DPR Debate

Growth Identification and Facilitation:
The Role of the State in the Dynamics of Structural Change

Introduction

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This DPR Debate is based on the contribution by Justin Lin, Chief Economist at the World Bank, and his colleague Célestin Monga, on ‘Growth Identification and Facilitation: The Role of the State in the Dynamics of Structural Change’. The article under consideration is important and timely as it articulates a number of new policy implications from Justin Lin’s earlier work on New Structural Economics, which was discussed in a previous DPR debate (Lin and Chang, 2009). This symposium contains the article and comments on it from five distinguished specialists, and closes with a rejoinder by Lin and Monga. This introduction discusses the article, the comments and the rejoinder.

Discussing ‘the role of the state in the dynamics of structural change’, as Lin and Monga do, is not new. However, the novel and noteworthy contribution of their article is that it provides a practical procedure to identify and facilitate growth through a six-step procedure. This approach complements existing approaches such as the growth diagnostics approach (Hausmann et al., 2005), the competitiveness approach (Porter and Schwab, 2008), the investment-climate survey approach (World Bank, 2005), or the capability approach (Cantore et al., 2011):

- Step 1: Governments should select dynamically growing countries with a similar endowment structure and with about 100% higher per capita income than their own average. They must then identify tradeable industries that have grown well in those countries for the previous 20 years.
- Step 2: If some private domestic firms are already present in those industries, they should identify constraints to technological upgrading or further firm entry, and take action to remove such constraints.

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• Step 3: In industries where no domestic firms are present, policy-makers may try to attract foreign direct investment (FDI) from countries listed in step 1, or organise new firm-incubation programmes.
• Step 4: In addition to the industries identified in step 1, the government should also pay attention to spontaneous self-discovery by private enterprises and support the scaling up of the successful private innovations in new industries.
• Step 5: In countries with poor infrastructure and a bad business environment, special economic zones or industrial parks may be used to overcome barriers to firm entry and FDI and encourage the formation of industrial clusters.
• Step 6: The government should be willing to compensate pioneer firms in the industries identified above with tax incentives for a limited period, co-financing for investments, or access to foreign exchange.

Without reviewing the article in detail, one can pose some obvious questions regarding the framework. For example, the first step of the new framework requires a country to identify sectors in which it has a comparative advantage on the basis of goods and services that have been produced for 20 years in similar countries. But what happens if the current circumstances have changed so fundamentally that a comparison with the past is less informative (for example, the rise of emerging power, new communications technology including fibre optic cables, new production processes, new global rules and institutions, climate change)? What if demand patterns have shifted so fundamentally (for example, the rise of the middle classes in China and India, global financial crisis) that different products are now more successful compared with those in the past? What if there are measurement issues, for example information communication technology (ICT) service exports may be quite difficult to measure but this might be just the export in which small landlocked countries with access to a good quality fibre optic cable have a comparative advantage? What if comparator countries are actually very different geographically or institutionally? So one could have doubts that step 1 would actually be sufficiently informative under all these circumstances.

Or with respect to step 2, the argument is made for government support (to remove binding constraints to growth), but it is not clear how a country knows which policy or instrument works best in which case (a comment which can also be made on the growth diagnostics literature, for example). So even if the right industry and constraints are identified, the wrong policy instrument might still lead to an unintended outcome. This links to a wider point which is underemphasised in the article, namely, that the conditions under which policies are implemented (government capacities, political incentives, the nature of state-business relations) can also be crucial for the success of industrial policies as the need for policies to follow the comparative advantage of a country (which is implicit in steps 1-6).

However, these issues aside, the growth identification and facilitation framework is presented as an alternative to the existing frameworks for analysis. We asked five distinguished experts to comment.
Comments from experts

Suresh Tendulkar comments on the distinction between the roles of the state in facilitating growth and in identifying sources of growth. Tendulkar accepts that there is an important role for growth facilitation, but is less certain about the role of the state in growth identification. He asks how the over-enthusiastic government can be restrained from taking on much more than it can effectively handle, and refers to the South Asian context. He also cautions that time-bound incentives are not straightforward.

Alice Amsden makes three points. First, she argues that industrial policies in countries ranging from the Middle East’s energy belt to the Asian manufacturing corridor and the BRIC (Brazil, Russia, India and China) economies have been more successful in practice than is portrayed by Lin and Monga. Secondly, she suggests that the latter’s two-track approach (identification and facilitation) is better than Michael Porter’s value-chain approach and Ricardo Hausmann’s ‘jumping-monkey’ model, because it involves building up business knowledge which is a more complete approach than is embodied in the other concepts. Thirdly, she argues that Lin and Monga’s model can be enhanced by using industrial policy to invest overseas and attract skills.

K. Y. Amoako argues that Lin and Monga’s approach is a practical and useful starting guide, suggesting that such a pragmatic approach is to be welcomed especially because it comes from the World Bank which traditionally has not believed in a pro-active industrial policy. However, Amoako also argues that the article pays too much attention to supporting products that follow a comparative advantage and too little attention to the acquisition of new technological capabilities and learning. Successful industrialisation has not always been based on competitive markets, and African countries have not always succeeded, despite following their comparative advantage.

Howard Pack suggests that the algorithm involved in selecting industries on the basis of a selection in richer comparable countries and then following the country’s comparative advantage is problematic. This is in part because the economic structure of the richer country could be the result of distorting policies, and in part because a formidable set of policies is required for successful policies which go beyond the mere identification of potential products. Governments should address a whole list of issues which are likely to go beyond the capacity of any government.

Wonhyuk Lim agrees that policy advice based on the ideas of comparative advantage, self-discovery and the facilitating state will help policy-makers in the early stage of development, but argues that more needs to be done to move a country beyond the middle-income trap. South Korea defied its comparative advantage by moving into heavy and chemical industries by means of building specific skills, filling specific gaps in the value chain, relying on a select set of business groups and strategic choice.

Rejoinder

Lin and Monga close the debate with a rejoinder. They answer many of these points directly, for example in arguing that growth identification and facilitation go hand in hand implicitly. They also agree with many of the constructive comments made, for example those by Professor Amsden on the importance of gaining experience in
managing business organisations, or on the way the model can be enhanced by using industrial policy to invest overseas.

But there are also some points where the reader is invited to make up his or her own mind. For example, Lin and Monga repeat time and again that their model focuses on ‘development of industries consistent with latent comparative advantages’. It is unlikely that many will object to this being indeed their intent, but they might object to whether it can be achieved in practice. Or, when Lin and Monga say that it ‘simply points to the necessity to set clear, transparent and rigorous criteria that mitigate .... support uncompetitive industries’, few would doubt that that is important, but many would rather question the ability of governments to implement these criteria successfully, as Tendulkar emphasised.

A further discussion, which has not been completely closed, is to what extent countries should follow a path consistent with their static comparative advantages or whether they should create dynamic comparative advantages (as implied by Amoako).

Another debate left somewhat open concerns knowledge (as brought up by Pack). Government officials are unlikely to know enough to be able to support industries in the way that is intended and to target the ‘development of industries consistent with latent comparative advantages’. When do they know enough?

Conclusion

The article by Lin and Monga introduces a useful and practical 6-step plan for governments to facilitate growth which seems a credible alternative to the existing frameworks (growth diagnostic framework, competitiveness analysis, capability analysis, investment-climate analysis). In doing so, it reinvigorates the debate on the appropriate role of growth policy in development, which has once again become a topical issue in development economics.

Most comments on Lin and Monga’s contribution to the literature agree with the importance attached to the role of the state in growth facilitation. Many also value the practical policy advice embodied in the approach. However, there is some disagreement about the capacity of the state to deliver on growth identification.

Furthermore, the two-track approach in Lin and Monga relies on countries following their comparative advantage, and several comments suggest that countries actually need to defy their comparative advantage involving a more complex set of policies than that suggested by the framework.

In conclusion, most agree that the approach could establish useful ingredients in successful industrial development and comes close to a recipe for growth. But there are doubts about the ability of the cooks to use the recipe and turn the ingredients into a fully cooked meal. Nonetheless, it is hoped that the application of the six-step procedure will produce relevant information that can help countries to grow faster. Indeed, apart from questions on what is the binding constraint in a country, developing-country policy-makers often ask: how did other countries achieve in the past what we would like to achieve now?
References


Growth Identification and Facilitation: The Role of the State in the Dynamics of Structural Change

Justin Lin and Célestin Monga*

The historical record indicates that, in all successful economies, the state has always played an important role in facilitating structural change and helping the private sector sustain it across time. This article puts forward a new approach to help policy-makers in developing countries identify those industries that may hold latent comparative advantage, and recommends ways of removing binding constraints to facilitate private firms’ entry into those industries. Two types of government interventions are distinguished: first, policies that facilitate structural change by overcoming information, co-ordination and externality issues, which are intrinsic to industrial upgrading and diversification; and second, policies aimed at protecting certain selected firms and industries that defy the comparative advantage determined by the existing endowment structure.

Key words: Industrial policy, role of the state, growth

1 Introduction

The recent global crisis, the most serious since the Great Depression, has forced economists and policy-makers to rethink their approaches to macroeconomic management. For developing countries, in the midst of a financial and economic turmoil not of their own making, the road ahead is likely to be rocky. Because of the sluggish recovery in high-income countries and the heavy cost of the crisis, they will have to confront a more difficult global environment for their exports and financing conditions. Yet, in order to continue tackling the enormous challenge of poverty and achieve convergence, they must return to the pre-crisis path of dynamic growth.

How to promote economic growth has been a main topic for economic discourse since the publication of Adam Smith’s The Wealth of Nations in 1776. Market mechanisms have proved essential for valuing the basic ingredients for production and providing the right price signals and the appropriate incentive system for the efficient allocation of resources. However, modern economic growth – a fairly recent phenomenon (Maddison, 2001) – is a process of continuous technological innovation, industrial upgrading and diversification, and improvements in the various types of infrastructure and institutional arrangements that constitute the context for business development and wealth creation (Kuznets, 1966).

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Historical evidence shows that all countries that have successfully transformed from agrarian to modern advanced economies – both the old industrial powers of Western Europe and North America, and the newly industrialised economies of East Asia – have had governments that played a pro-active role in assisting individual firms in overcoming the inevitable co-ordination 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 this article, we argue that these 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. In fact, government propensity to target industries that are too ambitious and not aligned with a country’s comparative advantage largely explains why their attempts to ‘pick winners’ have resulted in ‘picking losers’. By contrast, spontaneously or intentionally, the governments in successful developing countries have typically targeted mature industries in countries with an endowment structure similar to and a level of development not much more advanced than theirs. The main lesson is straightforward: to facilitate industrial upgrading and diversification, government policy must be anchored in industries with latent comparative advantage so that, once the new industries are established, they can quickly become competitive domestically and internationally.

This article broadens the scope of analysis of industrial policy by introducing an important distinction between two types of government interventions. First are those that facilitate structural change by aiming to provide information, compensate for externalities, and co-ordinate improvements in the ‘hard’ and ‘soft’ infrastructure that are needed for the private sector to grow in a manner consistent with the dynamic change in the economy’s comparative advantage. Second are those whose objective is to protect selected firms and industries that are in defiance of the comparative advantage determined by the existing endowment structure – either in new sectors that are too advanced or in old sectors that have lost comparative advantage.

The remainder of the article is structured as follows: Section 2 explains the importance of well-functioning markets and the rationale for a facilitating state in the process of dynamic economic growth. Section 3 briefly reviews some important lessons from early industrial development strategies around the world and analyses 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 analyses the reasons for their success or failure. Building on the foundations of new structural economics (Lin, 2010), Section 4 provides a framework for formulating industrial policy based on a new approach entitled ‘growth identification and facilitation’. Section 5 offers some concluding thoughts.

1. To protect jobs, governments in both developed and developing countries may also support old, declining industries, which have already lost their comparative advantages. Such policies will fail as well.
2. Examples of hard infrastructure are highways, port facilities, airports, telecommunication systems, electricity grids and other public utilities. Soft infrastructure consists of institutions, regulations, social capital, value systems, and other social and economic arrangements. For further discussion on their impacts on economic development see Lin (2010).
2 Structural change, efficient markets and a facilitating state

Economists have long been intrigued by the mystery of modern economic growth, typically observed through the seemingly divergent evolution of the change in per capita gross domestic product among countries. Since taking off sometime around 1820 (Maddison, 2001), the world growth rate has risen more or less steadily, peaking during a ‘golden age’ (1950-73) when it averaged almost 3% per year. But such progress has been uneven across regions, countries, and time. Sustained growth has led to improved living standards, first in Western Europe, North America and Japan, and more recently in newly industrialised (NIEs) and other emerging market economies. Cross-country income distribution that initially widened (with the proportional gap between the richest and poorest countries growing more than fivefold from 1870 to 1990) (Pritchett, 1997) has slowed in recent decades among groups of countries. With the narrowing of the top end of the distribution, there seem to be ‘convergence clubs’ among nations (Evans, 1996). Still, many of the poorest countries, especially in Africa, are excluded from the convergence process.

Modern growth theory has attempted to explain the diverging paths followed. Despite differences in approach and methodology, there is wide consensus that the variation of living standards across countries and time mostly reflects differences in the rate of capital accumulation and productivity growth. Empirical studies carried out from the perspective of development accounting show that, among these two broad factors, ‘productivity differences among countries are the dominant explanation for income differences. Similarly, differences in productivity growth are the most important explanation for differences in income growth rates among countries’ (Howitt and Weill, 2010: 43-4). Over the long term, productivity growth is associated with technological and structural change, namely, to reduce the costs of producing the same outputs with better knowledge and to relocate resources from lower value-added to higher value-added industries.  

It can therefore be said that continuous technological innovation, industrial upgrading, economic diversification and an acceleration of income growth are the main features of modern economic growth (Kuznets, 1966; Maddison, 2006). Each country at any specific time possesses given factor endowments consisting of land (natural resources), labour and capital (both physical and human), which are the total budgets that the country can allocate to primary, secondary and tertiary industries to produce goods and services. These are changeable over time, and conceptually it is useful to add

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3. Technology is defined here as knowledge (intangible intellectual capital) of how to transform basic inputs into final utility. It differs from human or physical capital by its non-rival nature. Efficiency is the way technology is used – with the goal of optimality, especially in the allocation of resources.

4. In the growth literature, structural change has not received as much attention as technological change because of the use of a one-sector model, which is incapable of handling issues related to structural change, in the standard growth accounting and regression research.

5. Maddison (2006) estimated that, in Western Europe, the annual per capita income growth rate before the 18th century was about 0.05%, accelerated to about 1% in the 18th and 19th centuries, and reached 2% in the 20th century. The required time for doubling per capita income thus reduced from 1400 years before the 18th century to 70 years in the 18th and 19th centuries, and further to 35 years in the 20th century.
both ‘hard’ and ‘soft’ infrastructure to the mix (Lin, 2010). Both types are essential to the competitiveness of domestic firms because they affect transaction costs and the marginal rate of return on investment.

At any given point in time, ceteris paribus, the structure of a country’s endowment, that is, the relative abundances of factors that the country possesses, determines the relative factor prices and thus the optimal industrial structure (Ju et al., 2009). A low-income country with abundant labour or natural resources and scarce capital will have comparative advantage and be competitive in labour- or resource-intensive industries. Similarly, a high-income country with abundant capital and scarce labour will have comparative advantage and be competitive in capital-intensive industries. The optimal industrial structure in a country, which will make it most competitive, is therefore endogenously determined by its endowment structure. For a developing country to reach the advanced countries’ income level, it needs to upgrade its industrial structure relative to their capital-intensity. However, to achieve that, it must first close its endowment gap with that of the advanced countries, and the strategy to get there is to follow its comparative advantage at each stage of its development. When firms choose to enter industries and adopt technologies consistent with that country’s comparative advantage, the economy is most competitive. These firms will claim the largest possible market shares and create the greatest possible economic surplus in the form of profits and salaries. Because of the competitiveness, re-invested surpluses earn the highest return, which allows the economy to accumulate even more physical and human capital over time. This dynamic can lead to a virtuous circle: it can upgrade the country’s factor-endowment structure as well as the industrial structure, and also make domestic firms more competitive in more capital- and skill-intensive products over time.

A firm’s objective is to maximise profit, not to exploit the economy’s comparative advantage. It will follow the comparative advantage in choosing its industry and technology in the development process only if the relative factor prices reflect the relative abundances of factors in the economy (Lin, 2009; Lin and Chang, 2009). Such relative factor prices with such nature will exist only in a competitive market system. An efficient market mechanism is therefore a required institution for the economy to follow its comparative advantage in the process of dynamic development.

However, in spite of the importance of the market mechanism, for the following information, co-ordination, and externality reasons, it is also desirable for the government to play a pro-active role in facilitating industrial upgrading and diversification in the development process.

First, the decision to upgrade or diversify is never an obvious choice. A pioneer firm may fail due to the lack of complementary inputs or adequate infrastructure for the new industry, or the targeted industry may simply not be consistent with the economy’s comparative advantage. Industrial upgrading and diversification are therefore likely to be a costly trial-and-error exercise of discovery, even with the advantage of backwardness (Hausmann and Rodrik, 2003). In order to be successful in a competitive

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6. The difference between factors of production and infrastructure is that the supply and demand of the former are determined individually by households and firms, whereas the latter in most cases is supplied by the community or governments by collective actions.
market, firms in a developing country need information about which industries within the global industrial frontier align with the country’s latent comparative advantage.

Information has the same properties as public goods. The costs of collecting and processing information are substantial; however, the marginal cost of allowing one more firm to share the information is almost zero, once the information is generated. Therefore, the government can play a facilitating role by investing in information collection and processing and making information about the relevant new industries freely available to firms. In addition, the choice of a new industry may also shape the economy’s future growth potential in a path-dependent way through the accumulation of specific human and social capital. The government is better than individual private firms at analysing information about this and making that information available to the public.

Second, technological innovation and industrial diversification and upgrading are typically accompanied by changes in capital and skills requirements for firms, as well as changes in their market scope and infrastructure needs due to the evolving nature of production embodied in the process. In other words, industrial upgrading and diversification are typically accompanied by changes in hard and soft infrastructure requirements. For example, with the change from agrarian production to manufacturing and from simple to advanced manufacturing in the development process, the scale of production and market scope become increasingly large, and with them the demand for transportation and power. Individual firms are not capable of internalising these provisions or deploying the kind of co-ordination efforts among firms in different sectors needed to meet those increasing demands. Even if some large single companies were willing to finance a national road or a power network, co-ordination through the public sector would be needed to ensure consistency, efficiency and prevention of natural monopolies when the national economy grows. In addition to the hard infrastructure, in a low-income country firms in small-scale, labour-intensive agriculture and manufacturing need only an unskilled labour force and an unsophisticated financial and marketing system. But when the economy expands into modern manufacturing, high-skilled labour and large funds for lump-sum investments in equipment, working capital and/or export financing are needed, as well as new marketing arrangements. However, individual firms are usually not capable of internalising the needed changes in soft infrastructure. Here again, there is a need for the state to provide or co-ordinate some of those changes in different sectors of the economy so as to facilitate the individual firms’ upgrading and diversification.

7. For example, the application of chemical fertilisers in rice and wheat require modern semi-dwarf varieties to avoid the lodging problem, and the use of modern seeds often requires timely irrigation. Individual farmers will not be able to do this by themselves. There is also a need for access to credits beyond individual farmers’ capacity. Similarly, the diversification from farm to non-farm industries or from small-scale traditional to modern industries also requires the provision of many new inputs and improvements in hard and soft infrastructure, which cannot be internalised in any individual firm’s decision.

8. The success of Ecuador’s cut flowers export in the 1980s is a good example. The fact that Ecuador had latent comparative advantages in producing and exporting cut flowers to the US market was known in the 1970s. But the industry did not expand and exports did not take off until the government helped arrange regular flights and investment in cooling facilities near airports in the 1980s (Harrison and Rodriguez-Clare, 2010). A similar story applies to Ethiopia’s cut flowers’ export to the European market. In issues
Third, innovation, which underlies the industrial upgrading and diversification process, is by nature a very risky endeavour. Even when governments are willing and capable of helping by providing firms with the necessary information and co-ordination, success is not guaranteed. Firms can fail because the targeted industry is too ambitious, or the market too small, or the co-ordination inadequate. But even such cases of failure offer useful information to other firms, indicating that the targeted industries are inappropriate and should be re-examined. First-mover firms therefore pay the cost of failure and produce valuable information for other firms. And when they succeed, their experience also provides information externalities to other firms: their success proves that the new industry is aligned with the economy’s new comparative advantage, thus prompting many new firms to enter the industry.  

The subsequent large entry of new firms eliminates the possible rents that the first mover may enjoy. From the perspective of an individual firm, the incentive to be a pioneer firm is repressed because of the asymmetry between the high cost of failure and the limited advantage of success. Unless there is compensation for the information externalities that the pioneer firm creates, few firms will have the incentive to be the first movers and thus the process of industrial upgrading and diversification as well as economic growth will be impeded (Aghion, 2009; Romer, 1990). In a developed country with global-frontier industries, a successful first mover can in general be rewarded with a patent and enjoys the rent created by a period of monopoly for its innovation. For a developing country, its new industry is most likely to be a matured industry located within the global industrial frontier. So the first mover will not be able to obtain a patent for its entry into a new industry. Some form of direct support from government to pioneer firms that are willing to take the risk to move to new industries is therefore justifiable.  

Compared with developed countries whose industries are located on the global frontier and their 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, co-ordination, and externality related to the provision of skilled labour, Germany’s dual system of vocational education and training has been a major factor in the country’s economic success over the past six decades.

9. In a recent field study in Zambia, we found that a local entrepreneur successfully started the production of corrugated roofing sheets. Within a year, more than 20 firms had joined in.

10. Precisely because of such positive information externalities, governments in developed countries also provide various forms of targeted support to firms engaged in innovation, such as funding of basic research, preferential taxes, mandates, defence contracts, and procurement policies.

11. The possibility of borrowing existing knowledge does not mean that developing countries need not engage in indigenous innovation. To be successful, they need to undertake a process of innovation that makes the borrowed technology suitable to local conditions, and also to carry out product innovation in sectors where they are already world leaders, or not too far behind the world leader. For further discussion, see Lin and Ren (2007).
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;

3 Picking winners or losers: lessons from experience

There is wide consensus among economic historians on the important role played by the
state in facilitating structural change and helping sustain it across time and across
developed countries. However, except for a few successful cases post-World War II, the
governments in most developing countries have failed to play that desirable role. It is
therefore essential to briefly review historical and contemporary experiences of state
intervention, to draw lessons from the many failures and few successes.

3.1 The role of the state in structural change in advanced economies

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,
which 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.\(^\text{12}\)

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 US (Trebilcok,

\(^{12}\) List’s book covers the rise of economic powerhouses in a variety of contexts, from Italian cities such as
Venice to Hanseatic cities such as Hamburg or Lübeck, and countries such as the Netherlands, England,
Spain, Portugal, France, Germany and the United States.
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 industrialisation 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 1719.13 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’.

In all advanced economies, the government supported the acquisition of foreign technology, ‘sometimes by legal means such as financing study tours and apprenticeships, and sometimes through illegal measures, which included support for industrial espionage, smuggling of contraband machinery, and refusal to acknowledge foreign patents’ (Chang, 2003: 18). In Germany (Prussia), for instance, Frederick the Great annexed the industrial province of Silesia and promoted the steel and linen industries. Advanced technologies such as iron-puddling, the coke furnace or the steam engine were subsequently imported from more successful countries (Kindleberger, 1978).

Government intervention took many forms in the early experiences of industrialisation. In Japan, the government created many factories (‘pilot plants’) in shipbuilding, mining, textiles, etc., most of which were subsequently sold off to the private sector at very low prices and further subsidised. This helped launch the process of industrialisation and diversification. Even when government-run enterprises performed poorly,14 there were many cases of failures that generated a burgeoning private sector. This was most notably the case in Japan during the Meiji Restoration15 when a vibrant textile industry emerged from the failure of the poorly managed state-owned enterprise. Private firms were successful because they learned the skill and management from the state-owned firms, and introduced various process innovations to replace expensive equipment with inexpensive labour, 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, even though these policies may not be announced under the formal label of ‘industrial policy’. Besides patent systems, which are industry-neutral, other such measures typically include support for basic research, mandates, allocation of defence contracts and large public procurements. Local

14. For a theoretical exposition, see Jones et al. (1990) and World Bank (1995).
15. The Meiji period (1868-1912) marked the beginning of an era of major political, economic, and social change which, according to conventional wisdom, brought about the modernisation and Westernisation of Japan. See Beasley (1972).
16. A common reason for the failure of state-owned enterprises is the government’s attempt to use them as a vehicle to develop industries or adopt technologies inconsistent with the country’s comparative advantage (Lin and Tan, 1999). Such attempts create a policy burden for state-owned firms which the state is compelled to provide with subsidies and protection. Information asymmetry prevents governments from knowing exactly what level of subsidies and protection would be adequate and state-owned firms use the policy burden as an excuse to ask for more subsidies and protection, which gives rise to the problem of soft-budget constraint (Kornai, 1986).
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’.

A prime example is the US, where the government has constantly offered strong incentives to private businesses and academic institutions for discovering new ideas that are valuable for sustaining growth, as well as making such ideas non-rival – besides building infrastructure in key economic sectors such as transportation and providing financing to education and training in order to build the country’s skills base in various industries. This is routinely done through subsidies for research and development, and through the granting of patents and copyrights. The Advanced Technology Program, for instance, launched in 1990, has been instrumental in the research and development of promising high-risk technologies. Government subsidies can also be found in areas such as defence, energy, transportation and home construction.

The ongoing debate over the need for a US industrial policy17 has not changed the hard facts about the important role played by the federal and state governments in industrial development in recent decades. Their interventions include the allocation of large amounts of public funding to defence-related procurements and R&D spending, which have large spillover effects throughout the economy (Shapiro and Taylor, 1990). In fact, the share of the federal government in total R&D spending, which was only 16% in 1930, has remained between 50 and 66% during the post-World War II years (Owen, 1966; Mowery and Rosenberg, 1993). As Chang observes, ‘industries such as computers, aerospace and the internet, where the U.S.A. still maintains an international edge despite the decline in its overall technological leadership, would not have existed without defence-related R&D funding by the country’s federal government’. Government support is also critical in other important segments of the economy such as the health industry: public funding to the National Institutes of Health, which in turn support a large fraction of R&D by biotechnological firms, has been essential in helping the US maintain its lead in that industry.

17. During the 1984 presidential campaign, Democratic candidate Walter Mondale argued that the economic policies of the country were ‘destroying industry – not building it’, and that federal aid should be directed to ‘those communities and regions hit hardest by economic change’ (quoted by McKenzie, 2007). Economists Bluestone and Harrison (1982) argued that the ongoing process of deindustrialisation amounted to a ‘wide-spread, systematic disinvestment in the nation’s productive capacity’. Pointing to the post-war economic success of Japan, which he credited to industrial policies orchestrated by its Ministry of International Trade and Industry (MITI), Thurow (1980) worried that, if left alone, ‘our economy and our institutions will not provide jobs for everyone who wants to work’, and that ‘we have a moral responsibility to guarantee full employment’. He observed that ‘major investment decisions have become too important to be left to the private market alone ... Japan Inc. needs to be met with U.S.A. Inc’. Others recommended various measures such as the creation of national and regional economic development banks similar to Herbert Hoover’s Reconstruction Finance Corporation, which would use subsidies and federal loan guarantees to slow the contraction of declining industries and speed the development of emerging industries; the launch of ‘Tripartite councils’ at the national, regional, and firm levels, which would be composed of representatives from management, labour and government and would seek consensus on how capital investment should be allocated. While often conceding on protectionist proposals, other economists and political leaders have maintained strong opposition to any coherent industrial-policy programmes.
The same is true in Europe where discussions of active industrial policy have been taking place since the end of World War II. In fact, many of Europe’s most remarkable industrial successes (space programme Ariane, aircraft manufacturer Airbus, etc.) were achieved in the context of intergovernmental co-operation, with decisive political support from the European Union. Since the early 1990s, the European Commission has issued several policy papers on the subject, including the 1994 report An Industrial Competitiveness Policy for the European Union, which set the stage for more determined government interventions. Other official strategy documents have focused on the risk of de-industrialisation, the regulatory burden, the impact of enlargement of the EU on the competitiveness of European companies and their location, etc. In the context of the review of the Lisbon Strategy in March 2005, EU Member States set the objective of ‘creating a solid industrial base’, and reiterated the increasing importance attached to R&D and innovation in all forms, as well as information and communication technologies.

France has always favoured government-sponsored economic programmes in which the public and private sectors co-ordinate their efforts to develop new technologies and industries. The French government often provides financial support and capital to the private sector by direct subsidies, tax credits, or government-run developmental banks. In Britain, the government, which defines itself as ‘a market shaper’, has recently released a new industrial policy aimed at: supporting enterprise and entrepreneurial activity, including the access to finance required for starting and growing firms; fostering knowledge creation and its application; helping people develop the skills and capabilities to find work and build the businesses and industries of the future; investing in the infrastructure required to support a modern low-carbon economy; ensuring open and competitive markets to drive innovation and rising productivity; and building on industrial strengths where Britain has particular expertise or might gain a comparative advantage, and where government action can have an impact (British Government, 2009).

Another interesting case is that of Finland, a late but successful state-led industrialisation. According to Jäntti and Vartiainen (2009), the economic policy that

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18. The European Coal and Steel Community (ECSC) was created in 1951 and the European Atomic Energy Community (EURATOM) in 1957.
19. In October 2005, the European Commission announced seven new horizontal initiatives in order to: ‘(1) consolidate the EU’s legal framework in the area of intellectual property, (2) take into account the links between the issues of competitiveness and environmental protection, (3) adapt the trade policy with a view to developing the competitiveness of European industry, (4) simplify the law governing certain industrial sectors (i.e. construction, food industry), (5) remedy the shortage of skilled labour in certain sectors (i.e. new technologies, textiles), (6) anticipate and support the structural changes in industry, by taking this objective into consideration in other EU policies (structural funds, in particular), and (7), adopt an integrated European approach to industrial research and innovation.’
20. Several proposals are currently under consideration to stimulate innovation and growth. The recently issued Juppé-Roccard report by two former Prime Ministers (a socialist and a conservative) recommends that France raises 35 billion euros (US$52 bn) through public borrowing to be spent on universities and research (providing them with endowments and incentives to merge or become independent and private), the green economy and high-tech to propel growth. Among the projects are plans to expand the high-speed Internet, develop green cities, and support innovative small businesses and France’s cutting-edge aerospace and nuclear industries. Of the 35 bn euros to be raised, 13 bn will come from the reimbursed bailout packages given to French banks, with the remaining 20 bn to be raised on the financial markets.
achieved this objective was a mix of heavy government intervention and private incentives. Government intervention aimed at a fast build-up of industrial capital in order to ensure a solid manufacturing base. The main features of the country’s growth regime were: a high rate of capital accumulation, which often required the use of administrative rationing of credit through interest-rate controls as well as a policy of selective loan approvals for capital-equipment investment; and a high rate of investment in targeted areas of manufacturing, the paper and pulp and metalworking industries in particular. State enterprises were established in the basic metal and chemical-fertiliser industries, and in the energy sector. As late as in the 1980s, state-owned enterprises accounted for 18% of the country’s total industry value-added (Kosonen, 1992).

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 (Krugman and Tuncer, 1982; Lal, 1994; Pack and Saggi, 2006). Nevertheless, the governments in developing countries will continue to attempt to play the facilitating role. It is therefore all the more important to understand better why some countries have been able to succeed while most others have failed, so that it is possible to advise the governments to do the right things and avoid the mistakes (Rodrik, 2009).

3.2 The recipe for success – or failure

There are two main reasons for the controversies and confusion about industrial policy in developing countries. First, economists have tended to focus their attention on the failed policies implemented and not on the objectives and the broader strategic choices made in the successful cases. Second, too often very different types of government interventions are lumped together in regression analyses, with little consideration specifically as to which ones may have attempted to facilitate the emergence of industries that are consistent with latent comparative advantage.

Summing up the research findings on how to achieve sustained growth through structural transformation and the diffusion of ideas and accumulation of knowledge, Romer notes that ‘the challenge is to find better forms of government intervention, ones that have better economic effects and pose fewer political and institutional risks’ (1990: 66). He also points out that ‘the temptation for economists, however, has always been to duck the complicated political and institutional issues that this kind of analysis raises and instead to work backward from a desired policy conclusion to a simple economic model that supports it’. In fact, the real challenge for economists and policy-makers in any country may be instead to identify the new industries that are consistent with the economy’s comparative advantage, which evolves as the endowment structure changes.

A common feature of the industrial upgrading and diversification strategies adopted by successful countries (the most advanced ones and the East Asian NIEs in the post-war period) was the fact that they targeted mature industries in countries not too far advanced compared with their own levels of per capita income. This may have been the
single most important cause for their success. Throughout human history, it appears that pioneer countries have always played (and often unwillingly) the role of an ‘economic compass’ for latecomers. Going back to the sixteenth century, the Netherlands played that role for Britain, which in turn served as a model and target for the US, Germany, and France in the late nineteenth and early twentieth centuries and for Japan in the mid-twentieth century. Likewise, Japan was imitated by Korea, Taiwan-China, Hong Kong-China, and Singapore in the 1960s and 1970s. Mauritius picked Hong Kong-China as its ‘compass’ in its catch-up strategy in the 1970s. China chose Korea, Taiwan-China, and Hong Kong-China in the 1980s.

Two main lessons can be drawn from these successful cases of state-led structural-change strategies. First, it appears that the government implemented policies to facilitate the development of new industries in a way that was consistent with the country’s latent comparative advantage as determined by its endowment structure. Therefore, firms, once established with government support in information, co-ordination, and sometimes limited subsidies, have turned out to be competitive. Second and even more important, to ensure that they would tap into their latent and evolving comparative advantage, the government targeted mature industries in countries that were, on average, about 100% higher than their own level of per capita income, measured in purchasing power parity.

When Britain applied industrial policies to catch up with the Netherlands in the sixteenth and seventeenth centuries, its per capita income was about 70% that of the Netherlands. When Germany, France, and the US used industrial policy to catch up with Britain in the nineteenth century, their per capita incomes were about 60 to 75% that of Britain. Similarly, when Japan’s industrial policy targeted the US automobile industry in the 1960s, its per capita income was about 40% that of the US. When Korea and Taiwan-China adopted industrial policies to facilitate their industrial upgrading in the 1960s and 1970s, they targeted industries in Japan instead of the US, and for a good reason: their per capita incomes were about 35% that of Japan and only about 10% that of the US at the time.

Looking closely at the elements of successful catch-up strategies, it appears that the specifics of policy interventions depended on the particular binding constraints for these new industries and on country circumstances. But while the interventions were

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21. The idea of a dynamic comparative advantage is often used to justify industrial policy and government support to firms (Redding, 1999). In our analysis, however, the argument is valid only if the government’s support is limited to overcoming information and co-ordination costs and the externalities associated with the pioneer status of first-movers. The targeted industry should be consistent with the comparative advantage of the economy and the firms in the new industry should be viable, otherwise they will collapse once the government support is removed. If the targeted industry is outside the country’s comparative advantage, the required open-ended support to the subsidised firms will crowd out the resources available to other firms that operate in industries consistent with the comparative advantage. This will obviously slow down economic growth and capital accumulation and will take more time for the economy to reach the stage targeted by the dynamic-advantage policy than an economy that follows a comparative-advantage strategy (Lin and Zhang, 2007).

22. For the purposes of this article, the use of per capita income measured in purchasing power parity is better than that of the market-exchange rate because, in cross-country comparisons, the former reflects the level of development and the cost of production better.

23. For a discussion of industrial policies in these countries, see Chang (2003); and for the estimations of per capita income for the above countries, see Maddison (2006).
often different, the patterns of industrial development were similar across countries. They all started from labour-intensive industries, such as garments, textiles, toys and electronics, in the early stage of development and proceeded to move up the industrial ladder step by step to more capital-intensive industries. The East Asian NIEs, for instance, exploited the fact that their endowment structures were similar to Japan’s to follow its development in a flying-geese pattern (Akamatsu, 1962; Kim, 1988). This was possible because the per capita income gaps with their target-country were not large (Ito, 1980).

The story of Korea is a particularly good illustration of this strategy. The government took a pro-active approach to industrial upgrading, and adjusted its strategy to enter industries that were consistent with the country’s latent (and evolving) comparative advantage. In the automotive sector, for example, early in Korea’s growth period, domestic manufacturers concentrated mostly on assembly of imported parts, which was labour-intensive and in line with their comparative advantage at the time. Similarly, in electronics, the focus was initially on household appliances, such as TVs, washing machines and refrigerators, and then moved to memory chips, the least technologically complex segment of the information industry. Korea’s technological ascent has been rapid, as has its accumulation of physical and human capital due to the conformity of its main industrial sectors with the existing comparative advantage and, hence, its changes in underlying comparative advantage. As a result, Korea has achieved remarkable GDP growth rates in the past forty years and has performed impressively in industrial upgrading into such industries as automobiles and semiconductors.

Developing countries in other regions of the world pursued the same path with excellent results. Chile, one of the Pacific Rim countries, successfully targeted industries that were consistent with its comparative advantage determined by its natural endowment, as well as industries that were already mature in more advanced countries. While free-market reforms introduced in the early 1970s brought many benefits to the country, they were slowly accompanied by market failures (Diaz-Alejandro, 1985). In recognition of these problems, the government has supported private-sector growth through a number of policy instruments, including the provision of agricultural public goods by a state institution (Servicio Agricola Granadero); guarantees for loans to small enterprises; a semi-public entrepreneurial institution (Fundacion Chile) responsible for

24. Countries in similar stages of development may specialise in different industries. However, the level of capital intensity in their industries will be similar. For example, in recent years, China is achieving dynamic growth by specialising in the labour-intensive manufacturing industries, such as electronics, toys and textiles, whereas India’s growth has relied on specialising in call centres, programming, and business process services, which are labour-intensive activities within the information industry.

25. In a similar spirit, Hausmann and Klinger (2006) recently investigated the evolution of a country’s level of sophistication in exports and found that this 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, labour skills, infrastructure, property rights, regulatory requirements, or other public goods. Established industries somehow have sorted out the many potential failures involved in assuring 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.

26. For the debate on the conformity of Korea’s industrial upgrading with its evolving comparative advantage, see the exchange between Lin and Chang (2009).
the development of the salmon industry; the ‘simplify drawback’ mechanism, which provided subsidies to new exports; the various programmes of the national development agency (Corporacion de Fomento de la Produccion, CORFO); and the National Council on Innovation for Competitiveness.

In recent years, the country has experienced ‘a burst of export discoveries of new comparative advantages’ (Agosin et al., 2008) and dynamic growth. Key to this success has been the diversification of Chile’s traditional resource-based industries of mining, forestry, fishing and agriculture, coupled with a strong drive to increase exports. The initial dependence on copper has been gradually reduced in favour of aluminum smelting. Forestry products have been expanded into salmon aquaculture and agriculture into wine production, as well as freezing and canning fruits and vegetables. Manufacturing has been less successful but many foreign firms have chosen to locate in Chile as it offers a secure platform from which to supply other markets across South America.

Mauritius, one of the most successful African economies, took off in the 1970s by targeting labour-intensive industries such as textiles and garments. These industries were mature in Hong Kong, 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 (MIDA) 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.

By contrast, many countries designed and implemented catch-up strategies that were too ambitious for establishing the ‘commanding heights’, given their level of development. Historical examples of such mistakes go back to countries such as Hungary or Russia, which tried to replicate industries in place in Britain in the late nineteenth century (Gerschenkron, 1962). While GDP statistics are scarce for individual countries, purchasing power parity estimates by Maddison (2006) indicate that their per capita GDP represented 25% and 30% that of Britain in 1900. Such a large gap made any attempt by the former to develop British industries unrealistic.

Most developing countries fell into the same trap after World War II. They often targeted advanced industries in advanced economies when their per capita incomes represented only a very small fraction of that of high-income countries. After gaining their independence from colonial powers, many countries considered the development of advanced heavy industries as a key symbol of their freedom, a sign of strength, and a political statement of their reputation on the international scene. Across Latin America, Africa and South Asia, some of these newly independent countries were run by political leaders with leftist inclinations who chose to follow the prevailing Stalinist model of state-led industrialisation through the development of advanced heavy industries,

27. According to Maddison (2006), Hong Kong’s per capita income in 1970 measured in 1990 international dollars was 5,695, whereas that of Mauritius was 2,945.
28. As discussed earlier, a similar policy was pursued successfully in Germany, France and the US at the same time. Their per capita incomes ranged from 60% to 75% that of Britain.
regardless of their political denominations. State resources were used in the industrialisation push, with resources directly allocated to various investments, and large public enterprises set up in almost every sector of the economy – all deemed strategic for the survival and modernisation of the nation. Under the ‘macroeconomics of nationalism’ (Monga, 2006), the criteria for designing industrial policies and selecting specific sectors for government intervention were mostly political.

In parallel to political aspirations for heavy-industry development, there was an obsession with ‘market failure’ in academic circles – especially in Latin America where many influential economists and policy-makers (Albert Hirschman, Raul Prebisch, Roberto Campos and Celso Furtado, among others) argued that industrialisation and growth could not take place spontaneously in developing countries because of structural rigidities and co-ordination problems. They recommended that government support be provided to the manufacturing industry for these countries to catch up with developed countries, regardless of the large income gap between the two.

Too often, such industrial policy defied the prevailing comparative advantage of many poor countries where factor endowments were characterised by the abundance of labour. By implementing the capital-intensive heavy industry-oriented development strategy, they were not able to build firms capable of surviving in open, competitive markets. Because of their high capital needs and their structurally high production costs, these public enterprises were not viable. Even when they were well managed, they could not earn a socially acceptable profit in an undistorted and competitive market. A good example is Egypt’s industrialisation programme in the 1950s, which featured heavy industries such as iron, steel and chemicals. The country’s per capita income represented about 5% that of the US, 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. The limited fiscal resource capacities of the state made such large-scale protection and subsidies 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 prices of raw materials – in order to reduce the costs of investment and continuous operation of their non-viable public enterprises (Lin, 2009).

These various experiments provide valuable lessons for economic policy. They highlight conditions under which industrial policies can succeed or fail. Failures occur when countries target industries that are too advanced, far beyond their latent comparative advantage. In such circumstances, government-supported firms cannot be

29. The new field of development economics was regarded as covering underdevelopment because ‘conventional economics’ did not apply (Hirschman, 1982). Early trade and development theories and policy prescriptions were based on some widely accepted stylised facts and premises about developing countries (Krueger, 1997). These included: (i) developing economies’ production structures were oriented heavily towards primary-commodity production; (ii) if developing countries adopted policies of free trade, their comparative advantage would forever lie in primary-commodity production; (iii) the global income elasticity and the price elasticity of demand for primary commodities were low; (iv) capital accumulation was crucial for growth and, in the early stage of development, it could occur only with the importation of capital goods. Based on these facts and premises, it was a straight step to believing that the process of development was industrialisation, which consisted primarily of the substitution of domestic production of manufactured goods for imports (Chenery, 1958).
viable in open, competitive markets. Their survival depends on heavy protection and large subsidies through various means such as high tariffs, quota restrictions and subsidised credit. The large rents embedded in these measures easily become the targets of political capture and create difficult governance problems (Lin, 2010).  

4 A framework for growth identification and facilitation

The historical and contemporary evidence showing that governments always play an important role in facilitating industrial upgrading and diversification in all successful countries 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 policy-making. As Charles Schultze, chairman of the Council of Economic Advisers under US President Jimmy Carter, once put it:

"The first problem for the government in carrying out an industrial policy is that we actually know precious little about identifying, before the fact, a ‘winning’ industrial structure. There is not a set of economic criteria that determine what gives different countries preeminence in particular lines of business. Nor is it at all clear what the substantive criteria would be for deciding which older industries to protect or restructure. (Schultze, 1983)"

It is therefore useful to draw on the theories of comparative advantage and backwardness advantage as well the successful and failed experiences of industrial policies discussed in Section 3 to codify 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 actual comparative advantage. Here, we propose a six-step process:

- First, the government in a developing country can identify the list of tradeable goods and services that have been produced for about 20 years in dynamically...
growing countries with similar endowment structures and a per capita income that is about 100% higher than their own.\textsuperscript{33}

- Second, among the industries in that list, the government may give priority to those which some domestic private firms have already entered spontaneously,\textsuperscript{34} 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.\textsuperscript{35} This could be done through the 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 randomised 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).

- Third, some of those 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 labour costs. The government may also set up incubation programmes to catalyse the entry of private domestic firms into these industries.\textsuperscript{36}

\textsuperscript{33} As discussed in Section 3, this is the most important principle for a developing country to reap the advantage of backwardness in its industrial upgrading and diversification. This is because, for a dynamically growing economy, its wage rate is increasing rapidly and is likely to start losing comparative advantage in the industries that it has produced for many years. Therefore, the industries will become the latent comparative advantage of countries with a similar endowment structure but with a lower wage. The principle also means that when a country grows beyond the income level of 50% of the most advanced country, it will become increasingly difficult to identify industries that are likely to be its latent comparative advantage. The country’s industries will locate increasingly close to the global frontier and its industries’ upgrading and diversification will increasingly rely on indigenous innovations. Therefore, the government’s policies to support industrial upgrading and diversification will increasingly resemble those of the advanced countries. The chance of those policies failing to achieve the intended goal will also increase. As for low-income countries with per capita income measured at about $1,000 in purchasing power parity (PPP) terms currently, in addition to identifying matured tradeable goods in countries at about $2,000 currently, it may also identify tradeable goods produced in countries that had similar per capita income levels 20 or so years ago and have been growing dynamically since then. In particular, China, Vietnam and India had a similar or even lower income levels 30 years ago than most of today’s poor sub-Saharan countries. Therefore, for today’s poor countries, they may identify the list of goods and services produced in China, Vietnam and India 20 years ago as references. They may also review their imports and identify the list of simple manufacturing goods, which are labour-intensive, have limited economies of scale, and require only small investments, as the targets of their industrial upgrading and diversification. The idea put forward is similar to that of monkeys jumping to nearby trees (Hausmann and Klinger, 2006), but the step proposed here is much easier to implement than the product-space analysis proposed by them.

\textsuperscript{34} This is because every industry requires some highly specific inputs such as knowledge, physical assets, intermediate inputs, labour skills, and so on. The existence of some private firms in the industry indicates that the economy at least partially possesses these crucial inputs.

\textsuperscript{35} Chile has produced wine for a long time. Its recent success in the wine industry is a good example. The change from a negligible wine exporter to the world’s fifth exporter in the 1970s benefitted greatly from the government’s programmes to disseminate foreign technology to local farmers and vineyards through Grupos de Transferencia Tecnológica and to promote Chilean wine abroad through Export Promotion Office, ProChile (Benavente, 2006).

\textsuperscript{36} Lessons from successful Asian countries can be of relevance here. When local Asian firms had no historical knowledge in a particular industry, the state often attracted foreign direct investment and/or
Fourth, in addition to the industries identified on the list of potential opportunities for tradeable 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.  

Fifth, 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 benefits of encouraging industrial clustering.

promoted joint ventures. After the transition to a market economy in the 1980s, China, for instance, pro-
actively invited direct investment from Hong Kong-China, Taiwan-China, Korea and Japan – a promotion policy which helped the local economy to get started in various industries. Bangladesh’s vibrant garment industry also started with direct investment from Daewoo, a Korean manufacturer, in the 1970s. After a few years, enough knowledge transfer had taken place and the direct investment became a sort of ‘incubation’, local garment plants mushroomed, and most of them could be traced back to that first Korean firm (Mottaleb and Sonobe, 2009; Rhee, 1990; Rhee and Belot, 1990). The booming cut-flower export business in Ecuador from the 1980s on also started with three companies founded by Colombia’s flower growers (Sawers, 2005). The government can also set up an industrial park to incubate new industries. Taiwan-China’s Hsinchu Science-based Industrial Park for the development of electronic and IT industries (Mathews, 2006) and the Fundacion Chile’s demonstration of commercial salmon farming (Katz, 2006) are two successful examples of the government’s incubation of new industries.

37. India’s information industry is a good example. Indian professionals in Silicon Valley helped Indian companies to take advantage of expanding opportunities for outsourced IT work in the 1980s. Once the potential of software exports was demonstrated, the Indian government helped build a high-speed data-communications infrastructure that allowed overseas Indians to return home and set up offshore sites for US clients. The Indian software industry has grown more than 30% p.a. for 20 years, with 2008 exports close to $60 billion (Bhatnagar, 2006). Ethiopia’s success in cut flowers exports is another example. Before the government’s identification of cut flowers export and the provision of supports in its industrial policy in the 1990s, a local pirate firm had exported cut flowers to the European market for over 10 years. Asparagus in Peru is also a good example. The possibility of growing asparagus, a foreign crop, was discovered by Peruvian farmers in the 1950s. However, the industry and exports did not take off in earnest until 1985 when USAID provided a grant for a farmers’ association to obtain advice from a specialist from the University of California, Davis, who had recently invented the UC-157 variety suitable for the US market, and from another expert who showed members of the association’s experimental station how to set up seedbeds for large-scale production and package the products for export. The state also supported co-operative institutions such as the Peruvian Asparagus Institute and Frío Aereo Asociación Civil for engaging in research, technology transfer, market studies, export drives, and quality promotion, and invested in the freezing and packing plants that handled 80% of fresh asparagus exports. With these interventions, Peru has overtaken China and become the largest asparagus exporter in the world (O’Brien and Rodriguez, 2004).

38. In addition to infrastructure, many African countries, for instance, also face the constraint of rigid labour regulation. To overcome this, Mauritius has allowed employment to be flexible in the export process zone, while maintaining the existing regulation for the domestic economy (Mistry and Treebhoohun, 2009).
Sixth, 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,\textsuperscript{39} direct credits to co-finance investments, or priority access to foreign reserves\textsuperscript{40} 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.\textsuperscript{41} 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.\textsuperscript{42}

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, co-ordination 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 realise a dynamic and sustained growth.

\textbf{4.1 Possible ways of identifying binding constraints}

The facilitation of industrial growth has been the subject of a rich body of research and several approaches have recently been suggested by various authors.\textsuperscript{43} While these are all likely to yield useful results, none of them focuses specifically on the identification of industries in which a developing country may have latent comparative advantage. The intellectual legacy of the failure of industrial policies based on development strategies that were inconsistent with comparative advantage has certainly led many economists to conclude that it may be impossible for any government to ‘pick winners’ successfully.

\begin{enumerate}
\item[39.] The measure commonly used in China to attract FDI is to exempt from corporate income tax for the first two years and reduce the tax by half for a further three years.
\item[40.] Direct credits and access to foreign reserves are desirable measures in countries with financial depressions and foreign-exchange control.
\item[41.] The likelihood of capture is proportional to the magnitude of protection and subsidies. If the targeted industries are consistent with the country’s inherent comparative advantages, and the protection and subsidies are used to compensate the pioneer firms for their positive information externalities, the magnitude of protection and subsidies should be small, and the elites will not have the incentives to use their political capital to capture the small rent. In addition, once the pioneering firms are successful, many new firms will enter and the market will become competitive, which will further reduce the danger of capture by elites. Alternatively, if the government’s goal is to support the development of industries that go against the country’s comparative advantages, the firms in the targeted industries will not be viable in competitive markets and the required subsidies and protections will be large, and are likely to become the target of rent-seeking and political capture (Lin, 2009).
\item[42.] We owe this \textit{ex-post} reward idea to Professor Shang-jin Wei.
\item[43.] See, for example, Di Maio (2008) and Agosin et al. (2009).
\end{enumerate}
In the absence of a framework for industrial identification, the existing literature has been limited to exploring ways of improving the business environment and infrastructure, which indeed affect firms’ operations and transaction costs. There is a robust empirical knowledge based on quantitative data on firm performance and perceptions-based data on the severity of a number of potential constraints facing firms in the developing world. It points out that in most of sub-Saharan Africa, for instance, firms tend to consider many areas of the investment climate 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 labour regulations and the availability of skilled labour as the main constraints to their activity; 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. Just as individual perceptions of well-being are subjective and do not necessarily correlate with objective measures such as income or consumption, firms’ perceptions of binding constraints to their development often differ from actual determinants of performance. This limitation is due to the very nature of the investment-climate data and the way they are often used. In a typical survey, the managers of a sample of firms are asked to rate each dimension of the investment climate (such as ‘infrastructure’, ‘access to financing’, ‘corruption’, etc.) on a scale of 1 to 4, corresponding to the degree to which it is an obstacle to firm performance.44 High mean reported values for particular dimensions of the investment climate are then interpreted as evidence of the severity of obstacles to growth.

However, this may not be the case. Despite their intimate knowledge of their business processes and operating environment, firms may not fully recognise the true origin of their main problems and mistakenly identify as a constraint something which is in fact a symptom of another less obvious problem. Because of these shortcomings, investment-climate constraints are increasingly complemented by the World Bank’s ‘Doing Business’ indicators, which are based on expert surveys (not just firm-level perceptions) and provide a more comparable cross-country perspective across a detailed range of regulation.

The problem remains, as survey results often vary depending on whether respondents are asked to rate their most important constraints, or to rank them. While ranking appears to be favoured by researchers who have examined different methodologies, since it forces stronger expression and relationships (Alvin and Krosnick, 1985), it may not be entirely reliable: firms or experts asked to rank constraints may not have a good basis for determining whether their top-ranked constraint is serious or not. Ranking without a solid and meaningful benchmark against which local firms can rate the severity of a particular constraint may not provide useful information. In addition, there are instances where picking any single quantitative

44. Ayyagari et al. (2005) present the mean reported values for a number of investment-climate variables in a sample of over 6,000 firms in 80 countries. In the overall sample, taxes and regulation, political instability, inflation and financing are reported as being the greatest obstacles to firm growth.
criterion could be misleading, as firms often face several constraints simultaneously. Ranking all of them as important may not be very helpful for policy-making. In order to account for the major role of firm heterogeneity in growth analysis, one must go beyond extracting means of investment-climate variables from firm-level surveys. Careful econometric modelling of firm performance is therefore needed to identify which particular variable has the biggest effect on growth. In other words, the policy variables with the greatest economic impact can be quite different from those with the highest perceived values.45

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). These two additional limitations make it highly desirable for investment-climate surveys to cover only a sample of firms that meet the criteria of viability, and can represent the economy’s true potential.

Another important problem with the recognition of obstacles to growth is the fact that many other constraints to business development are endogenous to the industries that might be targeted by a developing country. Good examples are specific types of human capital, financing instruments, or infrastructure that may be needed only by firms moving to specific industries. Identifying and removing them may require the use of several complementary analytical tools. One useful tool is the Growth Diagnostics Framework suggested by Hausman et al. (2008). It is based on the observation that, when presented with a laundry list of needed reforms, policy-makers either struggle to try to solve all of the problems at once or start with reforms that are not critical to their country’s growth potential. Because reforms in one area may create unanticipated distortions in another, focusing on the one that represents the biggest hurdle to growth is the most promising avenue to success. Countries should therefore figure out the one or two most binding constraints on their economies and focus on lifting those.

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 a high cost of finance (due either to low economic and social returns or to a large gap between social and private returns), or low private return on investment. The main step in the diagnostic analysis is to figure out which of these conditions more accurately characterises the economy in question. The use of this framework highlights the fact that, in some countries, the growth strategy should identify the reasons for the low returns on investment, while it must explain why domestic savings do not rise to exploit

45 Bourguignon (2006) observes: “‘Extracting means’ is the way I would characterize the Investment Climate Assessment exercises that the Bank is now carrying out. Like the ‘Doing Business’ indicators, these are undoubtedly useful. However, what they give us is essentially new and better right-hand side variables in cross-country regressions, not necessarily better data for country-specific analysis. The goal should be to use investment climate surveys to measure the sensitivity of firms of different types to investment climate variables, as another way of determining exactly which variable corresponds to a major obstacle to growth.”
large returns on investment in other countries. While 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.

Moreover, the Growth Diagnostic Framework is also imprecise in its links to the institutions that facilitate the growth process. The methodology proposed for the identification of the binding constraints to growth is not always straightforward. Even if data on shadow prices were widely available, it is not obvious that this would accurately identify areas in which progress is most needed in each country. For example, one could imagine a simple model of growth for a low-income country where technology and human capital are complementary. In such a country, the returns to education and technology adoption would both be low due to low levels of human capital and technology. An exclusive focus on shadow prices and an ignorance of cross-country comparison of levels would then suggest no need to improve education levels and encourage technology adoption.

In fact, even in situations where the Growth Diagnostics approach leads to relative certainty about the binding constraints to growth in any given country, there is still a wide range of policy options available to choose from. It is therefore necessary for policy-makers to rely not just on one approach but to use several different macro and micro tools to identify binding constraints to growth. Microeconomic analyses of growth show that differentiated firm dynamics drive a good part of aggregate productivity growth and capital accumulation. Establishing a diagnostic at the aggregate level requires a good knowledge of what happens at the micro level. In particular, monitoring the entry and exit of firms and the policy variables that affect them is essential to understanding overall gains in productivity in economies subject to strong structural changes (Bourguignon, 2006). One must take account of heterogeneity in country circumstances and among micro agents. This can more effectively be done through country-specific analyses.

Finally, even if one could identify relevant binding constraints to industrial development in industries with comparative advantage and induce improvements in a country’s business environment, the crucial issues of externality encountered by first movers and of co-ordination would remain unresolved. Despite the removal of the constraints, a country may then find its industrial upgrading and diversification process stalled. It is therefore necessary that the Growth Diagnostics Framework and other methods of targeting obstacles to industrial upgrading be used in conjunction with the growth identification and facilitation approach.

## Conclusion

The current crisis has inflicted heavy costs on economies around the world. Unemployment is at record levels in many countries, fiscal fragility is a legacy of the crisis in many countries, and capacity-utilisation rates in industry remain substantially below pre-crisis levels. Many developing countries have the potential to grow faster than developed countries and are now confronted with the challenge of finding new sources of growth in the context of a world of multi-polar growth (Zoellick, 2010). In
this regard, the role of developing-country governments in inducing and accompanying structural change (industrial upgrading and economic diversification) to promote growth, employment and poverty reduction must regain centre stage. Indeed, historical evidence and economic theory suggest that while markets are indispensable mechanisms for allocating resources to the most productive sectors and industries, government intervention – through the provision of information, co-ordination of hard and soft infrastructure improvement, and compensation for externalities – is equally indispensable for helping economies move from one stage of development to another (Lin, 2010).

Because of the many failures observed throughout the world in the post-World War II period, industrial policy has raised serious doubts among economists and policy-makers. Taking into consideration O’Brien and Keyder’s recommendation that ‘countries should (if possible) be studied in terms of some unique capacity for development at different stages of their history’ (1978: 15), this article has examined the mechanics of structural change in today’s advanced economies and the reason for success in a few developing countries in East Asia and elsewhere, as well as suggesting a framework for government intervention in the economy.

The article has argued that the failure of industrial policy is most likely to arise from mistakes made by policy-makers in the growth-identification process. Industrial policies implemented by governments in developed and developing countries usually fall into one of two broad categories: (i) they attempt to facilitate the development of new industries that are either too advanced and thus far from the comparative advantage of the economy, or too old and have lost comparative advantage; or (ii) they try to facilitate the development of new industries that are consistent with the latent comparative advantage of the economy. Only the latter type of policy is likely to succeed. High-performing developed and developing countries are those where governments were able to play an active role in the industrial upgrading and diversification process by helping firms take advantage of market opportunities. They have generally done so by overcoming the information, co-ordination, and externality issues, and by providing adequate hard and soft infrastructure to private agents. It is expected that the growth identification and facilitation approach put forward in the article can help governments in developing countries identify the right industries in their attempts to facilitate structural transformation in the development of their countries.

References


Comments

Suresh D. Tendulkar

Lin and Monga rightly admit that economists have been intrigued by the mystery of economic growth. Gone are the days of self-assurance and confidence of Walter Rostow in the 1950s who provided a predictable and certain roadmap of growth for every underdeveloped country. A large number of economic theoretical analytical models flourished shortly thereafter. While Rostow did not remain uncontested in his time (Kuznets and Gerschenkron readily come to mind), economists have been much more circumspect since then, despite or possibly because of the wealth of data becoming available. And rightly so. The growth brigade started with 1.5 to 2.0% a year in per capita terms in the eighteenth century with the Netherlands and Britain. It was joined by the United States, Germany and France in the nineteenth century, and the bar was raised significantly by the latecomers: Japan in the 1950s, Hong Kong, Singapore, South Korea and Taiwan in the 1960s, China, Thailand, Malaysia and Indonesia in the 1970s, India in the 1980s, and other emerging economies since then. With the two most populous countries, China and India, joining the brigade, the population-weighted inter-country inequality in per capita GDP has shown a welcome decline. The number of countries in the brigade, however, remains countable. While we are reasonably certain about common ex-post descriptive features associated with rapid growth, very few countries have managed to grow rapidly (say, 3% or higher in per capita annual terms) in a sustained fashion over more than two decades. Nor do we know or can predict with certainty what triggers spurts of sustained growth in any given country.

Undeterred, Lin and Monga embark on the ambitious and admirably persuasive enterprise of setting a two-fold agenda for government intervention in growth facilitation (provision of hard and soft infrastructure) and growth identification (continuing technological upgrading and diversification through anticipatory industrial policy) for developing countries striving for rapid economic growth for poverty reduction. The objective is indeed laudable beyond doubt. What is also on their side is the lessons they seek to draw from well-documented ex-post analyses of the successes as well as failures of state interventions during the pre- as well as post-World War II period. While my heart wants their enterprise to succeed, my head remains uncomfortable. Let me therefore express the sources of my discomfort with introspective comments which are indeed coloured by my South Asian, especially Indian, lenses, while recognising that the authors have an East and South-East Asian, including Chinese, perspective.

Less contentious and more readily acceptable is the important role of the government in growth facilitation, that is, the provision of hard (adequate networks of road, rail and air transport and communications, electricity grids and other public utilities) and soft (basic governance including competitive market institutions, financial

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system and regulation, basic health, and primary and secondary education services including vocational training) infrastructure. Because of externalities and their public good character, this is indeed the core legitimate domain of the government. The adequacy of physical facilities and the cost-effectiveness of operation and delivery of corresponding public services cut down the transaction costs of exchange for the private sector and impart competitive edge to the economic structure.

More difficult, uncertain and hence contentious is the role of growth identification. Lin and Monga’s excellent historical analysis brings out many failures and fewer successes, more over-enthusiastic though often well-intended policy excesses, more heavy-handed than ‘right’ mixes of non-intrusive interventions, persistence of once successful policies being indiscriminately extended beyond their effective time span, indiscriminate extension of the public sector well beyond the minimum core and discretionary controls often stifling the dynamism of functioning markets and leading to rampant rent-seeking activities. While one may readily concede that some ex-ante judgments regarding the choice of industries consistent with endowment structure and potential comparative advantage may go wrong, the discipline of time-bound withdrawal of concessions in the face of ineffectiveness and even timely exit from some patently unsuccessful policies including subsidies and tariff protection is difficult to obtain. The question ironically becomes: how do you control the over-enthusiastic government from taking on much more than it can effectively handle? In my assessment, growth identification and consequent ex-ante nurturing of picked winners and keeping them under a tight, time-bound leash are a much more difficult and risky enterprise based on the South Asian experience in this context. This does not rule out occasional, lucky successes, but this has to be ascertained by the experience of actual experiential judgment and confidence about the existence of warranted discipline.

Alice Amsden*

In their critical essay on the role of the state, Justin Lin and Célestin Monga concentrate on the concept of comparative advantage as the clue to slaying the dragon of underdevelopment. Are they moving ahead or simply standing still?

Comparative advantage can be construed deductively or inductively, as an abstract theory or as something that bubbles up from below. Economists mostly conceive of it deductively. Lin and Monga argue that ‘pervasive failures in developing countries are mostly due to the inability of governments to come up with good criteria for identifying industries that are appropriate for their country’s endowment structure and level of development’, i.e., their ‘latent’ comparative advantage. But the two vast de-colonised regions with the most successful industrial policies, fast GDP growth and steeply falling poverty, the Far East and Middle East, followed their comparative advantage by nosing around their neighbours; if an industry grew next door, this was taken as de facto proof of its comparative advantage – what more concrete evidence can there be? If an export-processing zone works, if a national oil company raises domestic supply and tax revenues more than an international oil company, other countries try to follow suit, and

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having a blueprint to follow (imitation has been overwhelmingly South-South) makes it easier for them to succeed.

Two great regional role models have evolved, whose meaning of ‘industrial policy’, unlike a theory’s, meanders, depending on who has joined and exogenous jolts. (The World Trade Organization’s restrictions on subsidies, I would argue, have driven the industrial policies of ‘emerging’ and ‘emerged’ economies underground, creating a sort of ‘level playing field’ of subterfuges.) The OPEC development role model (as distinct from the OPEC price cartel), which started in Iran and Saudi Arabia with Mexico’s 1938 oil nationalisations as example, employs millions of workers from as far away as Bangladesh and approximates the ‘labour-scarce, resource-rich economy’ described in the 1950s by Hla Myint. The Far East role model, running along the lines of the labour-surplus economy analysed by W. Arthur Lewis, formed around post-war Japan, which was neither developed nor underdeveloped at the time and which targeted industries according to simpler criteria than Lin’s or Monga’s; government support went to industries with dense linkages and high productivity growth rates internationally, first silk and cotton textiles (see Amsden and Suzumura, 2001). Large countries like the BRICs have industrial policies that straddle Asia’s manufacturing corridor and the Middle East’s energy belt, so in fact industrial policy has probably been more successful than the premise of Lin and Monga’s article, that ‘most have failed’.

Industrial policy has failed in the peasant export economy, the third prototype of Lewis, Myint and other classical economists, but it is questionable if this is a viable economic formation, given hyper-fast population increases (the 30 countries in 2005-10 with the highest estimated population growth rates include 24 smallholder-type economies, 23 from Africa). Landlessness, unemployment and underemployment are high, but labour costs are not low enough and manufacturing experience is not deep enough to compete against labour-surplus economies like India. What, besides population planning, is the best industrial policy to help peasant economies, many of which have newly discovered energy and mineral resources such as Sudan, Angola, Cameroon and Ghana: the OPEC development role model, with nearby Nigeria teaching what not to do, or Lin and Monga’s ‘important distinction’ between two types of government intervention? The latter differentiate policies ‘that facilitate structural change by overcoming information, and co-ordination and externality issues’ from those that ‘aim at protecting certain selected firms and industries that defy the comparative advantage determined by the existing endowment structure’ (once called dynamic comparative advantage?). Their distinction seems sensible but vague, at least for the vast energy and mining sector, the great hope of the defunct peasant economic configuration.

Developing countries without unlimited labour supplies, rich natural resources or a credible role model close by, such as Colombia, Morocco, Nicaragua and Nepal, are in need of advice about how to ‘pick winners’. Lin and Monga’s criteria face competition from those of Michael Porter (the value chain) and Ricardo Hausmann (the jumping monkey). I think Lin and Monga’s two-track approach is better than theirs because, if I understand its broad implications, comparative advantage boils down to having ‘knowledge of a business’, an empirical construct that rests on a roadmap of where an industry is going, production engineering skills, and project execution capabilities to get an investment up and running. (Taiwan’s electronics firms invested in producing CD-
ROMs, despite falling world prices, once government R&D had skirted restrictive patents and there was a sense that Japan would graduate to producing DVDs.) By contrast, where a monkey jumps or where a country situates itself on a value chain largely involves decisions determined by the narrow criterion of factor proportions.

The challenge Lin and Monga face is how to accelerate the growth of professionally managed business organisations and their unique skills. Business knowledge depends on experience, which I would say is the critical missing element in economies deprived of East Asia’s pre-war manufacturing culture (which was fortuitously strengthened by Japan’s regional war preparations). Experience can be understood using a learning curve, except that learning is not repetitive. Experience depends on gaining tacit and undocumented knowledge of multiple activities that may change simultaneously – a harder task than gaining ‘information’ (a fact). How can an industrial policy hasten the acquisition of experience?

Two possibilities that I think would move Lin and Monga’s argument forward would be to follow what the role models of East Asia and the Middle East are doing, and use industrial policy to: (i) invest overseas (outward foreign direct investment); and (ii) reverse the flow of talented brain drain (and create a level playing field for local talent), which may change a small country’s comparative advantage overnight. When Malaysia’s government reformed its industrial policy towards its Malay population – instead of subsidising Malay-owned enterprises in Malaysia, it began acquiring foreign companies and giving Malays equity in them – it developed skills to choose a specific overseas asset to buy, the same ‘knowledge of a business’ it needs to target a successful investment at home. Similarly with SABIC, Saudi Arabia’s state-owned petrochemical company, which acquired General Electric’s chemical business in China, the feedstock costs of both petrochemicals and chemicals drawing on intelligence of the supply of and demand for oil. An outward FDI can thus have positive spillovers on domestic income, employment, income distribution (as in Malaysia’s case) and picking winners.

Reversing talented brain drain by creating economic opportunities at home is a costly challenge, but one with potentially high returns, because embedded in returnees’ experience is an inductive clue as to the specific industries a government should support. Globalism’s imperfections, moreover, have created a willingness on the part of some professionals to return home, opportunities permitting. Morris Chang, a top executive in Texas Instruments, went back to Taiwan to run its new state-owned semiconductor company because he claimed that at TI he had hit a ‘yellow glass ceiling’. West African executives in Unilever talk about a ‘black glass ceiling’. Industrial policy is inherently nationalistic, and the role of government is to nurture nationalism of a productive type.

References

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Lin and Monga’s article emphasises the importance for sustained growth of technological innovation, industrial upgrading and diversification, and improvements in infrastructure and institutions. It notes that, while the market mechanism is essential for efficient resource allocation, it may not be sufficient to enable firms to overcome the problems of information, co-ordination and externality that often stand in the way of achieving the above-listed requirements for sustained growth in developing countries. It then points out that the historical evidence shows that governments in almost all the successful countries (i.e. the industrialised countries and the recent East Asian success stories) played and are continuing to play pro-active roles in helping firms in their economies to overcome these problems. It further states that governments in almost all developing countries have also tried to intervene in their economies for similar reasons, but most have failed. The article’s central thesis is that the failures were due to the fact that the governments intervened by trying to defy their economies’ existing comparative advantage, meaning that they tried to promote products that did not reflect their relative factor endowments, particularly of capital and labour. To address this, it proposes a process that policy-makers in developing countries may follow to pick industries or products to promote or facilitate.

The authors argue that, for a developing country to diversify its exports, the government should ‘… identify the list of tradeable 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% higher than their own’, and then remove the binding constraints or take necessary measures to facilitate their export development, including attraction of Foreign Direct Investment (FDI). The government should also look for successful discoveries by domestic enterprises and provide appropriate support. The article provides examples of the type of facilitation or support that may be given.

Overall, I find this proposal a very practical and useful starting guide for a government keen on diversifying and upgrading its country’s exports. It is to be welcomed that an article that looks at the role for the state in late-industrialisation in such a pragmatic manner emanates from the World Bank, which spent a great part of the 1980s and 1990s denying any positive or pro-active role for the state in industrialisation and promoting liberalisation and privatisation programmes to support that view. With the demonstrably superior economic performance of the East Asian countries (for example, Korea, Taiwan, Singapore and Hong Kong) in recent times, in the first three of which the governments pursued active industrial policies, the Bank has had to revise its position, starting with the East Asian Miracle Study (World Bank, 1993). It is to be hoped that this article by Lin and Monga will help move the Bank further along on the line of pragmatism. As they write, paraphrasing Rodrik (2009), ‘… instead of advising the governments in developing countries to give up playing the facilitating role, it is more important to understand better why some countries have been

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able to succeed while most others have failed, so that it is possible to advise the governments to do the right things and avoid the mistakes’.

While I fully share the authors’ view that the state has a positive role to play in facilitating industrialisation and commend their proposal, I would have liked to see a little more flexibility in the way they use comparative advantage (i.e. relative factor proportions) to review the cases of success and failure in diversification and industrial upgrading. The apparent use of the Hecksher-Olin-Samuelson (HOS) framework to interpret industrial policy appears to me to be too confining theoretically, and also does not seem to adequately explain the country experiences.

Conceptually, the idea that a country should try to focus on products for which it has the required factors in relative abundance makes eminent sense. However, this assumes competitive markets, both internationally and domestically, which may not be the case. It is also very static and may not take account of the likely demand, price, and prospects of technological change and learning of products on the world market. The fact that a country’s factor endowments enable it to produce product A more cheaply today relative to product B does not necessarily mean that, in the medium to long term, it is better off producing A instead of B, if in fact B has better demand and technological change and learning prospects. Admittedly, producing A today is more likely to raise national income and, presumably, thereby savings, which would enable the country to augment its capital. However, if the country is aiming to ‘catch up’ in industrialisation, it would at some point have to defy its existing comparative advantage and take non-marginal steps away from its current productive structure (i.e. try to produce B). Certainly, this would be a more risky move, but it would be taking high risks for potential high rewards. For me, therefore, the policy questions are twofold: (i) what should be the mix of the A and B products in industrial policy at any given time, and how should they change over time? And (ii) having chosen a particular mix, especially a mix including B products, what are the complementary policies that minimise the risks and enhance the chances of success? The latter question brings to the fore the issue of the acquisition of technologies and technological capabilities. In the HOS framework, which seems to inform Lin and Monga’s article, this issue is side-stepped by the assumption that technologies are equally accessible and can be efficiently operated by all producers. This assumption is clearly problematic. In fact, to my mind, the core development problem that industrial policy should address is precisely the access, efficient deployment, absorption and adaptation of technology (Lall, 2003, 2004). To meet this challenge takes more than focusing on existing comparative advantage as determined by existing relative capital-labour ratios.

In fact, if each country diversified and upgraded its industries only by trying to break into markets that countries ahead of it on the ‘industrial ladder’ were becoming less competitive in due to rising labour costs, then one would expect the industrial rankings of countries to be rather static over time. There would be hardly any instances of ‘catch up’ or overtaking; the US and Germany would not have overtaken Britain in industrialisation; Japan would not have become dominant in automobile exports; nor would Korea have become among the most efficient steel producers. My reading of the experiences of Japan and the East Asian countries is that the governments promoted a mixture of A and B types of industries, with the mix changing over time, but supported the industries with a host of fiscal, exchange-rate, trade and credit instruments. They also built strong institutions,
pursued active technology and FDI policies, aggressively developed skills, and pro-
actively engaged in industrial restructuring. One cannot be sure that what arose from all
these government interventions could always be characterised as competitive markets that
enabled firms to develop according to comparative advantage (see Johnson, 1982;
Amsden, 1989; Wade, 1990; Evans, 1995; World Bank 1993, and Chang, 2006). It should
also be noted that in Africa many of the industries established during the import-
substitution era failed, although a large number of them were engaged in manufactures of
textiles and other simple consumer goods that reflected the comparative advantage of the
countries in terms of relative factor endowments.

What can be taken from all this is that following comparative advantage is very
important, but is only one of a whole host of policies, institutions, capacities and
arrangements that have to be deployed together in order to increase the chances of success
of industrial policy. And for a country that wants to accelerate its industrial catching-up, it
may be necessary for it to defy its current comparative advantage to some extent and
promote a carefully selected small sub-set of products that are ‘high-tech’ (i.e. from the
point of view of the country’s current production structure). This would require a
government that is capable, organised, disciplined and prepared to work closely with the
private sector, and yet be able to subject it to rigorous performance criteria.

The above are just questions of nuance. As has already been noted, I do think the
article makes a valuable contribution by providing a practical and sensible way for
countries to initiate industrial policy. At the African Center for Economic
Transformation (ACET), we are engaged precisely in exploring ways for African
countries to transform their economies through, among other things, sensible industrial
policy. We therefore welcome this contribution from Lin and Monga.

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York: Oxford University Press.
Lin and Monga have covered an enormous range of issues in this intriguing article. They correctly argue for a rethinking of whether a more activist policy is necessary to stimulate manufacturing development in the least industrialised economies, especially in sub-Saharan Africa which has a relatively low level of manufacturing share of GDP and also surprisingly little small-scale manufacturing. It is worth noting that the same is true of the Arab economies (Noland and Pack, 2007). Given the growth in population and labour force and the need to find new sources of employment, the issue is of great importance. The main contribution of the article is a reiteration of the need to conform with comparative advantage in development, an argument made cogently in Lin’s Marshall lectures, while seeking to transform the economy to more advanced activities. The new argument is an algorithm for identifying successful sectors; this seems to be deeply influenced by East Asian experience. Phrased perhaps too baldly, the algorithm suggests looking at the industries in nations that are more advanced but not too much so – for Korea and Taiwan targeting Japan’s structure as Japan was ‘only’ three times richer.

This algorithm is problematic. First, the structure of the richer nation may not be economically optimal even for that country, but is itself the result of distorting policies. Some of Japan’s industrial development between 1868 and 1941 reflected a felt urgency to develop a serious military potential which did allow the Japanese to deploy battleships in the Russo-Japanese War of 1905. Japan’s metallurgical capabilities, reflected partly in post-1950 industrial development, built upon the skills developed in the 1930s that contributed to Japan’s initial success in World War II. Similarly, the USSR in the 1920s and ’30s emphasised heavy industry in an attempt to build up military capacity but also as a perceived path to industrial success. India in the early 1950s emulated the Soviet path which deeply influenced some Indians such as Mahalanobis, then chair of the Planning Commission. India violated the Lin-Monga dictum of pursuing labour-intensive industry, but that experience, replicated in many other nations pursuing import-substituting industrialisation, does suggest one of the perils of emulating more ‘advanced’ nations; the body politic may be tempted to throw aside strict economic rationality and pursue technologically advanced and capital-intensive sectors, steel in the 1950s and ’60s and high technology today. Once started down the road of emulation, technocrats may not be able to rein in their bosses. Korea’s economists have shown the considerable cost to the heavy and chemical industry programme of the 1970s and ’80s and it is possible that the interim costs were sufficiently large that the protection failed to satisfy the Mill-Bastable test (Yoo, 1990).

Moreover, the industrial policy of these nations was embedded within a macroeconomic framework that was conducive to growth, including (World Bank, 1993):

- exceptionally high saving and investment rates which continued for four decades, leading to the high growth rates of the capital-labour ratios;

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• a rapid increase in education measured in years, but also high achievement in science and mathematics measured in international tests and growing tertiary education enrolments in science and engineering;
• an enormous expansion of infrastructure including transportation, ports and roads that was not sectorally targeted;
• an emphasis on transferring technology from the rest of the world, whether in the form of technology licensing, FDI, the use of foreign consultants, or in some cases reverse engineering;
• the use of export growth as the *sine qua non* for the continuation of aid to firms, government programmes benefiting firms being contingent on exporting. This forced firms to increase their productivity and was the impetus for the demand for importing more advanced technologies. But export growth was also abetted by macro policies that limited domestic absorption and maintained a relatively constant real exchange rate that allowed potential exporters to gauge potential profitability without worrying about exchange-rate volatility. These macro aspects had a uniform impact, not one that varied among sectors. The fact that the bureaucracy charged with implementing export promotion was largely insulated from political pressure from firms, while there was a simultaneous close monitoring of firms that provided considerable information about their problems.

Such policies are not easily emulated in most of the countries that need to expand their industrial base.

Other problems emerge as well. For example, Yamamura (1986) (in an exhaustive study of Japanese industrial policy in the early 1950s) identified the criteria used by MITI to identify potential competitors with the US. Products encouraged were those with high income elasticities (so that additional supply by Japan would not drive down the initial international price) and a large market so that scale economies could be realised. To implement this policy the Japanese government: (a) provided interest-rate subsidies; (b) protected domestic market by tariffs; (c) limited or precluded entry of new local competitors so that favoured firms would not lose their ability to realise scale economies; (d) forbade foreign direct investment in the promoted sector; and (e) precluded potential local competitors from borrowing from local financial institutions to avoid the loss of scale economies by favoured firms. Korea and Taiwan, the other model nations that might be cited as having pursued a successful industrial policy, implemented some but not all of these measures. Clearly this is a formidable set of policies to implement and the complete programme is more complex than simply looking at a nation that is richer. This programme would be difficult to implement in any nation, and especially in those with a poor education base, limited government legitimacy and the widespread corruption characteristic of many of the least industrialised nations.

When Japan embarked on its policies, it targeted stable products whose characteristics were changing slowly. There are few such sectors nowadays. Even inexpensive clothing and shoes undergo remarkably rapid changes in style which demand that a successful firm be part of an international supply chain that can keep the supplier up-to-date on fashions and quality standards. Moreover, it is not clear how officials trying to foster an individual sector would even choose a product. Looking at
international trade statistics, one does not find ‘shoes’ but 50 or more categories, each employing a different technology and requiring different production and marketing skills. How many government employees in a ministry of industry could make such choices and carry out the calculation of a social cost/benefit analysis? Moreover, to choose among products would require extraordinary knowledge of both other sectors and the international prospects of the industry with respect to both likely prices and cost structures. Lin and Monga correctly identify lacunae that the government should address to promote structural transformation, in particular, ‘information, co-ordination and externality issues, which are intrinsic to industrial upgrading and diversification’. Kamal Saggi and I (2006) have provided a partial list of the requisite knowledge to deal with these problems, based on our synthesis of the industrial-policy literature. These include knowledge of:

- which firms and industries generate knowledge spillovers
- which firms and industries benefit from dynamic scale economies – what is the precise path of such learning and the magnitude of the cost disadvantage at each stage of the learning process
- which sectors have a long-term comparative advantage
- the size of scale economies of different firms and sectors in order to facilitate investment co-ordination
- an ability superior to that of individual firms to learn about their potential competitiveness
- the nature and extent of capital-market failures
- the magnitude and direction of inter-industry spillovers
- the relative amount of learning by individual firms from others and from their own experience
- the extent to which early entrants generate benefits for future entrants
- the extent of heterogeneity of firms’ learning abilities
- whether firms trying to reduce production costs also begin a simultaneous effort to improve their product’s quality in order to obtain a better reputation
- the potential effects of FDI or international trade in solving some of the co-ordination problems, including a detailed knowledge of which of tens of thousands of intermediates are tradeable
- forecasting which firms can create new knowledge and discover better production methods
- the spillover effects of FDI as well as the likely intensity of their purchase of domestic intermediates.

This is obviously a formidable list. It is unlikely that, even if a government hired several major international consulting firms, they would possess the ability to undertake this programme, despite having many PhDs and MBAs on their staffs. The implication for much more poorly educated and compensated government staff with considerably fewer resources is obvious. If this characterisation is valid, alternatives to government direction have to be sought. None of this implies that Lin and Monga are incorrect in their insistence on a positive role of government in building hard infrastructure such as roads and soft infrastructure such as a legal system and an environment conducive to
business. But these critical requirements are likely to exhaust the capabilities (and finances) of almost all national governments of the least industrialised nations.

References


Wonhyuk Lim*

Development may be conceptualised as the result of synergies between enhanced human capital and new knowledge, involving complementary investments in physical and social capital. The fundamental policy challenge is for the state to work with non-state actors and markets to address innovation and co-ordination externalities while minimising negative government externalities. Since the time of the Industrial Revolution, countries that have effectively responded to the innovation and co-ordination challenges have become successful. The key is for a country to retain the ownership of its development and progressively build up its capabilities to add value and respond to shocks, even as it actively learns from, and engages with, the outside world. The reinforcement of successful experiments through the feedback mechanism of performance-based rewards can lead to dramatic changes over time (Lim, 2011).

Developing countries typically export primary commodities or start their industrialisation in the assembly and production segment of the value chain in such labour-intensive industries as garments. Most countries fail to move to higher value-added segments along the value chain (such as product design) or to shift to higher value-added sectors (such as machinery and equipment) for two reasons. They either neglect to address externalities in technical education, R&D, and infrastructure development or rush to promote sophisticated industries without the requisite accumulation of skill and scale economies. International benchmarking based on endowment structures and close consultation between the government and the private sector is key to solving information and incentive problems at this stage, when countries try to upgrade their comparative advantage.

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Drawing on development history and economic theory, Justin Yifu Lin and Célestin Monga offer practical advice to developing countries faced with the challenge of identifying promising sectors and facilitating structural transformation. They note that ‘successful developing countries have typically targeted mature industries in countries with an endowment structure similar to theirs and with a level of development not much more advanced than theirs’ (emphasis added). Specifically, they propose that the government in a developing country focus on ‘tradeable goods and services that have been produced about 20 years in dynamically growing countries with similar endowment structures and a per capita income [measured in purchasing power parity] that is about 100% more than their own’, while also paying close attention to successful experiments in other sectors. They also advise the government to encourage the experimentation, self-discovery, and scale-up efforts of private enterprises by removing constraints, supporting pilots, and providing direct incentives to pioneer firms.

Building on the ideas of comparative advantage, self-discovery, and the facilitating state, this set of policy recommendations will help policy-makers in developing countries ‘to reap the advantage of backwardness’ in the early stages of development. However, more is likely to be needed if they are to move beyond ‘the middle-income trap’, when catch-up economies may have to take considerable strategic risks to jump into non-mature industries to compete with advanced economies. This is not an easy task. In fact, countries tend to move through the product space by developing goods close to those they currently produce, and can reach the core ‘only by traversing empirically infrequent distances’, which may explain why poor countries fail to converge with the income levels of rich countries (Hidalgo et al., 2007: 482).

Korea’s case is illustrative in this regard. Korea exploited its latent comparative advantage to develop mature, labour-intensive downstream industries in the 1960s, much in line with the advice provided by Lin and Monga. However, it did not just wait for its income and skill levels to rise to move into higher value-added industries. Instead, it systematically studied what had to be done to fill the missing links in the domestic value chain and move up the quality ladder, and made conscious and concerted efforts to aim for international competitiveness from the outset. It sought to indigenise intermediate inputs imported from foreign upstream industries, through the acquisition of technology, the development of human resources, and the construction of optimal-scale plants aimed at the global market. For instance, in the chemical-textile value chain, it systematically built the linkages backwards from the export of textiles to the production of synthetic fibres, and the development of basic petrochemicals.

Korea had a strong and increasing revealed comparative advantage in light industries when it made the decision to promote heavy and chemical industries in 1973. After benchmarking advanced industrial nations with natural endowments similar to its own, such as Japan, Korea recognised that it had a potential comparative advantage in machinery and equipment industries and began to remove the obstacles to achieving this objective, such as lack of technicians and engineers with the requisite skills in sophisticated industries. The government drafted a plan to increase the supply of technicians from 240,000 in 1969 to 1,700,000 in 1981, and established mechanical technical high schools offering full scholarships to poor but talented young students. National universities were called upon to focus on one specialised engineering field related to a nearby industrial complex.
In promoting upstream industries in the 1970s, Korea had to make a strategic choice. It could play safe and develop heavy and chemical industries for the small domestic market and risk the inefficiency resulting from sub-optimal scales and entrenched protectionism. Alternatively, it could promote these industries for the global market and risk capacity underutilisation and financial distress. It chose the latter option because, despite considerable risks, this promised a dynamically efficient growth trajectory if the country managed to develop the requisite skills before the financial burden associated with scale economies and complementary investments became overwhelming. To minimise time and exploit scale economies in establishing capital-intensive industries, the government decided to rely on a select group of state-owned enterprises and family-based business groups (chaebol) with successful track records. It considered that scale economies called for regulated monopoly or oligopoly in these industries until demand became large enough to support effective competition (Lim, 2011).

Although Korea’s case is but one example, it shows that industrial upgrading requires much more than international benchmarking based on comparative advantage and self-discovery and scale-up efforts. Innovation and co-ordination externalities in structural transformation demand strategic risk-taking by the public and private sectors.

References


Rejoinder

Justin Lin and Célestin Monga

We are grateful to Professors Amsden, Tendulkar and Pack, and Drs Amoako and Lim for their insightful comments on our article. We first discuss some of the general themes emerging from their analyses. We then respond to some specific comments by each of them.

1 General comments

1.1 On scope and justification

It is useful to start by stressing that every country in the world, intentionally or not, pursues industrial policy. This is true not only of the usual suspects such as China, Singapore, France and Brazil, but also of the United Kingdom, Germany, Chile and the United States. This is surprising only if one forgets that industrial policy broadly refers to any government decision, regulation or law that encourages ongoing activity or investment in a particular industry. After all, economic development and sustained growth are the result of continual industrial and technological upgrading, a process that requires public-private collaboration. The theoretical case for industrial policy is quite strong and has been acknowledged in the literature at least since Adam Smith in the lesser known Book 5 of *The Wealth of Nations* (in which he discusses factor endowments and infrastructure endowments), and Alfred Marshall, who outlined the analytical framework for understanding externalities and co-ordination.

Nowadays, a new wave of scepticism rests on the idea that industrial (sectoral) policy and competition policy are contradictory or at best substitutes. This argument is implicit in some of the comments by Professors Tendulkar and Pack and Dr Amoako. We believe that industrial policy based on the Growth Identification and Facilitation (GIF) framework actually enhances competition. By facilitating co-ordination and addressing externality issues, industrial policy helps many domestic and foreign firms to enter sectors that are consistent with the country’s latent comparative advantage and turn them into overt comparative advantages, and thereby intensifies competition within the industries and enhances the economy’s competitiveness internationally (Lin and Chang, 2009). Moreover, as shown by Aghion et al. (2010), competition weeds out bad projects, and thus reduces the danger of picking the wrong winner. Also, firms may naturally try to differentiate horizontally in order to increase their competitiveness in the market. In such situations, the more intense product market competition is within sectors, the more innovative and competitiveness-enhancing it will be.

1.2 On discipline and implementation

The political-economy difficulties of implementing any type of public policy are well known. The comments received highlight some of them: the fact that the body politic may be tempted to ignore economic rationality and pursue more sophisticated sectors in...
its zeal to emulate advanced countries; and the possibility of extending even successful policies well beyond their effective timespan, thus creating opportunities for rent-seeking activities. These general governance issues are increasingly well studied in the economic and political-science literature (Tollison and Congleton, 1995; Robinson and Torvik, 2005).

These concerns are legitimate but only for the traditional type of industrial policy which encourages firms to enter industries that defy comparative advantage. Firms in these industries are not viable in an open, competitive market. Their entry and continuous operation often depend on large subsidies and protection, which create opportunities for rent-seeking and corruption, and make it difficult for the government to abandon interventions and exit from distortions (Lin and Tan, 1999). The GIF framework promotes something quite different: the development of industries that are consistent with the economy’s latent comparative advantage. Firms are viable once the constraints to their entry and operation are removed. The incentives provided by the government to the first movers are to be temporary and small, solely for the purpose of compensating for their information externality. In that context, the issues of pervasive rent-seeking and the persistence of government intervention beyond its initial timetable can be mitigated.

2 Specific comments

Professor Tendulkar comments on the distinction between the roles of the state in facilitating growth and in identifying new industries for growth. He accepts the state’s important role in growth facilitation, but is more uncertain about its role in growth identification. Referring specifically to the South Asian context, he also asks how the over-enthusiastic government can be prevented from taking on much more than it can effectively handle.

We believe that without identification it is hard to determine the type of facilitation that would be desirable. The appropriate hard and soft infrastructures needed to foster industrial upgrading are often industry-specific. For the state to play its role in determining and providing the necessary infrastructure (facilitation), government officials must form a judgment and make decisions about which particular industries will need it (identification). The two roles are therefore complementary and sometimes difficult to disentangle. Moreover, because resources and capacity are limited, governments must prioritise their interventions – and explicitly or implicitly engage in some form of growth identification.

The issue of over-enthusiastic governments is not specific to South Asia. Many countries in Latin America, Africa and Asia (even China before 1979) exhibited the zealous state syndrome, with governments doing too much in their attempts to promote development. That risk, which is real, does not invalidate the need to deal with externalities and co-ordination. It simply points to the necessity to set clear, transparent and rigorous criteria that mitigate the propensity of governments to over-intervene or to support uncompetitive industries. We offer the GIF framework precisely to advise political leaders and the general public on the right way of carrying out industrial policy, and identify clearly what would be the wrong way, so that the probability for governments being over-enthusiastic is reduced.
Professor Amsden argues that industrial policies in countries ranging from the Middle East’s energy belt to Asia’s manufacturing corridor and the so-called BRIC economies (Brazil, Russia, India and China) have been more successful in practice than is portrayed in our article. Admittedly, many OPEC countries avoided the resource curse and managed to reach commendable levels of per capita income. However, most of them failed to use the resource rents to facilitate structural transformation in their countries, as carried out by the other resource-rich countries, such as the Scandinavian countries, the United States, Canada or Australia.

We submit that the performance of resource-rich countries could be further enhanced if they used the GIF framework to support structural transformation. This would require them to invest an appropriate share of revenues from their natural resources in human, infrastructural and social capital, and create incentives for domestic or foreign firms to facilitate the development and upgrading of industries in the non-resource sector. Their strategy should not be limited to maintaining good governance, keeping natural-resource revenues in sovereign funds and investing in foreign equity markets to insure against commodity price fluctuations, as is often the case.

Professor Amsden also questions the applicability of the GIF framework to a peasant export economy where the pace of population growth is rapid and landlessness, unemployment and underemployment are high, but where labour costs are not low enough and manufacturing experience is not deep enough to compete against labour-surplus economies like India. Regarding population growth, the same could have been said about Asian economies before their economic take-off in the 1960s. Children represent old-age insurance for many families in poor countries, and the increase in per capita income generally reduces fertility rates because that insurance is less needed and the opportunity cost of raising children rises with the increase in wages. East Asian economies did not have Mainland China’s restrictive family planning system but they experienced similar reductions in population growth rates. African governments should have devoted the same focus on promoting economic growth as they did on various interventions to reduce child mortality. As for the labour costs, those in the formal sector may not be low, especially in some African countries, as observed by Amsden. But the informal-sector labour costs are unlikely to be high. Moreover, one way out of that dilemma is for those countries to follow the practice of Mauritius in the 1970s (Subramanian and Roy, 2003), namely, allowing wage flexibility in the special economic zones so as to promote the development of new competitive, labour-intensive industries.

Professor Amsden stresses the importance of experience in managing business organisations, which is important indeed. By facilitating the development of latent comparative advantage industries, the GIF framework would allow more entrepreneurs to enter competitive manufacturing sectors, gain experience, and prepare their firms to upgrade to higher-level industries. Many successful business giants in Japan (Toyota, Sony, Honda), Korea (Samsung, LG, Daewoo), Taiwan-China (Formosa Plastics), or Hong Kong (Tyco-on Li Kasing) started as small businesses with a few employees and a few thousand dollars of investment. They overcame the odds because their promoters were gifted leaders, but they also acquired experience in business management because they operated in an environment that was conducive to sustained growth.

She also notes that our model can be enhanced using industrial policy to invest overseas and attract skills. We agree. In a country that is recording dynamic growth, the
government can employ outward investments to facilitate: (i) the relocation of firms that operate in its sunset sectors to other lower-income countries with a similar endowment structure so as to use those countries as export bases and benefit from their cheaper labour and/or to get access to their domestic markets; (ii) the acquisition by domestic firms of foreign firms in related sectors in higher-income countries, in order to get access to their technology, management experiences and market channels; and (iii) the acquisition of resources by domestic firms (in resource-scarce countries) from countries where they are abundant.

Dr Amoako argues that successful industrialisation has not always been based on competitive markets, and that African countries have not always succeeded despite following their comparative advantage. The GIF provides a dual-track strategy for government intervention. Following comparative advantage, which is only the first track of the GIF, is a necessary condition for a successful industrial policy. However, that is not sufficient. For industrial policy to contribute to a country’s growth and structural transformation, the government also needs to play the facilitation role by providing incentives to the first movers and to help them by removing binding constraints to their growth and by co-ordinating investments in the soft and hard infrastructures that are needed. The likely reason why some African countries have not succeeded despite following their comparative advantage is because their governments failed to play their facilitation role.

By arguing that the article pays too much attention to supporting products that follow a comparative advantage and too little attention to the acquisition of technological capabilities and learning, he also seems to assume that the GIF approach promotes static comparative advantage. Actually it does the opposite. Our framework promotes upgrading and diversification to new industries and is therefore dynamic in nature. There is a major difference between the GIF and the theory of dynamic comparative advantage which Dr Amoako has in mind. The latter typically attempts to help firms to enter industries that are a country’s future comparative advantage. Because of endowment constraints, firms in those industries would not yet be viable in a competitive market even if the government helped them with the co-ordination and externality compensation. By contrast, the GIF aims at helping firms enter industries with latent comparative advantage. Under that scenario, firms would be viable and require no subsidies or protection once the government provides co-ordination and externality compensation. It should be noted that if African countries cannot be successful in industries with latent comparative advantage, their probability of success in industries without comparative advantages will be quite small.

With the GIF approach, developing countries can tap into the potential advantage of backwardness, record higher rates of growth and upgrade their industrial structure, income level, and endowment structure faster than the high-income countries. Once their income levels and endowment structures are close to those of high-income countries, they will have gained comparative advantage in advanced industries, which will enable them to compete directly with and even overtake the high-income countries. Therefore, contrary to Dr Amoako’s prediction that ‘if each country diversified and upgraded its industries only by trying to break into markets that countries ahead of it on the “industrial ladder” were becoming less competitive in due to rising labour costs,
then one would expect the industrial rankings of countries to be rather static over time’, it is actually a faster way for a latecomer to catch up with the more advanced countries.

*Professor Pack* believes that targeting industries in richer comparable countries and then following the country’s comparative advantage accordingly is a problematic algorithm. His reasoning is two-fold: first, the economic structure of the richer country could be the result of distorting policies; and second, a formidable set of policies is required for successful policies which go beyond the mere identification of potential products. In support of his scepticism, he offers the examples of Japan and the USSR (which India tried unsuccessfully to emulate). This is a valid warning. Even in successful cases, industrial policy is never a smooth process. It always involves trial and error from governments that put in place good mechanisms and channels to learn from mistakes, adjust economic strategies, and minimise the potential costs of bad decisions.

However, our framework recommends not only that target countries be richer but also that they have recorded dynamic growth for a long period and where higher incomes and productivity gains in successful industries eventually raise wages and make them less competitive. If they have succeeded in growing dynamically for several decades, it is unlikely that they have followed strategies that defy their comparative advantage.

After the Meiji restoration, Japan took the German kingdom of Prussia as a model. According to estimates by Angus Maddison (2010), Germany’s per capita income in 1890 was US$2,428 and Japan’s $1,012.1 Japan’s was 42% that of Germany, hence Japan’s strategy was consistent with the approach proposed in the GIF framework. While Professor Pack’s summary of MITI’s policies in the 1950s and 1960s is quite instructive, the story behind the numbers is fully consistent with the GIF analysis as well: Japan’s per capita income in 1950, 1960 and 1965 was $1,921, $3,986, and $5,934 respectively, whereas those of the US were $9,561, $10,961, and $13,419. The ratios were as follows: 20%, 36% and 44%. The numbers for 1960 and 1965 are consistent with the principle of the GIF. The 1950 figure was lower than the normal threshold that the GIF framework suggests. This is probably due to the fact that Japan was still recovering from the war and its human capital and soft and hard infrastructure were greater than those indicated by its per capita income; a strong indication is the fact that Japan’s per capita income in the 1930s had already reached about 40% that of the US (for example, $2,120 vs. $5,467 in 1935).

In contrast to Japan’s story, the USSR in the 1950s was the wrong model for India for two reasons. First, the two countries did not have a similar endowment structure; the USSR was a resource-rich country while India was a resource-poor country. Secondly, the USSR was too far advanced compared with India. According to Maddison, the USSR’s per capita income in 1955 was $3,313, while India’s was $676 (only 20% that of its reference country). The GIF framework recommends that latecomers be realistic (and even modest) in their choice of reference countries and target industries.

Professor Pack also observes that world trade has undergone remarkably rapid changes in style and that there are fewer stable products and industries to be targeted today compared with several decades ago. We believe that, despite changes in style and product customisation, the division of labour among countries at different levels of

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1. All the estimates of per capita income here are measured in 1990 International Geary-Khamis dollars, taken from Maddison (2010).
development is still the same. For example, television evolved from black and white to colour and to flat panel today. The main producing countries have changed from the US before the 1950s to Japan in the 1960s-80s, to Korea in the 1980s-2000s, and China today. A latecomer entering the market today could go into labour-intensive assembly of the flat-panel TV production first, just as forerunners did a few decades ago when they decided to compete successfully in the black and white and colour TV markets.

Globalisation provides huge potential for industrialisation through specialisation. Several decades ago, many low-income countries faced the constraints of their limited market size, high transportation costs and trade barriers, and could not take advantage of the opportunities offered by large-scale manufacturing. With globalisation, virtually any country can identify production activities for which it has overt or latent comparative advantage, scale them up and create its own niche in the world market. Precisely because of globalisation, the economic development strategy in every country should follow comparative advantage closely. Multinational firms are more likely to exploit any small difference in production costs in the determination of their locations of production or procurement systems. Globalisation also makes the government’s role in the facilitation process even more important because only with good hard and soft infrastructures, which reduce transaction costs, can the cost advantage based on endowment structure and specialisation be realised.

Professor Pack provides an impressive list of knowledge requirements about targeted industries that government officials would need to know in order to design a successful industrial policy. He questions the capacity of governments in developing countries to meet those requirements. First, all countries at low-income level tend to lack high capacity by definition. Chang (2008) reminds us that, not so long ago, it was not unusual to refer to ‘Lazy Japanese and Thieving Germans’. With the process of economic development taking place, capacity will be enhanced in any society. More important, some of the requirements he identifies are likely to be relevant only for more advanced industries in high-income countries. For industries with low technical content, the list should be streamlined considerably. Moreover, instead of analysing the technical nature of various industries to find out the knowledge underpinning them, the private sector and government officials can rely on the advantage of backwardness and observe what the dynamically growing countries with similar endowment structures are already doing. These successful countries must have already overcome those knowledge challenges either by trial and error or by analysis.

Dr Lim agrees that policy advice based on ideas of comparative advantage, self-discovery and the facilitating state will help policy-makers in the early stage of development, but argues that more needs to be done to move beyond the middle-income trap. Korea, he writes, defied its comparative advantage by moving into heavy and chemical industries by building specific skills, filling specific gaps in the value chain, and relying on a select set of business groups and strategic choice. We agree with his observation that dynamically growing middle-income countries will have some industries that have already reached the global technology frontier and will eventually face the challenge of taking risks in technology and product innovation. For such industries, the government should continue to play its facilitating role, and use policy instruments similar to those in high-income countries, such as subsidising the R&D activities of individual firms by funding basic research in universities or public

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institutions, granting patents for new inventions, offering preferential taxes and defence and other government procurements, etc. But for other industries that remain well within the global technological frontier even at that level of development, the GIF framework could be used to address externalities and co-ordination issues.

The Korean government’s encouragement of the development of more capital/technology-intensive industries in the 1970s, as discussed by Lim, is in fact consistent with the need for industrial upgrading due to the change in comparative advantages. The textile, garment, plywood, wigs and other labour-intensive industries were Korea's comparative advantages and very competitive internationally in the 1960s. The success of these labour-intensive industries allowed the country to accumulate human and financial capital. As a result Korea’s endowment structure was upgraded. That process led to a gradual loss of comparative advantage in the original industries and allowed the economy to move into new, more capital- and technology-intensive industries. Lim’s account of Korea’s industrial upgrading process in the 1970s, which targeted mature industries in Japan instead of the most advanced industries in the United States, is in fact a good illustration of how the GIF approach explains the country’s economic success.

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