

Development Policy

Lecture Note 8

Institutions and Policies for Industrialization

In the past three classes we have introduced the process of industrialization in the developing world. Throughout our discussion we have made two fundamental assumptions:

1. Industrialization in the developing world occurs in a context of *surplus labor*, in which labor can move from very low productivity occupations to higher productivity occupations without reducing output in the traditional sector;
2. The advantage of manufacturing over other sectors is the potential to realize *increasing returns to scale*, such that large-scale investment in industry generates rapid increases in productivity and profits that accelerate the process of capital accumulation.

These two assumptions are fundamental to the Lewis Model, which describes how movements of labor from the traditional to the modern sector drive the development process. Increasing returns to scale are the main reason that manufacturing has historically been the engine of economic development, and is likely to remain so. Increasing returns are present in individual firms and for the industrial sector as a whole because of “spillover” effects. Faster growth of manufacturing valued added is associated with more rapid productivity growth because knowledge and skills acquired in one firm or industry are carried into others. “Learning by doing” generates skills and innovation as investment accelerates in the manufacturing sector. Moreover, the presence of downstream industries creates markets for inputs: a dynamic garment sector boost demand for cloth and fibers; the furniture industry creates demand for plywood, glue and fittings. Increasing returns to scale are also a factor in the Global Business Revolution, which has seen an unprecedented concentration of technology and capital within a small number of globally dominant enterprises in each sub-sector or product group. The assumption that labor is unemployed or underemployed implies that supply and demand are not automatically in balance, and that investment may be insufficient to clear the labor market.

Surplus labor and increasing returns to scale do not fit easily into the standard economic model of perfectly competitive markets. In these models, all factors of production, including labor and capital, are fully employed. There is no unemployment or disguised unemployment, and investment is equal to saving. Rates of return to capital are equal across all activities. The only institution in the standard model is the market: there are no labor unions, no government and no banks.

The main policy recommendation that comes from the standard model is that government should strive to remove all obstacles to market transactions. Policies that intervene in the market will prevent labor and capital markets from obtaining equilibrium, which reduces the efficiency of production and exchange. But we should remember that the standard model is intended as an illustration of the operation of economic principles assuming full employment and constant returns to scale. If these assumptions are not valid, then the policy relevance of the standard model is limited.

Policy Trends

In the real world, industrial development is limited by insufficient domestic demand for manufactures, lack of investment and shortages of skills and technological capabilities. Post World War II development thinking recommended a massive investment effort to realize economies of scale and generate positive externalities across industries and overcome. Paul Rosenstein-Rodan, an Austrian economist who taught for many years at MIT, proposed in 1943 a “big-push” investment effort in Eastern Europe to provide jobs to underemployed workers in the agricultural sector and to realize economies of scale and positive external economies.¹ You will remember that Alexander Gerschenkron pointed out that late-industrializing countries in Europe had financed large-scale investments to acquire foreign technologies and realize the “advantages of backwardness.”

In addition to the big push, post-war theories stressed the need to protect domestic industries from foreign competition. The idea was that new domestic industries needed time to develop technological and managerial capabilities before they could compete with imported goods. “Infant industry protection” is an old idea that can be traced back to the 1700s and was used extensively in the UK, the United States, Germany, Japan, Korea and Taiwan.² Japan, Korea and Taiwan proved adept at protecting local industries in the home market while subsidizing exports to encourage domestic firms to capture large overseas markets.

In the 1950s many economists in Latin America and elsewhere came to see the world as divided into “center” and “periphery” countries. The countries of the center exported manufactured goods and the periphery produces agricultural commodities, energy and minerals. The Argentinean economist Raul Prebisch hypothesized that the price of manufactured goods tends to rise relative to raw materials. Developing countries were therefore playing a losing game, in which they had to produce more and more natural

¹ Paul Rosenstein-Rodan (1943) “Problems of Industrialization of Eastern and Southeastern Europe,” *Economic Journal*, 53:202-211.

² For example, Alexander Hamilton, the first US Secretary of the Treasury, recommended protection for manufactured goods as early as 1791.

resources in order to purchase the same amount of manufactured goods. He recommended that developing countries protect their domestic industrial sector and focus on producing for the local market.

The Prebisch thesis turned out to be incorrect. The terms of trade between raw materials and manufacturers have fluctuated and have not followed a consistent trend. Prices of energy, minerals and agricultural commodities have risen sharply in recent years. Moreover, the prices of some manufactured goods have fallen: computer prices, for example, are a small fraction of their levels of twenty years ago. There is great diversity in price trends among individual commodities and manufactured goods. Latin American countries' ISI policies discouraged agricultural exports and missed an important opportunity to earn foreign exchange, increase domestic employment and raise productivity. Southeast Asian countries did a better job of capitalizing on opportunities for agricultural exports.

At the same time, manufacturing has grown rapidly in the developing world over the past twenty years. It is no longer the case, if it ever was, that developing countries specialized in producing raw materials. Although the growth of manufacturing has been most rapid in East Asia, other regions have also recorded high rates of growth. High income countries are also some of the largest producers of raw materials: for example, agriculture in the US and EU and minerals from Australia.

As we discussed in the last class, the growth of manufacturing in the developing world is closely associated with the sharp rise in foreign direct investment after 1990. Trade liberalization and technology change contributed the trend toward outsourcing and modularization. Manufacturing moved from high-wage rich countries to middle and lower income developing countries to capture cost advantages.

As noted above, most developing countries pursued some form of import substituting industrialization during the post-war period. The "newly industrializing countries" of East Asia (South Korea, Taiwan, Singapore and Hong Kong) replicated the experience of Japan in combining ISI with export promotion. Import protection and export promotion were combined in these countries: upstream industries were often protected from international competition, but downstream producers were offered incentives—for example, access to foreign exchange, cheap finance or protected domestic markets—to compete in international markets. The forms that this combination of ISI and export promotion varied from country to country: Korea relied heavily on vertically integrated conglomerates (*Chaebol*) while Taiwan promoted upstream SOEs and private firms and downstream start-up companies linked to state research facilities. Singapore and Hong Kong were more dependent on foreign direct investment than either Korea or Taiwan.

Countries that relied exclusively on their domestic markets, notably Latin American countries, did not perform as well as the Asian NICs. Their markets were generally too

small to enable firms to grow large enough to realize economies of scale. Of more importance was the absence of competition. Small markets meant that one or two producers could satisfy domestic demand. These companies had an incentive to lobby government for more protection rather than increase profits by increasing domestic market share. They had no incentive to innovate and develop new products. Current account deficits widened as domestic firms were not sufficiently competitive to export and the high cost of domestic inputs reduced the scope for agricultural exports. Domestic firms also remained dependent on imports for capital and intermediate goods. Latin American countries borrowed from international banks to cover their trade deficits, setting the scene for the 1980s debt crisis.

ISI had fallen out of favor by the 1980s. Southeast Asian countries like Indonesia, Thailand and Malaysia also reversed course and promoted manufactured exports. This was prompted by the collapse of commodity prices in the early 1980s and by the exchange rate realignment that followed the Plaza Accords in 1986. The growth of manufactured exports was closely linked to inward FDI in industries such as garments, footwear and electronics. Successive rounds of trade liberalization, culminating in the creation of the World Trade Organization and the expiration of the Multi-Fiber Agreement, helped these countries increase manufactured exports.

However, effects of liberalization have not been the same all over the world. East Asia, including developing countries in the region (led by China), have sharply increased their share of global manufactures. Latin America's share has increased, largely as a result of increased output from assembly operations on the Mexico-US border and in Central America. Paradoxically, South America did not see an increase in labor intensive manufacturing after liberalization, but instead specialized in more capital intensive activities and commodity production. South Asian manufacturing has increased from a low base, but Sub-Saharan Africa has not increased its share of global manufacturing.

The question facing East Asian developing countries is how to move from simple assembly operations to more complex, technologically intensive processes that generate more value added per worker. There is some (early) evidence that productivity growth in Asian manufacturing is already slowing down. For countries like China, tighter labor markets will mean higher wages. If low wage jobs move elsewhere, can China generate enough employment in higher productivity occupations? Can China and the countries of Southeast Asia achieve industrial deepening, that is, moving from simple assembly operations to produce electronic components, auto parts, machinery and chemicals?

National innovation systems

Attention has shifted in recent years from trade protection to promoting technological development and innovation as a means of increasing competitiveness. As we

discussed in our last class, technological capacity is highly concentrated within a small number of firms and countries. The US remains the world leader by a considerable distance, with Japan another dominant countries. Taiwan and Korea have made tremendous progress but still lag considerably behind the two leaders. “Emerging” countries like China and Brazil do not yet have the capacity to compete with the leaders in innovation.

Productivity is closely associated with innovation. Countries approaching the technological frontier have generally shown more rapid rates of productivity growth. The close relationship between innovation and productivity has focused attention on the factors that contribute the development of technological capabilities in late industrializing countries.

Education is an obvious precursor of innovation. Higher levels of secondary and post-secondary enrolments can potentially help reduce skill gaps and encourage investment in more technologically intensive industries. But enrolments in themselves are often a poor indicator of the supply of relevant skills, since universities are sometimes (often?) out of touch with the kinds of skills needed in industry. Moreover, some regions (Southeast Asia) have seen lagging growth in Science, Technology, Engineering and Mathematics (STEM) enrolments even as gross tertiary enrolment rates increase.

The quality of education also varies considerably from place to place as shown by results in standardized international tests. Although global university rankings are far from perfect, they do provide an indicator of which countries are closing in on the technological frontier. Southeast Asian universities are underfunded and therefore do not have up-to-date infrastructure and laboratory facilities. In terms of governance, they are not required to compete for access to public resources. Nor are they benchmarked against international standards, for example publications in international journals or links to business and the community. They have not shown an ability to develop meaningful research and training partnerships with business.

Infrastructure is also important, particularly information and communications technology. Broadband penetration is a useful indicator of communications infrastructure development. Converging countries like Singapore, Taiwan and Korea have invested heavily in fiber optic cables to increase connection speeds and widen access.

Experience has also shown that innovation is closely tied to the presence of one or several large firms that have developed innovation capacity by first acquiring and adapting technology from overseas and then gradually developing research and design capabilities. Chinese companies like Huawei, Chery and BYD Auto are the latest to traverse this path. The goal is to develop technological capacity as a contract manufacturer and then in stages emerge as an original design manufacturer (ODM) for

a large multinational firm. These large firms also stimulate independent startups and spin-offs, which helps create an innovative cluster. No Southeast Asian companies have achieved this milestone to date.

A growing literature has focused attention on the role of government in helping firms to acquire knowledge and skills, to promote industrial research and development, to reduce risks associated with innovation and to link the local economy to the multinational corporations that are the market and technology leaders in the global economy. An important conclusion is that there is neither one pattern of industrial development nor one form of state involvement to promote technological development and innovation.³ However, even given this heterogeneity, successful policies have tended to supplement markets by providing incentives for firms to enter innovation-based industries rather than rely on compulsion or state monopoly over R&D spending.

The example of Taiwan is often discussed as relevant to Southeast Asian countries. The government of Taiwan established two publicly funded research institutions that took the lead in technology development in computers and information technology: the Industrial Technology Research Institute and the Institute for Information Industry. These agencies financed and conducted the upstream research, and were a magnet for highly skilled engineers and scientists, many of whom had been trained in the US and remained there after completing their degrees. The institutes eventually created private sector spin-offs that focused on product development rather than upstream scientific research. The rapid growth of the semi-conductor industry provided these scientists and engineers with a rapidly growing niche in ICT technology.

Other successful countries have followed different paths. Some, like Singapore and Ireland, have relied more heavily on FDI. Israel, with its tradition of excellent universities and strong linkages to US financial markets, has encouraged the growth of venture capital funds. The main lesson is that government does have role in promoting innovation and technological development. This role begins with secondary and tertiary education, infrastructure and “social infrastructure” such as the rule of law and transparent regulations. But it often extends beyond these obvious policies to include the provision of knowledge as a public good or the creation of incentives to encourage firms to engage in R&D activities.

³ Dan Breznitz (2007) *Innovation and the State: Political Choice and Strategies for Growth in Israel, Taiwan and Ireland*, New Haven: Yale University Press,