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Justin Yifu Lin

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Industrial Policy Revisited: A New Structural Economics Perspective

Justin Yifu Lin[1]

Although whether governments should play a facilitating role in economic development has long been a topic for economic discourse and research, as an important instrument industrial policy is often and actively used by governments to promote economic development, both in history and at the moment. Despite much controversy surrounding whether and how governments implement industrial policy, in this article failures and successes of implementing such policy are analyzed through a new structural economics perspective. Specifically, the article argues that (1) sector-targeted industrial policy is essential to achieve dynamic structural change and rapid, sustained growth in an economy; (2) most industrial policies fail because they target industries that are not compatible with the country's comparative advantages; (3) successful industrial policy should target industries that are the country's latent comparative advantages; (4) historical experiences show that in the catching-up stage, successful countries' industrial policies, in general, have targeted the industries in countries with a similar endowment structure and somewhat higher per capita income; and (5) the Growth Identification and Facilitation Framework, based on new structural economics, is a new, effective way to target latent comparative-advantage industries and support their growth.

JEL Classification: L5, O1, P5.

1 INTRODUCTION

How to promote economic growth has been a topic for economic discourse and research at least since the publication of Adam Smith's *The Wealth of Nations* in 1776. Although past theories have studied how markets and governments play roles in promoting (or retarding) economic development, the growth research still faces significant methodological difficulties and challenges in identifying actionable policy levers to sustain and accelerate growth in specific countries. In particular, the role of government in development is debatable and contentious. Nowadays, mainstream economists agree that market

[1] National School of Development, Peking University.

mechanisms are essential for getting relative prices right and thereby facilitating efficient resource allocation. However, the experiences of successful countries also show that governments often play a crucial role in facilitating industrial transformation.

Industrial policy is an important instrument that is actively used by governments to promote economic development, both in history and in the present. Historical evidence shows that all countries that have successfully transformed from agrarian to modern advanced economies, including both the old industrial powers of Western Europe and North America, and the newly industrialized economies of East Asia, have had governments that played a pro-active role in assisting individual firms in overcoming the inevitable coordination and externality problems. In fact, the governments in high-income countries today continue to do so. However, the sad fact is that almost every government in the developing world has attempted, at some point, to play that facilitating role, but most have failed.

In most socialist and developing countries, after World War II, governments pursued developing the capital-intensive industries that prevailed in advanced countries (Lin, 2011). Such a development strategy was typically advocated by the dominant development thinking, structuralism, in the 1950s and 1960s, and in essence it was a comparative advantage defying (CAD) strategy (Lin, 2003, 2009). Under a CAD strategy, the government protected firms in prioritized industries by various industrial policies, such as granting the prioritized enterprises a market monopoly, suppressing interest rates, overvaluing domestic currency, and controlling prices for raw materials, to reduce the costs of investment in and operation of these enterprises.

Such intervention inevitably caused widespread shortages in funds, foreign exchange, and raw materials, and government interventions, including national planning in the socialist countries and credit rationing, investment, and entry licensing in non-socialist developing countries. Consequently, although the adoption of a CAD-oriented industrial policy could establish some advanced industries in socialist and developing countries, it inevitably led to inefficient resource allocation, suppressed working incentives, rampant rent-seeking behavior, deteriorating income distribution, and poor economic performance. If the goal of industrial policies is to narrow the gap between developing and developed countries, then, in almost all cases, the first-generation industrial policy was a failure.

Despite these failures in terms of the effectiveness of industrial policies, all countries continue to adopt industrial policies to promote economic development. And, fortunately, there have been a few successful cases of catching up with or significantly narrowing the gap with advanced industrialized economies by implementing industrial policy. Japan, in 1950, a developing country with a per capita income one-fifth of that of the United States, reached 63 percent of U.S. income by 1970 and became the world's second-largest economy. Japan's rise was the result of an impressive annual growth performance of 9.6 percent during the 1950s and 1960s, driven by the transformation from an agrarian to an industrialized economy. Using an outward-oriented, market-friendly development strategy, the Asian Tigers—Hong Kong SAR, China; the Republic of Korea; Singapore; and Taiwan, China—grew in excess of 7 percent annually between the early 1960s and the early 1990s, demonstrating that it is possible to maintain impressive growth rates and close the gap with advanced economies.

More recently, growth in several large economies, such as China, Brazil, and India, has taken off, turning them into new global growth poles (World Bank, 2011). These high growth rates have led to a significant reduction in poverty. Between 1981 and 2005, the percentage of people living below US$1.25 a day was halved, falling from 52 percent to 26 percent. This drop in poverty was nowhere as apparent as in China. In 1981, a staggering 84 percent of the Chinese lived in poverty. By 2005, this proportion had fallen to 16 percent—well below the average for the developing world. As the Growth Report (Growth Commission, 2008) identified, all the countries that have experienced rapid growth have a committed, credible, and capable government. Without a doubt, implementing industrial policy effectively is only one characteristic of a capable government.

But why have some industrial policy implementations succeeded while others have failed? Is government action really needed in the process of economic development? If so, how can the government identify the right strategy and facilitate economic development through appropriate industrial policy? If we can learn from the failed development attempts by most developing countries and especially the few successes, explore the nature and determinants of economic growth, and provide policymakers with the tools to unleash their country's growth potential, poverty could become a memory of the past within a generation or two.

In this article, I will provide a new structural economics analysis of the reasons for the failure of using industrial policy as an instrument for economic development. I argue that the pervasive failures are mostly due to government inability to come up with good criteria for identifying industries appropriate for a given country's endowment structure and level of development. The article is organized as follows: Part 2 introduces the main ideas of new structural economics. Part 3 explains the rationale for a facilitating state in the process of dynamic economic growth, briefly reviews some important lessons from early industrial development strategies around the world, and analyzes the role of the state in the process of structural change in today's advanced economies. It also examines similar attempts by developing-country governments to adopt policy interventions to facilitate industrial upgrading and economic diversification and analyzes the reasons for their success or failure. Building on the foundations of new structural economics (Lin, 2011), Part 4 provides a framework for formulating industrial policy based on a new approach entitled "Growth Identification and Facilitation" (Lin and Monga, 2011). Part 5 concludes.

2 THE NEW STRUCTURAL ECONOMICS

Economic development and transition are among the most challenging issues in modern economic study. The current global crisis, the most serious one since the Great Depression, calls for a rethinking of economic theories. It is therefore a good time for economists to reexamine development theories as well.

New structural economics, hereafter NSE (Lin, 2011, 2012), which is based on analysis of the nature of modern economic growth, proposes a framework for rethinking economic development and industrial policy. It starts with the observation that the main features of modern economic development are continuous technological innovation, industrial upgrading, and economic diversification, which make possible continuous increases in labor productivity and thus per capita income in an economy.

NSE proposes the starting point for the analysis of modern economic development to be an economy's factor endowments, that is, the availability of labor, capital, and natural resources. Factor endowments are given in an economy at any specific time and are changeable over time. The optimal industrial structure in an economy, that is, the industrial structure that will make the economy most competitive domestically and internationally at any specific time, is endogenous to its comparative advantages, which in turn are determined by the given endowment structure of the economy at that time.[2]

[2] A country's *competitive advantage* refers to a situation where domestic industries fulfill the following four conditions: (i) They intensively use the nation's abundant and relatively inexpensive factors of production; (ii) Their products have large domestic markets; (iii) Each industry forms a cluster; and (iv) The domestic market

Economies that try to deviate from their comparative advantages are likely to perform poorly.

With capital accumulation, the economy's factor endowment structure evolves, pushing its industrial structure to deviate from the optimal determined by its previous level. If they try to grow simply by adding more and more physical capital or labor to the existing industries, economies eventually run into diminishing returns. Firms then need to upgrade their industries and technologies accordingly in order to maintain market competitiveness.

If an economy follows its comparative advantage in the development of its industries, they will be most competitive in the domestic and world markets. As a result, they will gain the largest possible market share and generate potentially the largest surplus. Capital investment will also have the largest returns. Consequently, households will have the highest savings propensity, resulting in an even faster upgrade of the country's endowment structure.

A developing country that follows its comparative advantage to develop its industries can also benefit from the advantage of its backwardness in the upgrading process and grow faster than advanced countries. Enterprises in developing countries can benefit from the industrial and technological gap with developed countries by acquiring industrial and technological innovations that are consistent with their new comparative advantage through learning and borrowing from developed countries.

The main question then is how to ensure that the economy grows in a manner that is consistent with its comparative advantage. Once the relative prices of capital, labor, and natural resources reflect the relative scarcity of these production factors in the endowment structure, most firms, with the goal of maximizing profit, will be induced to enter the industries consistent with their comparative advantage, because that is the way to minimize their costs of production and maintain competitiveness in the market. Such a relative price

for each industry is competitive (Porter, 1990). A country's *comparative advantage* is the situation in which it produces a good or service at a lower opportunity cost than that of its competitors. The first condition for competitive advantage listed by Porter suggests that the industries should be the economy's comparative advantage determined by the nations' endowments. The third and the fourth conditions will hold only if the industries are consistent with the nation's competitive advantage. Therefore, the four conditions can be reduced to two independent conditions: comparative advantage and domestic market size. Of these two independent conditions, comparative advantage is the most important because if an industry corresponds to the country's comparative advantage, the industry's product will have a global market. That is why many of the richest countries of the world are very small (Lin and Ren, 2007).

system exists only in a competitive market system. In developing countries where this is usually not the case, it is necessary that government action be taken to improve various market institutions so as to create and protect effective competition in the product and factor markets.

However, some costs and benefits of continuous industrial upgrading cannot be internalized by individual firms. First, in order to enter a new industry, firms need to have information about production technologies and product markets. If such information is not freely available, each firm will have to invest resources to search for, collect, and analyze it. First-movers who attempt to enter new industries can either fail—because they target the wrong industries—or succeed—because the industries are consistent with the country's new comparative advantage. In the case of success, their experience offers valuable and free information to other prospective entrants. They will not have monopoly rent because of competition from new entry. Moreover, the first-movers often need to devote resources to train workers on the new business processes and techniques and those workers may then be hired by the first-movers' competitors. Even in situations where first-movers fail, their bad experience also provides useful knowledge to other firms. Yet, they must bear the costs of failure themselves. In other words, the social value of the first-movers' investment is usually much larger than the private value and there is an asymmetry between the first-movers' gains from success and the cost of failure. All these externality issues will make individual firms reluctant to upgrade industrial structure by themselves.

Second, as a country climbs up the industrial and technological ladder, many other changes are required: the technology used by its firms becomes more sophisticated, capital requirements increase, and the scale of production and size of markets also increase. Market transactions increasingly take place at arm's length. A flexible and smooth industrial and technological upgrading process therefore requires simultaneous improvements in soft infrastructure, including educational, financial, and legal institutions, and in hard infrastructure, such as roads, highways, port facilities, and power supplies, so that firms in the newly upgraded industries can reduce transaction costs and reach the production possibility frontier (Harrison and Rodríguez-Clare, 2010). Improvement of the hard and soft infrastructure requires coordination beyond individual firms' decisions.

Economic development is therefore a dynamic process marked with externalities and requiring coordination. Undoubtedly, the market is a necessary basic mechanism for effective resource allocation at each given stage of development, but dynamic economic growth requires the government to play a pro-active, facilitating role to overcome externality and coordination issues for an economy to move from one stage to another. The government can do so by (1) providing information about new industries consistent with the new comparative advantage determined by the change in endowment structure; (2) coordinating investments in related industries and the required improvements in infrastructure; (3) subsidizing activities with externalities in the starting phase of introducing new industries and new technologies; and (4) catalyzing the development of new industries by incubation or by attracting foreign direct investment to overcome the deficits in social capital and other intangible constraints.

In sum, the NSE framework is three-pronged: it includes an understanding of the country's comparative advantage, defined as the evolving potential of its endowment structure; reliance on the market as the optimal resource allocation mechanism at any given stage of development; and recognition of the facilitating role of the state in the process of industrial upgrading. NSE helps in explaining the economic performance of the most successful developing countries.

3 STRUCTURAL CHANGE, EFFICIENT MARKETS, AND A FACILITATING STATE

Based on the principles of NSE, it is clear why industrial policy is indispensable to economic development: although markets provide incentives for efficiently allocating resources at any given stage of development, they are insufficient for initiating and sustaining development, because economic development involves industrial upgrading and corresponding improvements in hard and soft infrastructure at each level of development. Such upgrading and improvements require inherent coordination, with large externalities to firms' transaction costs and returns to capital investment. Thus, in addition to an effective market mechanism, the government should play an active role in facilitating structural changes.

Compared with developed countries whose industries are located on the global frontier and whose industrial upgrading and diversification rely on their own generation of new knowledge through a process of trial and error, developing countries in the catching-up process move within the global industrial frontier and have the advantage of backwardness. In other words, they can rely on borrowing the existing technology and industrial ideas from the advanced countries. This method of acquiring innovation has a lower cost and is less risky than the one used by firms in developed countries (Krugman, 1979). Therefore, in a developing country committed to the market system, if firms know how to tap into the potential of the advantage of backwardness and the government pro-actively provides information, coordination, and externality compensation in the process of industrial upgrading and diversification, the country can grow much faster than a developed country and achieve the goal of converging with high-income countries (Lin, 2009). After all, this was the case for Britain before the eighteenth century; for Germany, France, and the United States in the nineteenth century; and the Nordic countries, Japan, Korea, Taiwan-China, Singapore, Malaysia, and other East Asian economies in the twentieth century (Amsden, 1989; Chang, 2003; Gerschenkron, 1962; Wade, 1990).

Reviewing the historical and contemporary experiences of state intervention, including many failures and a few successes, is helpful for understanding two additional practical reasons why industrial policy is a useful instrument for a facilitating state: (1) the contents of coordination may be different, depending on the industries, and (2) the government's resources and capacity are limited. The government needs to use them strategically.

There is ample historical evidence that today's most advanced economies relied heavily on government intervention to ignite and facilitate their take-off and catch-up processes. Government intervention allowed them to build strong industrial bases and sustain the momentum of their growth over long periods. In his well-known survey of trade and industrial policies leading to early economic transformations in the Western world, List (1841) documented various policy instruments through which governments protected domestic industries or even intervened to support the development of specific industries—many of which became successful and provided the bedrock for national industrial development.

Likewise, Chang (2003) has reviewed economic developments during the period when most of the currently advanced economies went through their industrial revolutions (between the end of the Napoleonic Wars in 1815 and the beginning of World War I in 1914). He has documented various patterns of state intervention that have allowed these countries to successfully implement their catch-up strategies. Contrary to conventional wisdom that often attributes the Western industrial successes to laissez-faire and free-market policies, the historical evidence shows that the use of industrial, trade, and technology policies was the main ingredient for their successful structural transformation. This ranged from the frequent use of import duties or even import bans for infant-industry protection to industrial promotion through monopoly grants and cheap supplies from government factories, various subsidies, public-private partnerships, and direct state investment, especially in Britain and the United States (Trebilcok, 1981). All European countries trying to catch up with Britain devoted efforts to technology policy. Up to the middle of the first Industrial Revolution, the main channel for technological transfer was the movement of skilled workers who embodied new knowledge. Latecomers to the industrialization process, such as France, attempted to acquire them on a large scale from Britain, but the British government banned the emigration of skilled workers for more than a century, starting in 1719. When new technologies became embodied in machines, they too were put under government control: various laws were adopted throughout the eighteenth and nineteenth centuries to ban the export of "tools and utensils."

Government intervention took many forms in the early experiences of industrialization. In Japan, the government created many factories ("pilot plants") in shipbuilding, mining, textiles, etc., most of which were subsequently sold to the private sector at very low prices and further subsidized. This helped launch the process of industrialization and diversification. Even when government-run enterprises performed poorly, there were many cases of failures that generated a burgeoning private sector. This was most notably the case in Japan during the Meiji Restoration when a vibrant textile industry emerged from the failure of the poorly managed state-owned enterprise. Private firms were successful because they learned skills and management from state-owned firms, and introduced various process innovations to replace expensive equipment with inexpensive labor, which was Japan's comparative advantage at the time (Otsuka et al., 1988).

Developed-country governments continue to adopt various measures to support industrial upgrading and diversification, although these policies may not be announced under the formal label of "industrial policy." Such measures typically include support for basic research, mandates, allocation of defense contracts, and large public procurements. Local governments also often provide all kinds of incentives to private firms to attract them to particular geographic areas and induce new investments. The application of all these measures needs to identify specific industries or products and amounts to "picking winners."

Almost all developing countries have tried to replicate the earlier models of state-led structural change, especially after World War II. From the planned economies of Eastern Europe and Asia to left-leaning or even liberal regimes in Latin America, Asia, Africa, and throughout the Arab world, many governments have adopted various policy measures to promote industrial development and industrial upgrading (Chenery, 1961). While there have been a few successes in East Asia, most of these attempts have failed to deliver the expected results (Krueger and Tuncer, 1982; Lal, 1994; Pack and Saggi, 2006).

A good example is Egypt's industrialization program in the 1950s, which featured heavy industries such as iron, steel, and chemicals. The country's per capita income was about 5 percent of that of the United States, the world's most important steel producer at the time. Unless the government continuously provided costly subsidies and/or protection, Egyptian firms could not attract private investment. I refer to these firms as non-viable.[3] In other words, these non-viable enterprises are unable to survive in an open, competitive market even if they are well managed; and, unless the government provides subsidies and/or protection, no one will invest in or continue to operate such firms. The lack of capital-intensive industries in developing countries is not, therefore, caused by market rigidity, as structuralism argued, but by the non-viability of the firms in an undistorted, open, competitive market.[4]

The limited fiscal resource capacities of the state made the large-scale protection for and subsidies to these non-viable firms unsustainable. In such situations, governments have had to resort to administrative measures—granting market monopolies to firms in the so-called priority sectors, suppressing interest rates, over-valuing domestic currencies, and controlling the

3 If a normally managed firm is expected to earn a socially acceptable profit in a free, competitive market without government protection or subsidies, the firm is viable. There could be many factors that affect the viability of a firm. I use the term "non-viability" to describe the inability of normally managed firms to earn socially acceptable profits because of the firms' choices of industry, product, and technology away from those deemed optimal by the economy's endowment structure.

4 The models based on increasing returns, such as Krugman (1981, 1987, 1991) and Matsuyama (1991), and coordination of investments, such as Murphy et al. (1989), assume that the endowment structure of each country is identical and, therefore, that firms will be viable in an undistorted, open, competitive market once the government helps the firms overcome market failure and escape the poor-equilibrium trap. Such models could be appropriate for considering the government's role in assisting firms to compete with those in other countries at a similar stage of development. Such models are, however, inappropriate as policy guidance for developing countries that are attempting to catch up with developed countries because the endowment structures in developing and developed countries are different. With government help, a developing country might be able to set up firms in advanced capital-intensive industries that have economies of scale; however, because of the scarcity of human and physical capital, the comparative cost of production of firms in the industry in the developing country will be higher than for firms in a developed country in the same industry. The firms will, therefore, still be non-viable in an undistorted, open, competitive market. As such, the government needs to support and protect the firms continuously after they have been set up.

prices of raw materials—in order to reduce the costs of investment and continuous operation of their non-viable public enterprises (Lin, 2009). In such circumstances, government-supported firms cannot be viable in open, competitive markets. Their survival depends on heavy protection and large subsidies through various means such as high tariffs, quota restrictions, and subsidized credit. The large rents embedded in these measures easily become the targets of political capture and create difficult governance problems (Lin, 2011).

By contrast, Mauritius, one of the most successful African economies, took off in the 1970s by targeting labor-intensive industries such as textiles and garments. These industries were mature in Hong Kong-China, its "compass economy." Both economies share the same endowment structure and the per capita income in Mauritius was about half that in Hong Kong-China in the 1970s. The Mauritius Industrial Development Authority and Export Processing Zones Development Authority were created by the government to attract Hong Kong-China's investment in its export processing zone. The vision was to position Mauritius as a world-class export hub on the Hong Kong-China model. Together, they have contributed to the country's emergence as an economic powerhouse.

Historical evidence shows that successful countries in their catching-up stage all used industrial policies to facilitate their industrial upgrading and their industrial policies targeted industries existing in dynamically growing countries with a similar endowment structure and moderately higher per capita income: (1) Britain targeted the Netherlands' industries in the sixteenth and seventeenth centuries; its per capita GDP was about 70 percent of that of the Netherlands. (2) Germany, France, and the United States targeted Britain's industries in the late nineteenth century; their per capita incomes were about 60 percent to 75 percent of Britain's. (3) In the Meiji Restoration, Japan targeted Prussia's industries; its per capita GDP was about 40 percent of Prussia's. In the 1960s, Japan targeted the industries in the United States; Japan's per capita GDP was about 40 percent of that of the United States. (4) In the 1960s to 1980s, Korea, Taiwan-China, Hong Kong-China, and Singapore targeted Japan's industries; their per capita incomes were about 30 percent of Japan's. (5) In the 1970s, Mauritius targeted Hong Kong-China's textile and garment industries; its per capita income was about 50 percent of Hong Kong's. (6) In the 1980s, Ireland targeted information, electronic, chemical, and pharmaceutical industries in the United States; its per capita income was about 45 percent of that of the United States. (7) In the 1990s, Costa Rica targeted the memory chip packaging and testing industry; its per capita GDP was about 40 percent of Taiwan-China's, which was the main economy in this sector.

Thus, for an industrial policy to be successful, it should target sectors that conform to the economy's latent comparative advantage. The latent comparative advantage refers to an industry in which the economy has low factor costs of production but the transaction costs are too high to be competitive in domestic and international markets. Firms will be viable and the sectors will be competitive once the government helps the firms overcome coordination and externality issues to reduce the risk and transaction costs. But the question is: How are governments able to pick the sectors that are in line with the economy's latent comparative advantages?

A short answer is to target industries in dynamically growing countries with a similar endowment structure and somewhat higher income. Based on the principles of NSE, industrial upgrading is based on changes in comparative advantages due to changes in endowment structure. Countries that have a similar endowment structure should have similar comparative advantages. A dynamically-growing country's industries should be consistent with the country's comparative advantages. Some of its industries will lose comparative advantage as the country grows and its endowment structure upgrades. Those "sunset" industries will become the latent comparative advantage of the latecomers. For countries with a similar endowment structure, the forerunners' successful and dynamic industrial development provides a blueprint for the latecomers' industrial policies. The next section proposes a more detailed guide for identifying and facilitating the industries with comparative advantage.

4 THE GROWTH IDENTIFICATION AND FACILITATION FRAMEWORK

Although the historical and contemporary evidence shows that governments always play an important role in facilitating industrial upgrading and diversification in all successful countries, it may not be enough to validate an idea that has been mired in controversy for so long. Many economists who agree with the general notion that government intervention is an indispensable ingredient of structural transformation have maintained their opposition to industrial policy because of the lack of a general framework that can be used to guide policymaking.

To justify that industrial policy is essential to promote economic development, this article codifies some basic principles that can guide the formation of successful industrial policy. The first step is to identify new industries in which a country may have latent comparative advantage, and the second is to remove the constraints that impede the emergence of industries with such advantage and create the conditions to allow them to become the country's competitive advantage. Specifically, I propose a six-step process:

(1) The government in a developing country can identify the list of tradable goods and services that have been produced for about 20 years in dynamically growing countries with similar endowment structures and per capita income that is about 100 percent higher than its own. This step could avoid the government doing the wrong things or being captured by vested groups for rent seeking.

(2) Among the industries in that list, the government may give priority to those that some domestic private firms have already entered spontaneously and try to identify: (i) the obstacles that are preventing these firms from upgrading the quality of their products; or (ii) the barriers that limit entry to those industries by other private firms. This could be done through a combination of various methods such as value-chain analysis or the Growth Diagnostic Framework suggested by Hausmann et al. (2008). The government can then implement policy to remove these binding constraints and use randomized controlled experiments to test the effects of this so as to ensure the effectiveness of scaling up these policies at the national level (Duflo, 2004). This step takes advantage of tacit knowledge owned by existing domestic firms.

(3) Some of the industries in the list may be completely new to domestic firms. In such cases, the government could adopt specific measures to encourage firms in the higher-income countries identified in the first step to invest in these industries, so as to take advantage of the lower labor costs. The government may also set up incubation programs to catalyze the entry of private domestic firms into these industries. When the tacit knowledge has not existed, the government can help import or cultivate it.

(4) In addition to the industries identified in the list of potential opportunities for tradable goods and services in step 1, developing-country governments should pay close attention to successful self-discoveries by private enterprises and provide support to scale up these industries. Consequently, an economy will not miss opportunities arising from new technologies that are not identified by the preceding steps.

(5) In developing countries with poor infrastructure and an unfriendly business environment, the government can invest in industrial parks or export processing zones and make the necessary improvements to attract domestic private firms and/or foreign firms that may be willing to invest

in the targeted industries. Improvements in infrastructure and the business environment can reduce transaction costs and facilitate industrial development. However, because of budget and capacity constraints, most governments will not be able to make the desirable improvements for the whole economy within a reasonable timeframe. Focusing on improving the infrastructure and business environment in industrial parks or export processing zones is, therefore, a more manageable alternative. Industrial parks and export processing zones also have the benefit of encouraging industrial clustering. This step ensures that the government plays the coordination function in a pragmatic way.

(6) The government may also provide incentives to domestic pioneer firms or foreign investors working within the list of industries identified in step 1 in order to compensate for the non-rival public knowledge created by their investments. These incentives should be limited both in time and in financial cost. They may take the form of a corporate income-tax holiday for a limited number of years, direct credits to co-finance investments, or priority access to foreign reserves to import key equipment. The incentives should not and need not be in the form of monopoly rent, high tariffs, or other distortions. The risk of rent seeking and political capture can therefore be avoided. For firms in step 4 that discovered new industries successfully by themselves, the government may award them special recognition for their contribution to the country's economic development. This step addresses the externality issue.

The industries identified through the above process should be consistent with the country's latent comparative advantage. Once the pioneer firms come in successfully, many other firms will enter these industries as well. The government's facilitating role is mainly restricted to provision of information, coordination of hard and soft infrastructure improvement, and compensation for externalities. Government facilitation through the above approach is likely to help developing countries tap into the potential of the advantage of backwardness and realize dynamic and sustained growth.

In the explanation of the six-step procedure, several other ways of identifying binding constraints are also mentioned. In the following, I explain how the Growth Identification and Facilitation Framework complements and adds new knowledge to the existing methods.

(1) Business and Investment Environment: There is robust empirical knowledge based on quantitative data on firm performance and perception-based data on the severity of a number of potential constraints facing firms in the developing world. However, this idea is based on the Washington

Consensus and its goal is to introduce a whole set of first-best institutions. For example, it points out that in most of Sub-Saharan Africa, firms tend to consider many areas of the investment climate to be major obstacles to business development and the adoption of more sophisticated technology. Finance and access to land seem to be areas of particular concern to smaller firms; larger firms tend to perceive labor regulations and the availability of skilled labor as the main constraints to their activity; and firms across the board are concerned about corruption and infrastructure—especially network utilities such as electricity, telecommunications, transportation, and water (Gelb et al., 2007).

Despite their usefulness, investment climate surveys, which try to capture the policy and institutional environment within which firms operate, can be misused or misinterpreted. First of all, the government may not have the capacity to introduce all those changes. Economic policies have to reflect the capacity of the state to implement them. In fact, identification of new industries and prioritization of government's limited resources to facilitate the development of those industries are both essential for successful growth strategies in developing countries. Because fiscal resources and implementation capacity are limited, the government in each of those countries has to prioritize and decide which particular efforts and facilities it should improve or where optimally to locate the public services to make those success stories happen. Deng Xiaoping explained that pragmatic wisdom at the beginning of China's transition to a market economy when he advocated allowing a few regions and people to get rich first so as to achieve common prosperity for all people in the nation. The dynamic growth in those regions and industries would increase fiscal revenues, giving the government more resources to improve infrastructure for other regions in the nation later.

Another concern about investment climate surveys is that the first-best institutions may be different at different stages of development. Countries at different levels of development tend to have different economic structures because of the differences in their endowments. The production activities of countries in the early levels of development tend to be labor intensive or resource intensive and usually rely on conventional, mature technologies and produce "mature," well-established products. Except for mining and plantations, their production has limited economies of scale. Their firm sizes are usually relatively small, with market transactions often informal, limited to local markets with familiar people. The hard and soft infrastructure required for facilitating that type of production and market transactions is limited and relatively simple and rudimentary. At the other extreme of the development spectrum, high-income countries display a completely different endowment structure. The relatively abundant factor in their endowments is typically capital, not natural resources or labor. They tend to have comparative advantage in capital-intensive industries with economies of scale in production. The various types of hard infrastructure (power, telecommunications, roads, port facilities, etc.) and soft infrastructure (regulatory and legal frameworks, cultural value systems, etc.) that are needed must comply with the necessities of national and global markets where business transactions are long distance and large in quantity and value.

So the optimal institutions may be changing with levels of development. And it is, more or less, irrelevant to list the first-best institutions for developing countries at various stages of development.

Investment climate surveys have two more limitations. They do not provide information about industries that do not yet exist, but in which a country has latent comparative advantage. And the existing industries that are surveyed may not be consistent with the country's comparative advantage, either because they are too advanced (as a legacy of a development strategy that defied comparative advantage), or because they have become fundamentally uncompetitive (as a result of a general wage increase that accompanied the country's development). Second, such surveys will not suggest any compensation for the first-movers or ameliorate the external effects associated with the messages conveyed by first-movers.

(2) Growth Diagnostics: Compared with the laundry list of needed reforms, the Growth Identification and Facilitation Framework focuses on binding constraints instead of the whole set of first-best institutions (Hausmann et al., 2008). The Growth Diagnostics approach provides a decision-tree methodology to help identify the relevant binding constraints for any given country. It starts with a taxonomy of possible causes of low growth in developing countries, which generally suffer from either the high cost of finance (because of either low economic and social returns or a large gap between social and private returns), or low private returns on investment. The main step in the diagnostic analysis is to figure out which of these conditions more accurately characterizes the economy in question.

Although the Growth Diagnostics Framework attempts to take the policy discussion of growth forward, its focus and the specification of its model remain quite macroeconomic. This is understandable; after all, growth is a macroeconomic concept and taking the analysis to a sector level would raise issues of sector interactions and trade-offs.

The main concern about the Growth Diagnostics Framework is still the fact that it relies on information based on existing production activities. These activities may be in industries where the country has no comparative advantages. There may be no firms in the new industries in which the countries have latent comparative advantage. It is quite cumbersome to use the Growth Diagnostics Framework to find the industries with potential comparative advantage.

(3) Product Space: Hausmann and Klinger (2006) investigated the evolution of a country's level of sophistication in exports and found that the industry upgrading process was easier when the move was to "nearby" products in the product space. This is because every industry requires highly specific inputs such as knowledge, physical assets, intermediate inputs, labor skills, infrastructure, property rights, regulatory requirements, or other public goods. Established industries somehow have sorted out the many potential failures involved in ensuring the presence of all of these inputs. The barriers preventing the emergence of new industries are less binding for nearby industries, which only require slight adaptations of existing inputs.

This idea is based on the fact that firms in existing sectors own tacit knowledge that is helpful for successful upgrading/diversification to nearby sectors in the product space. However, from the NSE perspective, the existing sectors may be wrong sectors because of the wrong interventions in the past. Some sectors in which the country has latent comparative advantage may be totally new to the country and the tacit knowledge can be brought in with foreign direct investment. In spirit, the comparative advantage and Growth Identification and Facilitation idea is similar to that of monkeys jumping to nearby trees, but the step proposed here is much easier to implement than the product-space analysis proposed by them.

(4) Randomized Control Trials: This concept was adopted by researchers at the MIT Poverty Lab, who suggest that the quest for growth be re-centered on assessing the impact of a development project or program (against explicit counterfactual outcomes). Starting with the idea that credible impact evaluations are needed to ensure that the most effective programs are scaled up at the national or international level, they design randomized control trials (RCTs) or social experiments that can be used to leverage the benefits of knowing which programs work and which do not (Duflo and Kremer, 2003). Their approach is based on the notion that the standard aggregate growth paradigm relies, to a large extent and mistakenly, on the assumption of a rational representative agent. Stressing heterogeneity in country circumstances and among micro agents, this new wave of research attempts explicitly to account for the heterogeneity of individual households and firms in development analysis and policy. It has produced some useful tools for understanding the effectiveness of some specific micro projects. But even assuming that they can

actually transfer lessons from localized development experiences to different geographic or cultural areas, RCTs still fall short in providing useful overall guidance to policymakers confronted with the design of development strategies. In sum, they search for ingredients instead of a recipe.

5 CONCLUDING REMARKS

In this paper, I provide an NSE perspective on industrial policy, especially in developing countries. Economic development, which reflects ever-increasing average labor productivity and per capita income, is a process of continuous structural changes in technology, industries, and hard and soft infrastructure. The differences in economic structure for countries at different levels of economic development are a result of the differences in their endowment structure. Firms in an industry will be viable in an open, competitive market only if the industry is consistent with the comparative advantage determined by the economy's endowment structure. In the past, development thinking used the advanced countries as references and advised the developing countries to develop what the advanced countries had but they did not have (modern, large-scale, capital-intensive industries in structuralism) or to do what the advanced countries could do relatively well but the developing countries could not (business environment and governance in the neoliberal Washington Consensus). A third wave of new development thinking, NSE, advises developing countries to scale up what they could do well (their comparative advantages) based on what they have now (their endowments).

Every developing country has the potential to grow dynamically for decades, and to become a middle-income or even a high-income country in one or two generations, as long as its government has the right industrial policy to facilitate the development of the private sector along the lines of the country's comparative advantages and tap into the latecomer advantages. For the government's industrial policy to achieve that desirable result, a change in development thinking is necessary.

REFERENCES

AMSDEN, A. H. (1989). *Asia's Next Giant*. New York and Oxford: Oxford University Press.

CHANG, H.-J. (2003). *Kicking Away the Ladder: Development Strategy in Historical Perspective*. London, Anthem Press.

CHENERY, H. B. (1961). "Comparative Advantage and Development Policy." *American Economic Review* 51 (March): 18–51.

DUFLO, E. (2004). "Scaling Up and Evaluation." In F. Bourguignon and B. Pleskovic (eds.), *Annual World Bank Conference on Development Economics 2004*. Washington, DC: World Bank.

DUFLO, E., M. KREMER (2003). "Use of Randomization in the Evaluation of Development Effectiveness." Paper prepared for the World Bank Operations Evaluation Department, July.

GELB, A., et al. (2007). What Matters to African Firms? The Relevance of Perception Data. Policy Research Working Paper No. 4446. Washington, DC: World Bank.

GERSCHENKRON, A. (1962). *Economic Backwardness in Historical Perspective: A Book of Essays*. Cambridge, MA: Belknap Press of Harvard University Press.

GROWTH COMMISSION (2008). *The Growth Report: Strategies for Sustained Growth and Inclusive Development*. Washington, D.C.

HARRISON, A., A. RODRÍGUEZ-CLARE (2010). "Trade, Foreign Investment, and Industrial Policy for Developing Countries." In D. Rodrik (ed.), *Handbook of Economic Growth*, Vol. 5. Amsterdam, The Netherlands: North-Holland, p. 4039–213.

HAUSMANN, R., B. KLINGER (2006). Structural Transformation and Patterns of Comparative Advantage in the Product Space. Working Paper No. 128. Cambridge, MA: Harvard University Center for International Development.

HAUSMANN, R., D. RODRIK, A. VELASCO (2008). "Growth Diagnostics." In N. Serra and J. E. Stiglitz (eds.), *The Washington Consensus Reconsidered: Towards a New Global Governance*, New York, Oxford University Press, pp. 324–354.

KRUEGER, A. O., B. TUNCER (1982). "An Empirical Test of the Infant Industry Argument." *American Economic Review* 72: 1142–152.

KRUGMAN, P. (1979). "A Model of Innovation, Technology Transfer, and the World Distribution of Income." *Journal of Political Economy* 87(2): 253–66.

KRUGMAN, P. (1981). "Trade, Accumulation and Uneven Development." *Journal of Development Economics* 8(2), 149–61.

KRUGMAN, P. (1987). "The Narrow Moving Band, the Dutch Disease, and the Competitive Consequences of Mrs. Thatcher." *Journal of Development Economics* 27(1/2), 41–55.

KRUGMAN, P. (1991). "History versus Expectations." *Quarterly Journal of Economics* 106(2), 651–67.

LAL, D. (1994). *Against Dirigisme: The Case for Unshackling Economic Markets*. San Francisco: International Center for Economic Growth, ICS Press.

LIN, J.Y. (2003). "Development Strategy, Viability and Economic Convergence." *Economic Development and Cultural Change* 53: 277-308.

LIN, J.Y. (2009). *Economic Development and Transition*. Cambridge: Cambridge University Press.

LIN, J.Y. (2011). "New Structural Economics: A Framework for Rethinking Development." *The World Bank Economic Research Observer* 26(2): 193-221.

LIN, J.Y. (2012). *New Structural Economics: A Framework for Rethinking Development and Policy*. Washington, DC: World Bank.

LIN, J.Y., C. MONGA (2011). “Growth Identification and Facilitation: The Role of the State in the Process of Dynamic Growth.” *Development Policy Review* 29(3): 264-290.

LIN, J.Y., R. REN (2007). “East Asian Miracle Debate Revisited” (in Chinese) *Jingji Yanjiu* (Economic Research Journal) 42(8): 4-12.

LIST, F. 1841 [1930]. *Das Nationale System der Politischen Ökonomie (The National System of Political Economy)*. Vol. 6. Schriften, Reden, Briefe. A. Sommer (ed.). Berlin: Reinmar Hobbing.

MATSUYAMA, K. (1991). “Increasing Returns, Industrialization and Indeterminacy of Equilibrium.” *Quarterly Journal of Economics* 106(2): 616–50.

MURPHY, K. M., A. SHLEIFER, R. W. VISHNY (1989). “Industrialization and Big Push.” *Journal of Political Economy* 97: 1003-1026.

OTSUKA, K., G. RANIS, G. SAXONHOUSE (1988). *Comparative Technology Choice in Development: The Indian and Japanese Cotton Textile Industries*. London: Macmillan Press.

PACK, H., K. SAGGI (2006). “Is There a Case for Industrial Policy? A Critical Survey.” *World Bank Research Observer* 21(2): 267–97.

PORTER, M. E. (1990). *The Competitive Advantage of Nations*. New York: Free Press.

ROMER, P. M. (1990). “Endogenous Technological Change.” *Journal of Political Economy* 98(5): Part II, S71–S102.

TREBILCOK, C. (1981). *The Industrialization of Continental Powers, 1780–1914*. London: Longman.

WADE, R. (1990). *Governing the Market.* Princeton, NJ: Princeton University Press.

WORLD BANK (2011). *Global Development Horizons: Multipolarity: The New Global Economy*. Washington, DC: World Bank.