Africa.

It is useful to put Africa in the context of other regions of the world. The next chart compares the growth of per capita incomes with the growth in trade, where trade is measured as the total exports and imports in an economy, from 1990 to 2000. There is clearly a positive relationship between these factors – as income rises so does trade. The visually striking feature of the chart is that China does exceptionally well and sub-Saharan Africa (excluding South Africa) does exceptionally poorly. China, in the 1990s, grew by nearly eight percent per annum and trade, as a proportion of income, expanded by a similar amount. In contrast, African growth was virtually zero and trade growth, while positive, was very low relative to the successes in China and South Asia. In terms of these comparisons, then, it seems there is something Africa is doing particularly wrong.

Returning to the example of Mauritius, the next chart will place this success story in the context of three other African economies – Botswana, South Africa and Zambia – by comparing their per capita GDPs from 1970 to 2000. Botswana, another successful economy in Africa, has managed to increase its level of income by three- or four-fold in this thirty year period. In contrast, South Africa has seen a steady decline in its per capita income and the decline in Zambia has been even more dramatic. Yet, in 1970 the per capita incomes of these four countries ranged from about $1,000 to $7,000. The bulk of African economies today have substantially lower incomes, as can be seen when looking at a similar chart for Ghana, Uganda, Kenya, Nigeria and Tanzania. Although the incomes of these countries, in the main, have not been growing there are two success stories – Ghana and Uganda. The economies of these two countries have been growing, but their incomes, nevertheless, have remained very low, with GDP per capita staying below $1,500.

Turning to export values per capita, again for Mauritius, Botswana, South Africa, and Zambia, the link between income growth and exports becomes obvious. While the per capita export values increased substantially in Mauritius and Botswana, where income per capita has grown, South Africa and Zambia have not experienced a similar trend. It should be noted that Botswana's exports are almost all diamonds, while Mauritius has diversified into manufacturing. It is also important to remember that the export values in these four countries are between $500 and $1,000 per capita, in other words, none of these countries is rich by the standards of the OECD countries. However, other economies in Africa have exports of about $100 per capita, again illustrated by Ghana, Uganda, Kenya, Nigeria and Tanzania. While these five countries have seen modest growth, they are exporting at very low levels. This is both good and bad news. It is bad news in that it is a sign of the extent of the failures of the African countries to participate in the global economy. However, it is indicative that an expansion of exports in these African countries, if it can be engineered, means the impact on the western world would be negligible. In these five countries, for example, the impact of manufacturing exports on African economies, with the exception of Mauritius, is negligible; of exports in these countries, less than five dollars per capita comes from manufactures.

Many reasons have been advanced to explain why manufacturing exports have been more closely associated with growth than primary products. These include higher income elasticity of demand, benefits from skills transfer and increased possibilities of learning by doing. The second and third point to the possibility of higher total factor productivity (TFP) with manufactures than non-manufactures. TFP is the amount produced when controlling for inputs, in other words, if TFP rises it means for any given level of input more output is actually produced.

I will now argue that these attempts to explain the importance of manufacturing exports are not very convincing. Higher income elasticity of demand may possibly offer some explanation, however, this is not always the case as can be seen in the impact China is having on the prices of primary products. It is also true that there is a problem

of skills transfer, but the primary problem poor countries have is finding jobs for unskilled workers. It is the issue of employment among the unskilled that requires most attention. Finally, the increased possibilities of learning by doing remains a big issue and one to which we, at the Centre for the Study of African Economies (CSAE) at the University of Oxford, have been devoting a lot of time. CSAE has micro-data that enables us to compare the efficiency of manufacturing firms that export with the efficiency of firms that do not.

Now I will turn to the evidence that demonstrates the relationship between higher TFP and the export of manufactures. There is a finding across virtually all micro-data sets that exporting and higher levels of efficiency are positively correlated – more efficient firms are more likely to export. But what is the direction of this relationship? Is it that more efficient firms, by being more efficient, get into the export market or is it that firms learn from exporting; that exporting is actually a way of increasing their efficiency?

The next chart shows only the correlation between efficiency and exporting. It is not exact because it is looking at labour productivity, not TFP, across the five countries in the CSAE dataset: Ghana, Kenya, Nigeria, South Africa, and Tanzania. The chart shows, generally, as the percentage of firms that export increases so does labour productivity, as measured in output per worker. Additionally, the differences in labour productivity among the five countries are enormous, and therefore, so are the differences in the probability for growth. For example, of those firms in the sample, while sixty percent in South Africa export, less than twenty percent of Ghanaian manufacturing firms export.

Further, the micro-data offers much stronger evidence that exporting leads to rises in efficiency than evidence that efficiency drives exporting in Africa. This is different from other countries, where there is strong evidence self-selectivity in exporting, in other words firms first become efficient and then begin exporting. However, in Africa this does not appear to be true. Indeed, the most strikingly robust result to emerge from surveys of African manufacturing firms is the strong correlation between firm size and exporting.

As mentioned above, manufacturing for export in Africa, with the exception of Mauritius, is negligible. Nonetheless, it is also true that most large firms in most African countries export. This chart shows the five countries – Ghana, Kenya, Nigeria, South Africa and Tanzania – for which CSAE has comparable data. The firms in these countries which export have been placed into one of two categories: those who export into Africa and those who export outside of Africa. The striking characteristic across all these countries, with the exception of Nigeria, is that most large firms export. On the whole, as the size of the firms increases, seen here in three categories – small, medium and large, greater percentages of the firms are exporting. In Ghana, for example, about forty percent of large firms are exporting. The exception to this generalization is Nigeria where few firms of any size export. Many will say Nigeria does not export because the country is very large and does not need to export, but this is not true.

The typical picture of Africa is that it does not export manufactured goods. This is true, however, in most African countries, with Nigeria again as the exception, most large firms do export. To reconcile these seemingly contradictory statements, it must be noted that there are very few large firms and that this deficit is a key element of the problem in Africa. There are many reasons why, unless firms reach a critical size they will not be able to export. Further, by international standards, those firms classified here as large are not particularly big. Instead, they have just about 100 employees. This number proves a critical trigger point in this probability of exporting equation; once a firm has over 100 employees the probability a firm will be in the export market increases dramatically, again with the exception of Nigeria.

Thus, it seems a slightly different question is needed to explain why Africa cannot export: why is firm growth so limited in Africa and what limits the ability of firms to enter the export market? I do not wish to suggest there is only one answer to the question, but part of the answer, I want to argue, comes from the link between wages and TFP. That is, in order to understand if these firms are in the export market one must understand whether it is profitable for them to be in the export market. The challenge then is to find out what underlies the lack of profitability of these relatively large firms and their consequent inability to grow and export.

Some results can be extracted from the micro-data which may help to answer this question. The first of these two charts shows the differences in TFP in Kenya, Nigeria and Tanzania relative to that of Ghana. The TFP of Kenya, Nigeria and Tanzania is lower than that of Ghana, as shown by the negative values on the chart. To illustrate the linkage between the efficiency with which firms work and the wages they face the second chart shows that the relative wages of Kenya, Nigeria and Tanzania are all higher than those in Ghana. Ghana should then be a relatively competitive economy because its TFP is higher and its wages are lower than those of the other three countries. Indeed, when the data from these two charts are combined in a third, in order to illustrate competitiveness by using wages relative to productivity, Ghana's position as a comparatively competitive economy can be seen. Kenya, on the other hand, is the least competitive of these four economies because its TFP in contrast to its wages are particularly high.

The next step is to examining the ability of firms across these four countries to export. The first of two charts, which illustrates the exports of Kenya, Nigeria and Tanzania relative to that of Ghana, shows exports to all destinations. In this context it does not appear as though Ghana does particularly well: Kenya does better and Tanzania exports at about the same rate as Ghana, while Nigeria's exports are much lower. However, in the second chart, illustrating only those exports that leave the continent, Ghana performs much better than all three of the other countries. Ghana, then, is a relatively successful exporter. It is my argument that Ghana's comparative success flows from its higher level of efficiency relative to its wages. While Ghana may be efficient in Africa, in a broader context it is not very efficient. We must remember to ask how competitive these African economies are relative to China and the other countries

emerging in the world economy. The key part of any analysis of the success of these African firms must focus on the sources causing their lack of profitability, focusing on wages as well as other factors, such as the cost of capital.

In sum, I have argued that the cause of Africa's failure to grow is to be found in its inability to export. The magnitude of that failure is clearly apparent, even within an African context. The problem is not confined to manufacturing but it is particularly acute in this sector. Nonetheless, rapid growth is possible – it has happened in Mauritius; it can be done. Moreover, most large firms in most African countries export. Therefore, in order to understand the sources of failure of manufacturing and export, we must understand the linkage between the size of the firms, their ability to grow, and their ability, in growing, to enter the export market. Ultimately their ability to enter the export market is linked to the efficiency with which they operate relative to the costs they face – both wage and capital costs.

Thank you.

[Question]
Thank you for unpacking the notions of exporting and learning. I want to suggest a further layer of unpacking is needed because some exporting in Africa, as well as in Latin America, is not always instigated by the developing country. Instead, sometimes exporting is instigated by developed countries; developing countries have, in many cases, become the manufacturing centres for developed economies. In such cases, developed traders go around the world, shopping for the lowest cost producer. This is, perhaps, not same type of exporting that would bring the type of development and technological advancement that comes from the type of exporting Professor Otsuka explained in the case of East Asia, where the developing country instigates exporting by having their own traders and taking an active role in looking for markets. This is the further layer of unpacking that I would like to suggest is necessary.

[Dr Teal]
The CSAE sample demonstrates that African firms engaged in exporting are overwhelmingly firms in the country; it is not true that it comes from outside. There is a substantial element of non-national owned firms – Asian run firms in East Africa and Lebanese run firms in West Africa – but the primary issue of foreign ownership is that there is no incentive for foreign direct investment in these firms. At the moment this is because they are not profitable enough.

As far as learning is concerned, it is quite true that learning is going to create many diverse lanes. This is also true in many Asian economies. As Professor Otsuka discussed, the firms in Asia began with low quality goods and with copying. This is a very good strategy because it is cheaper. Once wages start to rise and development is successfully underway, as with Japan in the 1950s and East Asia in the 1960s and 1970s, economies have an incentive to learn. This is not something that requires help from outsiders, although there are obviously examples where that has been an important part of the process. It is not true that a great deal of innovation in China was the result of direct investment; it came from within China. Mauritius on the other hand has benefited from Chinese expertise, Chinese capital, Chinese technology, and Chinese machinery. This, then, is an example where foreign input was significant. There is not one way of developing, instead I think the key is to ensure that the most profitable route is available.

[Follow-up question]
Thank you. However, I was not talking about foreign direct investment, but instead about the role of global buyers and independent firms.

[Dr Teal]

There are more examples of that in Africa in the processing of food. Global buyers have a major role in many African food chains because marketing costs are very important in that area. In order to keep marketing costs low these firms need a scale of operation which is otherwise completely unavailable. Global buyers will also be important in other industries where it reduces costs. The question is not: are global buyers needed. Instead, where global buyers reduce the costs of access to producers they will enable more profitable investment opportunities and where these economies of scale do not fit global buyers will not be needed.

[Question]
Professor Teal, from your presentation I have come to the conclusion that large firms export more. The then question becomes, how does Africa grow its large firms? Are these large firms SOEs or are they now privatized? In addition to the need for these large firms grow, should an SME sector also grow to be subsidiaries to these large firms? Also, what about the informal sector and the micro-enterprises, do these all come together to support the large firms, or should the focus be on the large firms alone, whether privatising them or making them more efficient as SOEs?

[Dr Teal]
First, these large firms are not, now, in most of these countries state owned. Privatization and diversification has meant a contraction in the state owned sector. Ownership is by far the most important factor in enabling firms to be large because in order to be large firms need to have low cost of capital. The only way to get a low cost of capital, in the context of many of these African firms, is to have access to foreign capital. This access comes through equity and not through other forms of investment for a range of reasons. There are some domestically owned large firms, but they are the exception not the rule.

This, however, does not link to the informal sector at all. It does not link simply because in most large firms in these African countries are not growing. Ghana is the one country for which there is an industrial census that allows for comparisons between the size distributions of firms in the late-1980s with those today. In that twenty-five year period the average firm size in Ghana has fallen from about twenty employees to nine, the number of enterprises in the economy has gone up from 4,000 to 24,000 and the number of large firms has not changed. The massive explosion of small firms is not linked to the expansion of the large firms but linked to a collapse in employment opportunities. I argue that much of the expansion of the informal sector is a sign of economic failure, not a sign of economic success. People are driven to the informal sector because of the lack of employment opportunities elsewhere. In the successful growth pattern described by Professor Otsuka small firms come on the street to service the large firms. The small firms do not serve as a substitute for the failure of employment generation among large firms, which is the case in many African countries. South Africa is the country in sub-Saharan Africa with the greatest number of large firms, yet it is also the country with the highest rate of unemployment in the world.

South African unemployment rates range from twenty-four to thirty percent of the labour force. South Africa lacks an informal sector which turns up as unemployment. In the other parts of Africa the informal sector turns up as an absorber of labour which has no other opportunities. The difference is that there are higher sources of non-labour income in South Africa than in other African countries.

[Question]
My first question is about the domestic markets of these developing countries. It seems to me that the difference between India and China, and African countries are large potential markets. You have said large companies tend to export their products. If African countries do not have large domestic markets does this prevent them from producing large companies and exporting their products? Is there any data relation between the size of the domestic market and economic growth? Secondly, you have mentioned Mauritius' success as a developing economy. What did Mauritius do differently from other African countries? And what prevents other African countries follow the Mauritius model?

[Dr Teal]
Those are excellent questions; I think we would all like to know the answer to the second. Unfortunately, the CSAE dataset is small and not powerful enough to enable us determine what is different about these firms in Mauritius. I think, and this is just a supposition, that new technologies and managerial inputs dramatically increased the efficiency with which firms operated relative to the costs they faced, enabling them to become massively profitable relative to what they were before the input of Chinese technologies new to Mauritius. These Chinese technologies created the basis for a very successful and profitable sector. You can see this happening in other countries in Southern Africa as well, such as Swaziland and Lesotho. Today some of these firms are transferring, because wage costs in Mauritius are now too high relative to the efficiency with which these firms operate. In short, the answer to your second question is that firms increased their efficiency faster than their costs rose. In, this context employment expanded dramatically in Mauritius and the people who took these new jobs were not already in the labour force, instead, they were people, mainly women, entering the labour force. These women were willing to work at very low wages relative to the men.

To answer your first question, it seems to me that Mauritius is a counter example those who say a large domestic market is needed for growth. Mauritius has a small domestic market, yet it is by far the most successful economy in sub-Saharan Africa. It is tiny, but many African countries are small in economic terms, although they are likely to have larger populations than Mauritius. The key is to have productivity and costs inline with the ability to enter the export market, and then the sky is the limit in terms of growth. I am not denying that a large domestic market can help, for example there is evidence that it has helped in parts of China. Although, China can be seen as many countries given that many regions of China are bigger than parts of Africa combined. Therefore,

what makes sense in talking about China's development does not necessarily transfer sensibly to areas of the world divided into much smaller units.

[Question]
I have a question for Dr Teal. You argued in your lecture that exports are to blame for the failure of Africa to grow. Then you said the reason for the lack of exports is the lack of large firms. I could not see in your argument how exports directly effect growth and I would like you to address this question of cause and effect.

[Dr Teal]
While I have not stressed that exporting drives the growth of firms, I do think there is some evidence for this. The CSAE data was collecting over a period of time; this allows regressions to be run incorporating lag values to some variables in order to see if they cause growth. However, the vast majority of large firms have not been growing. I do think that the relationship between firm growth and exports goes both directions. However, neither of these relationships is fundamental. No large firm set up in Africa today will start to export immediately – that was essentially what attempted with the import substitution policies of the 1950s and 1960s. No continent in the world has had more protection than Africa over a longer period of time. Behind these high protective walls large firms were set up, but they did not export because they were incredibly inefficient. The fundamental cause of both exporting and growth can be found in the efficiency with which firms export given the costs they face. Ultimately, it is this which explains both exporting and firm size.

[Question]
Thank you very much. My question is about regional trade development in Africa. Hypothetically speaking if Ghana had lower wages than Kenya, allowing Ghana to concentrate on lower value added and labour intense products, then Kenya could import from many cheap products Ghana and export them to developed countries. In reality this does not work: could you please give your insight into why this in sub-Saharan Africa.

[Dr Teal]
The issue with regional development is that many African economies are very similar. There have been attempts at regional integration. The most successful was the East African Common Market which essentially collapsed because all the countries wanted to protect their own industries. Within East Africa Kenya was by far the most efficient country, therefore Kenya's industry was expanding relative to that of Uganda and Tanzania which made the Ugandans and Tanzanians unhappy. My view is that regional integration is a complete red herring because the size of the market needed and the types of products that must be produced require an international market. While I have been focusing on manufactures, there are many things these economies can do in

the service sector. Again Mauritius is a good example; the most successful industry in Mauritius is tourism. Around Africa, some of the most successful enterprises are hotels, often run by South African businesses. They are exploiting a range of features in Africa, such as parks and beaches. The reason I have focused on manufactures is that I am sure it is part of the solution. However, I do not want to give the impression that manufactures are the only part of the solution. Indeed, the general point I am trying to make is that we must begin by trying to understand what makes enterprises profitable, regardless of whether they are in the manufactures or tourism sector.

In terms of the specifics of your question, Ghana does have relatively low wages and relatively efficient firms within the African context. We are currently attempting to compare firms in Ghana with firms in South Korea in an attempt to discover differences in the sources of productivity, labour productivity in particular. This may not be possible as, even if you allow for the differences in price indices, etcetera, it may be that these firms are fundamentally different. Ultimately what matters for these African economies is their ability to compete with other countries, in particular China. In terms of the costs, the median wage of workers in Ghana is zero. This is because many firms in Ghana are run by apprentices who are literally paid nothing. Given these incredibly low wage costs it would seem that these Ghanaian firms should be incredibly profitable. The problem is that they are not big enough to incur the costs that they need to enter in the export market.

[Question]
I have two questions. The first is about governance and politics. It seems to me that the question of the quality of governance is crucial. For example, anyone who is aware of the changes in Zimbabwe between the 1980s today must ask questions about governance. The other question is about structural adjustment policy. You mentioned the problems with the import substitution policies of the 1950s and 1960s, which were, of course, advocated by the leading development agencies of the time. I would like to know your assessment of the impact of the structural adjustment policies on African development, particularly industry.

[Professor Otsuka]
Governance is very important. I think structural adjustment has both positive and negative impacts. The negative side is that it has the potential to reduce the chances Africans will initiate their own industry. On the other hand, the relations between African countries and European countries, etcetera are very important for African countries to learn. The fundamental difference between Africa and Asia, in my conceptualization, is that there has been active integration in Asia, while in Africa integration has been lacking. Once enterprises succeed in innovation they grow, in turn allowing them to produce high quality products. That is why they export. I think that explains why there is a positive correlation between firm size and growth.

Why has China been successful in industrialization while sub-Saharan Africa has, in general, failed? There are two things that effect innovation and its realization. One is the opportunities for enterprises in certain developing countries to learn from the experiences of other countries. China has learned a great deal from the experiences of Thailand and Japan. In Ethiopia, industry is growing because it shares research with Italy. I do not know the case of Mauritius, but I suspect that Mauritius has very strong relations with India. Access to the information of developed countries is critically important for enterprises in developing countries to grow. While I am not saying Africans are less capable than Asians, it is true that many capable Africans work for the government. There are a relatively smaller number of capable people engaging in the manufacturing industry in Africa. Ethiopia is one exception to this, and that is why Ethiopian industry has been growing. For other countries however, I recommend offering training programs to strengthen interconnections, as well as to transfer the knowledge from developed countries to the countries in Africa.

[Dr Teal]
I will add a few words on governance and structural adjustment. I entirely agree that in certain cases the governance is absolutely critical. I think governance can be fatal – Zimbabwe is clearly an example. However, it is very easy to exaggerate the importance of having an uncorrupted state. China is widely accounted as extremely corrupt, it just happens to have corrupt people who want to grow.

On structural adjustment: it has been an unmitigated disaster because in reversing those policies the fundamental issues of why these firms are not profitable have not been successfully addressed.

[Question]
I think the aspect of quality is very important. My concern is should Africa export? Dr Teal, in discussing Nigeria, instead of advocating quality products for citizens, you disparaged the notion that Nigerians could have a sufficient market or demand. However, the demands of the local market may be sufficient to encourage the production of high quality goods. Perhaps, then, your argument should focus more on quality. I do not understand how exporting, or not, determines the quality of goods. I think markets or industries are small as a result of income levels, as this determines what people can buy and what they cannot.

[Dr Teal]
First, quality is something can be expensive to produce. The question is always whether it is worth the cost incurred in producing higher quality. The history of growth in both Japan and China begins with the export of low quality goods. Low quality goods are easier to produce, and there is no problem with their production if a country can do so successfully. I entirely agree that the key, ultimately, is to change the quality. Such a change will require innovation, learning, copying, and a range of other things. But the issue is: why aren't these enterprises profitable? In particular, why is

the record of Nigeria in supporting anything now, apart from oil, so dismal? In part, it is a problem of governance, especially given the extent of embezzlement of oil revenues. Ending embezzlement will solve one element of the problem, but you won't solve it all. On a per capita basis Nigeria is not rich; the revenues from oil exports alone are between $100 and $150 per capita. Therefore, even if all problems of corruption and embezzlement were solved, oil rents would still not provide the basis for high incomes; other industries would need to be expanded as well. In Nigeria it is just possible that this could be done without exports if oil revenues were used wisely, as they would generate substantial amounts of income growth in the economy that would in turn generate a market for domestic enterprise. If there is a large economy which could grow through its domestic market it might be Nigeria. I very much doubt it, but it might be.

[Question]
My question is to both of you. Professor Otsuka discussed exporting and innovation with regard to the success of East Asia. The potential to export and the efforts made to learn usually come from subcontracting firms. Does innovation, or the gains made from the knowledge available from developed countries, reach a dead end in growing clusters? It is often said that innovation, in Pakistan for example, is linked to the requirements established firms set out for subcontractors. Changes in technology increase the need for innovation from subcontracting firms. The primary advantage subcontractors have is cheap labour, an advantage which fades because they do not have the capacity to develop innovation to the extent required. Can exporting be a barrier in this sense?

[Question]
The problem with Africa is I feel is family goods. If that is the case, do you think integration of Africa might be the solution to the problem of exports in Africa?

[Question]
My question has to do with a contradiction on the issue of wages. On the one hand low wages allows developing countries, Ghana for instance, to be competitive. However, strong domestic markets need people to earn money so they can buy products. This seems to me a very contradictory and maybe you can clarify the issue.

[Question]
You have stressed the importance of internal factors for exporting and growth. I have a question about external forces on exports, in particular the impact of IMF loan conditions on the liberalization of certain industries. An example of this would be the cashew industry in Mozambique, where liberalization led to a collapse of the exports of cashew nuts. How would you modify your recommendations and conclusions to account for external forces and rules that can inherently generate disadvantages in exports?

[Professor Otsuka]
Regarding subcontracting, my understanding is that the development of subcontracting is the result of innovation. Innovation produces differentiated products and differentiated products need differentiated parts and components. To produce those products the subcontracting system is developed. Thus, it is a result of innovation. A second reason for the development of the subcontracting system is these economies of scale. In Thailand the average number of employees per company is about sixteen, in Japan the average number only is seventeen because there are many of these economies of scale, particularly in the production of parts and components. At the same time subcontracting requires a lot of production costs, assembly lines for example. Some companies, like Honda, prefer integration to reduce production costs, where as Toyota has about 50,000 subcontractors; there are different systems, but subcontracting is a result of the production of differentiated products.

I think integration with African economies will help, although I do not think the impacts of market size are very important. The African market is much smaller than the domestic markets. Nonetheless, it is a good idea for African countries to export to each other. Very little of this trade has been happening. One exception would be Nairobi. There average employment is only twenty-four in the government companies, yet many of them do export their products to Uganda, Somalia and Ethiopia. This kind of integration helps industrialization.

Whenever China grows Africa suffers. That is the price of the cheap products coming from China to Africa, and produces many indigenous informal sectors. At the same time, when product prices decline as a result of imports from China some entrepreneurs try to innovate. I have just observed a government-cluster in Nairobi, where prices were declining, but they are now recovering because of innovation. If information about production methods, quality control, market system, etcetera can be provided I am sure the small government clusters in Kenya can grow. External trade or imports from other countries can have both positive and negative impacts.

[Dr Teal]
In regard to innovation and exporting, as I have argued, I do not think there is one answer. Innovation is sometimes a key, but sometimes copying is just as good. The questions to be asked are: what is the profit goal and what opportunities are available. If there is a great deal of technology available, as well as cheap labour, a country can just steal the technology and get started.

I think integration of African markets is a complete non-starter simply because they are too similar. If African economies are going to grow they will do so by exporting to the rest of the world.

It is quite true that there is a contradiction between low wages and low domestic incomes. It is exporting that will increase incomes. Again, the example of Mauritius is instructive. The wages in Mauritius increased from $50 a month to $300 a month. The

solution is to create the jobs in the export industries. Wages with then grow because output is growing faster than the rate of supply.

On external factors, and China in particular, China has helped improve trade in Africa dramatically over the last five years. That is because prices of commodities such as copper, oil, and many of the primary products that Africa produces have soared. Yes, it is true African firms are competing with imported Chinese manufactures. It is also true that Africans are paying a lot more for their products, so there are some ambiguities as far as the economies are concerned.

If it is true that external factors are a key in terms of trade, and I do not think it is at the moment, such factors would actually help manufactures. I have already said I think IMF loans and liberalization policies have been a disaster. This is not because countries should not be liberalizing, but rather policies should be aimed at changing the factors which making these firms under-competitive. The example of the Mozambique cashew nut industry is an extremely interesting one. In this case it is clear that no one considered the levels of competition in the market. There are many other examples in Africa where industries have been privatized such that they are worse than the previously nationalized industries. This is often because no thought has been given to how most competitively-run firms operate; they have reduced wages, which they can do because there is no competition. Efficiency of firms and market structure are other factors that need to be considered. The solution to Africa's problem is not to protect these industries, those who think it is simply do not know the extent of the disaster caused for companies by these policies over the last twenty or thirty years.

[Professor Otsuka]
To clarify one last thing, in my discussion of innovations above, I did not mean innovations which are really new. I have a phrase 'imitated innovations,' by which I mean imitation, but with a small new element and that is why developing countries can learn from experienced developers.