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We began this volume by asking the question, Why are international income differences so large? The answer we have developed in the course of these chapters attributes most of these differences to country-specific policy that directly or indirectly restricts the set of technologies that the individual production units can use. These differences in constraints translate into differences in total factor productivity (TFP) at the aggregate level. We hypothesized that many of these constraints exist on account of monopoly rights that industry insiders with vested interests tied to current production processes have. With the government's protection, these insiders impose restrictions on work practices and provide strong barriers to the adoption of better technologies.

During the course of these chapters we asked a number of additional, albeit related, questions. Namely, we asked why modern economic growth started first in England before continental Europe, why modern economic growth did not begin in China in the late fourteenth century, why the United States forged ahead of Britain in the late nineteenth century to become the world's most productive nation, and why growth miracles occurred in some countries. We now answer these questions in the context of our theory.

Why England before Continental Europe

Our theory accounts well for the fact that modern economic growth started first in England in the late eighteenth century rather than in continental Europe. England at this time did not protect the monopoly rights of insiders. Ekelund and Tollison (1991) document that the protection of monopoly rights declined in England in the three centuries leading up to the industrial revolution. During the Middle Ages, it was common for the crown to raise revenues by awarding monopoly rights. However, between 1500 and 1750 in England, monopoly rights were awarded less frequently. These authors attribute this trend to a steady shift in power away from the crown and to Parliament. This shift occurred on account of checks the feudal lords put on the crown in the thirteenth century. What emerged were two separate political bodies of similar power that competed for the rents associated with these monopoly rights. According to Ekelund and Tollison (1991), this competition effectively increased the cost of securing monopoly rights, as both the royal courts and the common law courts aligned with Parliament disputed the legality of any rights granted by the other ruling body. As a result of this competition, little regulation was in place in the middle eighteenth century in Britain, and no group could successfully block the adoption of the better technologies that innovators developed.

France, in contrast, had no political competition; the crown had all the power to grant monopoly rights and exercised this power to generate revenues. Corbet, the finance minister under the reign of Louis XIV, perfected this art of revenue generation in the seventeenth century. The economic structure of France, consequently, was dominated by government-sanctioned monopolies that were protected by elaborate regulations.

The situation in Spain at that time was similar to the situation in France. The Spanish crown lacked a serious competitor for power. It granted monopolies and controlled the prices of important products, such as grain. Historians frequently cite the rights granted by the Spanish crown to the Mesta, the coalition of sheep owners, as an important reason why the industrial revolution started much later in Spain. In exchange for tax revenues, the Spanish crown granted the Mesta the right to continue to graze and move its herds along traditional migration routes. To protect this right, the crown prohibited the enclosure of arable land. It is believed that the protection of these rights delayed land enclosure and the productivity increases that the land enclosure system allowed.

Despite the fact that France and Spain had political systems that fostered monopoly rights and impeded economic development relative to England, modern economic growth did eventually occur in France and Spain. As Mokyr (1990) argues, modern economic growth could not be stopped in these countries after it began in England because of the competition between these sovereign states. Governments could not stifle economic progress by protecting monopolies while other states were growing. If they were to, they would surely be invaded and conquered by the richer states. On account of this competition, no individual government could afford to protect monopoly rights as strongly as before.

Why Not Earlier in China²⁶

The theory also accounts for the failure of China to enter into modern economic growth in the fifteenth century. By all accounts, China was poised to start modern economic growth at that time. Technologically, China was every bit as advanced in the beginning of the fifteenth century as

was western Europe just prior to the start of the industrial revolution in the eighteenth century. In fact, China's development experience from 900 to 1250 parallels in many ways the development experience of England from 1500 to 1750. Per capita iron production increased dramatically, population increased, and the price of iron fell by a factor of 4 relative to the price of grain.

China, of course, failed to experience sustained growth in per capita output until 1950. What happened that delayed China's entry into modern economic growth for over five centuries? The evidence points to the same centralization of power that delayed modern economic growth in continental Europe. Prior to the Mongol conquest of China in 1279, China's central government had four competing groups: the emperor, the civil bureaucracy, the military bureaucracy, and the powerful and independent policy critics. There also was a powerful and independent censorate that effectively policed the bureaucracy, thereby keeping corruption at a relatively low level. None of these groups had the power to dominate policy. As a consequence of competition among these four groups, bureaucracies had a limited ability to protect industry insiders with interests vested in currently used production methods. Regions in China were not autonomous economies that could impose tariffs and other barriers to competition from producers in other regions. As a consequence, groups with the ability to block the use of better technologies chose not to block their use. Our view is that the low level of barriers to technology adoption and its efficient use are why China grew in the 950–1250 period.

Subsequent to this period, the level of barriers increased. Following the expulsion of the Mongols in 1368, the structure of government changed, with a highly centralized government emerging. Shortly after the expulsion, the em-

peror began to consolidate power, first with the trial and execution of the prime minister and the killing of more than 30,000 civil officials and then with the execution of the general of the army and the purge of 15,000 military officials. The consolidation of power by the emperor was completed with the elimination of the policy critics.

Associated with this centralization was a notable increase in the number of state-operated monopolies as well as an increase in state regulation of the economy during this early Ming period, 1368–1450. The state even attempted to monopolize the measurement of time and the calendar. China, in the first half of the fifteenth century, built huge ships, and its fleets sailed as far as east Africa. The objective was to open trade routes with the Indian subcontinent and other parts of southern Asia. In the middle of the fifteenth century, however, the Chinese government explicitly banned ships with more than two masts, effectively restricting shipping to inland waterways. By doing so, China failed to discover the New World and dominate world trade. Chinese trade with the rest of the world declined dramatically subsequent to banning ships with more than two masts in 1450.

Moreover, the emperor fostered a farm-based society. A consequence of this policy was that textiles were produced on the farm with the spinning of the cotton into yarn and the weaving of the yarn into cloth being done by hand. The technology for producing cotton cloth more efficiently in factories was available but was not used. Apparently, the state protected the farmers with a vested interest in the inefficient hand spinning and weaving from efficient textile factories to maintain a stable farm-based society. Given the importance of the textile industry in the industrial revolution, China's failure to enter into modern economic growth in the 1400–1950 period is no surprise.

Associated with this centralization was also a change in the examination for entry into civil service. Individuals now entered civil service by having knowledge of Confucian classics and literature rather than having good administrative skills. According to Edwards (1999), individuals from merchant families came to make up a substantial portion of the civil bureaucracy as a result of this change in the civil service examination. These civil officials then formed guilds, with membership based on region of origin. Guilds consisted of those officials serving in a region who came from the same region. Later, membership in these guilds was expanded to include merchants who had the same region of origin as the civil servants, so that a commercial-bureaucratic complex formed. The officials in these guilds protected merchant members from competition from indigenous merchants. They set weights and standards and worked with local governments to effectively discourage entrepreneurs from starting up factories.

Once this centralization of power was complete, Chinese rulers were able to extinguish technological progress within the country's borders for six centuries. China was able to do this because it lacked the competition or threat of invasion that was critical to western Europe's development. Without this constant threat, the Chinese government had the incentive to protect the monopoly rights of groups with vested interests tied to currently used technologies. Technological innovation that was rapid from 950 to 1250 stopped, and Chinese living standards stagnated until 1950.

Why the United States and Switzerland Did So Well

Today the United States and Switzerland are the richest industrial nations. The reason that they are the leaders is

not an abundance of natural resources. If natural resources were so important for development, countries such as Canada, Australia, and Brazil, with their abundant natural resources, would be richer than the United States and Switzerland. What is relevant and unique about the United States and Switzerland is that both countries have states or canton governments with considerable sovereign power, but not so great as to be able to prohibit movement of goods and people between them.

In the United States, the interstate commerce clause grants the federal government the right to regulate interstate commerce. In the latter half of the nineteenth century and first part of the twentieth century, this clause was interpreted to mean that states could not interfere with interstate commerce. A state had to treat products produced in other states the same as products produced within its borders. Consequently, there was free trade between states, and production coalitions within a state had no choice but to use the best existing technology or to go out of existence.

Later in the twentieth century, the interpretation of the interstate commerce clause was broadened to mean that the federal government could regulate businesses. Associated with this extension, the United States ceased to grow richer relative to the large industrial economies of western Europe. Indeed, the United States lost most of its TFP advantage in the second half of the twentieth century. The reason for this loss is that with federal regulations and national coalitions, it often is in the interest of the coalition of factor suppliers to use its political influence to block the best use of technologies in production.

Switzerland has a government system that is similar to that of the United States, with competition between the states or cantons. Indeed, the Swiss constitution of 1874 is modeled after the U.S. Constitution. With free movement of goods and people between states, there are few benefits

to a group of specialized suppliers to have monopoly rights. If they exercise these rights, competition from firms in other states leads to the demise of that industry in that state.

Why Japan Experienced Its Development Miracle

Our theory accounts for development miracles as well which, in our theory, occur when policies that prevent firms from making use of readily available technologies are removed on a permanent basis. Such changes did occur in Japan after World War II. Japan, after the jolt of Commodore Perry's visit in 1853 and the Meiji Restoration, experienced modern economic growth. The Japanese economy, however, grew only slightly faster than the industrial leader from 1870 to 1940 and closed only a small part of its income gap with the United States over that period. Japanese productivity increased from about 20 percent to 25 percent of that of the United States in this period. Beginning in the 1950s, however, something changed. Japan experienced a growth miracle with per capita income increasing from less than 20 percent to about 75 percent of the U.S. level in a mere twenty years. This was a period of above-average growth for the United States, which makes this catch-up all the more remarkable.

Certainly there were a number of important policy changes during the Meiji Restoration that resulted in modern economic growth starting in Japan in that era. However, the effect of these policy changes in terms of the degree by which monopoly rights tied to current work practices were eliminated was small relative to the policy changes that followed World War II. Japan was occupied after World War II and the primary concern of the U.S. occupiers was that Japan not again become a

highly centralized and powerful military state. The U.S. occupiers, with some success, broke up Japan's industrial-bureaucratic complex and succeeded in creating competing power centers. A more democratic constitution drawn up by the United States replaced the Prussian-derived constitution of the late nineteenth century Meiji era. More competition among groups in a more democratic system limited the ability of government to protect the vested interest groups tied to current work practices. With these changes, a growth miracle followed.

Development Policy: Competition, Free Trade, and Privatization

The policy prescriptions that follow from our theory are clear. To improve living standards, governments of poor countries must stop protecting monopoly rights of industry insiders with vested interests in the current production processes, as well as stop granting new monopoly rights in the future. If the constraints that prevent firms in the poor countries from using readily available technologies and efficient work practices are eliminated, growth miracles will ensue, and the cross-country differences in income levels will be of the order of magnitude of regional differences within countries.

Governments can stop protecting these monopoly rights by promoting competition. If there is intense competition, industry insiders with the right to block efficient production will never exercise this right, because to do so would spell the end of their industry. Moreover, if there is intense competition, a government is less likely to grant these rights in the future. This is because groups of factor suppliers are also less likely to make investments to try to obtain these rights. If an industry is facing competition,

there are no rents, and without these rents, there is little incentive for groups of factor suppliers to organize and lobby the state.

Such a policy prescription is hardly new. The idea that monopoly leads to large inefficiencies and retards economic progress can be traced to the writings of Adam Smith and Alfred Marshall. In spite of empirical support, the classical view that monopoly is a detriment to economic growth and development, and hence, competition should be promoted, received little attention over the last half of the twentieth century. Instead, the Schumpeterian view that monopoly rents are needed to provide incentives for the development of better technologies has dominated. Our view is that countries are not poor because incentives to develop new technologies are lacking. The technologies have been developed in other countries, and it is just a matter of using the technology that is best, given factor prices, and using that technology efficiently.

The current dominance of the Schumpeterian view is due to the lack of a theoretical mechanism by which monopoly rights lead to large inefficiencies. There are, of course, some theoretical mechanisms by which monopoly leads to inefficiencies. One mechanism is the consequence of monopoly power creating a gap between marginal rates of substitution and transformation as modeled by Harberger (1954). Another mechanism is the consequence of capitalized monopoly rents on the accumulation of physical capital as modeled by Laitner (1982). Both mechanisms, however, generate inefficiencies that are at most a few percent of gross domestic product (GDP), a number that is small relative to international income differences.²⁷ In contrast, the monopoly right we consider can give rise to huge inefficiencies.

To promote competition, poor governments can begin by privatizing industries that are not natural monopolies. To some extent this has started in Latin America. Our chapter 8 model treated the product side of the market as perfectly competitive and private. We could equally well have treated the product market as monopolistic and public in our theory. The results are the same. However, as a practical matter, having the industry monopolized instead of competitive, and public rather than private makes it easier for states to protect the monopoly rights of factor suppliers.

To promote competition, governments should foster free trade. The state needs to ensure that goods and services can move freely between regions inside its country's borders and between countries. International trade, thus, matters for development precisely because it is an important source of competition. Even if the number of domestic firms in an industry is small, the competition from foreign firms, in either domestic or international markets, can be a strong enough force to eliminate the resistance to the adoption of better technologies and the efficient use of technologies. Holmes and Schmitz (1995) have formalized this idea in a general equilibrium dynamic model with lobbying costs.

Ferriera and Rossi (1999) document the dramatic increases in productivity in Brazil that followed trade liberalization in the early 1990s. They document that after declining over the 1980s, both output per worker and TFP increased after the trade liberalizations. For example, they report that output per worker for sixteen industries at the two-digit level declined at an average annual rate of 1.61 percent from 1985 to 1990, but thereafter increased at an average annual rate of roughly 6 percent. Associated with

this increase in output per worker and TFP is a significant decline in employment and hours. This is precisely what our theory predicts should have happened.

The effect of increased foreign competition on productivity can be dramatic. Galton and Schmitz (1998) document the effect of increased foreign competition on productivity in iron ore mining in the 1980s. Increased competition from Brazilian iron ore mines had major consequences for productivity in the U.S. mines, which are located in northern Minnesota. Output per unit of input increased by a factor of 2 as competition made it in the interest of the specialized factor suppliers to permit the doubling of productivity. The reason why miners were so reluctant to accept these more efficient work practices is that they were worried about jobs in the region for their children. Perhaps property rights to jobs, along with dynastic considerations, account for the reluctance of the miners to accept a buyout until there is no option. Most of those losing their jobs associated with the change in work practices were highly skilled machinists who had no problem finding good jobs 250 miles away in the Twin Cities.

Final Comment

To conclude, we think that inevitably insiders will gain the power to dictate work practices. Systems are needed in which it is not in the interest of these insiders to exercise this power to block efficient production. One such system is to have a federal government that prohibits states from interfering with interstate commerce and the free movement of goods and people between states. International trade agreements are another mechanism to achieve this objective. With such arrangements, it is not in the interest

of groups with vested interests tied to current work practices to impose barriers to the use of the best available technology given factor prices. The gains from such practices are huge, not 1 or 2 percent but 1,000 or 2,000 percent. There is no reason why the whole world should not be as rich as the leading industrial country.