
Conclusions

In this volume we have addressed the experiences of Japan, Korea, and Taiwan with selective intervention or industrial policies. We believe that, on balance, the weight of the evidence derived from both econometric and input-output studies of these economies that we presented in the preceding chapters indicates that industrial policy made a minor contribution to growth in Asia.

Skepticism is often voiced about such empirics. One question is whether the sectoral total factor productivity (TFP) growth rates, which are key to demonstrating that industrial policy boosted income and welfare, are reliable measures. We have noted the problems with their calculation (appendix 2.1), particularly the possibility that these calculations may understate TFP growth rates in countries with rapid growth in capital-labor ratios if the elasticity of substitution is below 1 or technical progress is not Hicks neutral but labor augmenting. However, as noted in the discussion of Korea in chapter 2, even labor productivity growth was not positively associated with the extent of promotion.

Furthermore, in addition to the TFP-based studies, we have introduced a much broader array of evidence that runs counter to the view that industrial policy was a major source of growth. For example, in our discussion of Japan we examined sectorally differentiated subsidies and noted that their small size and the fact that so much was directed to agriculture suggest that their sectoral impact in industry was likely to have been small. Another widely cited preferential activity, Japan's R&D subsidies, was also small. Unless the relevant elasticities of the R&D decision with respect to subsidies were implausibly large, the amounts involved would have been too small to have fundamentally altered private-sector decisions.

Some proponents of industrial policy do not simply voice skepticism about one or more of the measures employed to gauge its impact but rather object to the entire effort to measure its quantitative effect. For example, it is held that the mere commitment of the governments to intervene established a general atmosphere conducive to growth whose beneficial effect is difficult or impossible to measure, particularly for individual sectors. Industrial policy may have led to an increase in “animal spirits” or the willingness to take risks and hence led to riskier investment with higher returns, which in turn encouraged saving. Rapid growth of physical capital could thus have been the result of industrial policy applied to selected sectors, and the rapid accumulation of human capital as well may have been a rational response to growing opportunities generated by the atmosphere of confidence and by increasing amounts of complementary physical capital. Such views could of course be correct; as noted in chapter 1, the high savings and investment rates have yet to be completely understood. There are many possible explanations, and as of now there is no generally accepted explanation of the extraordinary savings rates in the three countries, but it suffices to say that there is no convincing case linking industrial policies—as opposed to demographics, bequest motives, and a host of other hypothesized explanations—to the observed behavior (Deaton and Paxson 1994).

The experience in other countries calls into question whether either the high investment or savings rate is plausibly attributable to sectorally targeted policies as opposed to favorable macroeconomic policies. Many countries have attempted systematic import-substituting industrialization to foster growth. They, too, discriminated among sectors and in general pursued many policies that were very similar to those employed in Japan, Korea, and Taiwan. The major difference was the greater emphasis on exports in the Asian countries. Yet the types of protection afforded under import-replacing policies, particularly quantitative restrictions, reduced risk even more than did the industrial policy in the Asian countries, as it precluded any imports above the quotas: there was no possibility that sufficiently efficient foreign competitors could still compete with local firms despite the imposition of tariffs. Yet the import-substituting countries never approached the 30 percent or greater investment rate in Asia or experienced the rapid growth rates of capital shown in tables 4.3 and 4.4. Nor did overall higher education enrollments or those in science and engineering respond in the manner that they did in Japan, Korea, and Taiwan, perhaps because the growth of employment opportunities was much lower, as output was largely sold in slowly growing domestic markets.¹

1. Both Korea and Taiwan experienced considerable emigration of university graduates in the 1950s and 1960s. Only with the rapid growth of export-oriented industries and concomitant job opportunities did this stop and eventually reverse.

The phrase “Asian Miracle” in the World Bank’s volume (1993) was intended ironically, as most of the volume was devoted to cataloguing the readily explicable sources of growth. If there was any “miracle,” it resided in the incompletely explained rates of accumulation. Those hewing to a strongly positive view of industrial policy would then have to explain why no such miracle occurred in India or Latin America. In contrast to those who have argued that the high investment rates were due to industrial policy, Bhagwati (1999) argues that they were due to the public investment in infrastructure in the 1950s and 1960s that made future private investment profitable.² Once in place, this infrastructure facilitated growth, including that in export earnings, which were critical to the financing of imported equipment whose marginal social product exceeded its cost in international prices.

Although it is impossible to be certain that “atmospherics” have not been important and that neglecting their effects results in an underestimate of the impact of selective intervention, the fact that acceleration in investment in physical and human capital were not observed in other interventionist countries requires some suspension of the usual canons of evidence unless only the East Asian brand of industrial policy is conducive to such accumulation. Thus South Asian and Latin American countries that pursued interventionist policies had less than half the growth rate of education per worker in their periods of intensive import substitution (table 4.3). Moreover, these rates were lower even in the 1960–73 period, when they were moving into more capital- and technology-intensive sectors. In this period Korea and Taiwan were still not committed to a high-tech route, and students could not have been sure of the pay-offs to their newly acquired skills. Indeed, in the 1960s the high rates of tertiary enrollment in Korea and Taiwan were accompanied by significant brain drain, hardly suggestive of a policy-led shift in the demand for educated labor.

Another doubt often articulated, discussed in chapter 2, is that intervention generated significant externalities whose impact is not captured by the tests reported earlier that concentrate on individual sectors within manufacturing. This may indeed have been an achievement of industrial policy in the Asian countries, but the sector-specific evidence, admittedly for a later period in the case of Japan, such as the absence of correlation between incentives and the TFP growth rate, places the entire burden of demonstrating the benefits of policy on the existence of externalities (in the absence of an economywide impact on capital accumulation—which has not been substantiated). One cannot of course reject the possibility that externalities were generated. But given the evidence from detailed sectoral analysis, the argument that externalities had significant beneficial

2. In this he differs from Rodrik (1995), who ascribes the investment boom to a response to investment subsidies in the 1960s and 1970s.

effects on growth would require that any externalities offset the negative intersectoral effects of industrial policies, such as loans going to sectors with low TFP growth. The argument can be made that the entire manufacturing sector, and perhaps the entire economy, is the beneficiary of widely diffused external economies regardless of what occurs in individual sectors, a view espoused by early postwar advocates of industrialization. Such a flow of externalities should be reflected in manufacturing-wide or aggregate TFP measures. However, some of the TFP growth that did occur in individual sectors was explicable by conventional explanations that were not related to externalities, such as learning-by-doing at the firm level and the importation of foreign technology that firms undertake without government prodding.³ As noted in appendix 2.2, rapid export growth may have accelerated both of these phenomena, but such growth could have been generated by general rather than selective export promotion.

If extensive government intervention generates benefits external to the promoted sectors,⁴ then it should show up in high rates of TFP growth for the entire manufacturing sector—and perhaps for the entire economy, assuming that manufacturing confers externalities on the agriculture, construction, and service sectors. However, such gains should have been manifested in all economies that undertook industrial promotion, not simply the Asian countries. Yet the evidence shows that in India, for example, almost every one of the two-digit manufacturing sectors experienced negative TFP growth in the period from 1960 to 1980 (Ahluwalia 1985), suggesting that there was no significant effect from cross-sector externalities, and the economywide TFP growth rate was close to zero.⁵ Many Latin American countries experienced similarly dismal performance, though not in the 1960s. In the cases of Korea and Taiwan, nationwide TFP growth was not usually absolutely high in any period, being only slightly above the OECD values for most of the subperiods shown in table 4.3.⁶ And surprisingly, in the period 1960–73, when it might be argued that in Korea and Taiwan industrial policy may have had its major benefit, their TFP growth rates were at or below those in the OECD countries.

3. On the role of foreign technology in Taiwan's development, see Pack (2001b). More generally, on the interest in obtaining new technology, see Hobday (1995) and Kim (1997).

4. The evidence presented in chapter 2 on input-output linkages indicates that such external benefits would have to stem not from intersectoral purchases of inputs, and most likely not from movement of workers, but from general "atmospherics."

5. Of course intrasector performance could have been still worse, and externalities may have raised TFP growth rates from -2.0 to -1.5 , but this is presumably not what advocates of industrial policy have in mind.

6. Using comparable methods for each period to avoid any biases inherent in the calculations, Collins and Bosworth (1996) calculated the TFP growth rates and output per worker growth rates for Korea and Taiwan for several periods.

However, it is possible that these calculations of aggregate TFP growth across countries understate its true rate (Nelson and Pack 1999), and thus measures of TFP *levels* may be useful.⁷ In 1975, at the end of the initial spurt of industrialization, the average TFP level in Korean manufacturing relative to that in the United States was 0.18 (Pilat 1994).

Can this evidence be reconciled with the conjecture that in the earliest stage of development, say, 1960 to the early 1970s, industrial policy helped initiate Korean or Taiwanese growth (Pack and Westphal 1986)? Growth in output per worker is a function of the growth rate of TFP and of the growth rate of the ratio of capital to labor. As shown in table 4.3, in the critical period 1960–73, TFP growth rates accounted for a substantially lower share of growth in output per worker than did growth in capital per worker. The TFP growth rates were below those in the OECD countries despite the very large absolute gap with respect to this group and the possibilities for narrowing it.⁸ An interpretation favorable to the impact of industrial policy is that it was successful insofar as the investment ratio and TFP growth rates did not fall in the face of extraordinary rates of capital accumulation (see tables 4.3 and 4.4). The capital stock growth rates were double or triple those of other countries, even Germany, yet TFP growth remained positive. The metric of achievement is then the ability to stave off rapidly diminishing returns to capital that would have brought the accumulation process to a halt. Especially in the earlier years, through the mid-1970s, the various governments were successful in avoiding major unprofitable investments and in avoiding the scale of corruption that undermined the productivity of investment in other developing countries.

Moreover, the allocation of capital that occurred could not have been particularly misguided, as even the most pessimistic assessment of TFP growth finds it to have been positive. In Korea and Taiwan in the 1960s and early 1970s, TFP growth was impressive especially given that they were still very poor countries, recovering from enormous political and economic dislocation in the preceding decades. From this perspective, the success of selective intervention can be measured as the positive TFP growth rates achieved by initially poor countries that were absorbing extraordinary increases in productive factors. The productive absorption of enormous increases in capital presumably could have been achieved by generally responsible macroeconomic and banking regulation without a detailed industrial policy. But if one takes this view, the role of industrial

7. In terms of equations (3) and (4) in appendix 2.1, either m or σ could vary among countries, although reasons for such intercountry variation are not immediately obvious.

8. All of these calculations are subject to the caveats noted in appendix 2.1 about the underlying elasticity of substitution and the bias of technical change. However, there is no reason to believe that the values of these variables differed systematically across countries, thus the ranking of TFP across countries is unlikely to be affected though the absolute levels may not be correctly calculated.

policy, in part, would be that it substituted for the absence, at this early juncture, of the regulatory institutions that come with greater economic development.⁹ Similar arguments might be made for Japan for the period between 1945 and the Korean War boom.

There are, however, many equally plausible alternative explanations that could account for the avoidance of diminishing returns to capital. Nelson and Phelps (1966) and Schultz (1975) argue that education has a high payoff only if there is an inflow of new technology. The typical example would be that greater education would not generate much increase in productivity for a sewing machine operative using a simple sewing machine. In contrast, if workers and managers are called upon to utilize new machine tools or new intermediate goods, such as new metal alloys, those with more education are likely to learn to utilize these inputs more effectively. This view of the determinants of productivity growth suggest an important potential interaction that almost certainly took place in Japan, Korea, and Taiwan. The growth in capital spending financed considerable growth in imported capital goods and intermediate products. These imports had an immediate effect insofar as they embodied new technology (Pack 1992b, 2001b).¹⁰ They also led to a higher marginal productivity of recent investment in education. Thus the interaction of education and new inputs is likely to have been a critical component in forestalling a decline in capital's marginal product. Not only was education growing more rapidly than in South Asia, Latin America, and other large developing countries (see figure 2.3 and table 4.3), but the education also had a much greater productivity because of the inflow of new technology, a phenomenon that could not occur in the import-substituting countries of the other regions given their inward orientation. The increasing education levels were not a result of industrial policy: as can be seen in table 2.1, Japanese and Korean human capital in the mid-1950s was already high relative to their per capita income.

Another characteristic that contributed to the high marginal product of capital, especially in Korea and Taiwan, was the considerable flexibility of labor and the efforts of firms to improve their productivity once the easiest parts of labor-intensive growth had occurred (Fields 1984). Labor flexibility implied that workers moved without impediment to expanding areas rather than try to maintain their positions within sectors that were coming under increasing competitive pressure. In Taiwan, for example, workers moved to sectors in which the skills obtained in their previous

9. Stiglitz (1994) has argued that it was precisely the absence of such institutions that undercut many of the market reforms introduced in postcommunist societies in Eastern Europe.

10. Bhagwati (2000) also emphasizes the importance of the inflow of new producers' goods and its effective use by the highly educated labor force. The productivity-raising effects of a greater range of inputs has been stressed in the endogenous growth literature, for example, Grossman and Helpman (1991) and Rivera-Batiz and Romer (1991).

industry of employment were relevant as measured by the input-output coefficient between the sector of previous employment and that of new employment (Pack and Paxson 1999). Such fluidity would improve the productivity of capital invested in these sectors, as the complementary labor was of a higher quality. The absence in much of the period of either union- or government-imposed rules was critical to this pattern.

An additional explanation of the difference in performance points to the more competitive atmosphere that resulted from the reliance on exports as a measure of performance or from the practice of competitive “tournaments” in Japan (World Bank 1993).¹¹ In addition, a critical difference was the relative openness of the Asian countries to disembodied technology imports obtained through technology licenses, whereas the Latin American countries and India were both restrictive, fearing monopolistic pricing and excessive foreign exchange costs. And, again, given the highly educated labor force, this inflow of technology was used effectively. While it is well documented that the Japanese government achieved better terms for firms that imported technology, the absolute cost savings relative to the enormous productivity of such technology was necessarily tiny.¹²

It is possible that for the initial phases of industrialization in Korea and Taiwan, government efforts had a significant role, as suggested by Pack and Westphal (1986) as well as by other authors. Unfortunately, it has not been possible to confirm this interpretation empirically except in the cases of a few specific sectors for the period in question. As we have shown, the evidence on the benefits of industrial policy for later periods has been generally negative. These empirical findings do not preclude the possibility that for some firms and subsectors government intervention had positive effects. POSCO, a government-owned steel plant initiated by the Korean government because of imperfections in the capital market and now among the most efficient in the world, is often cited. On the other hand, even this view is now in question; for example, Little (1994) calculates that its rate of return on equity capital has been a paltry 2 percent. Today, from the perspective of four decades of growth, it is very difficult to support the view that industrial policy was the decisive source of growth after the initial spurt—and the initial spurt itself may simply have reflected the exploitation of comparative advantage in the labor-intensive sectors of newly liberalized economies. Industrial policy was merely a secondary boost to this evolution.

Suppose a policymaker is still not convinced by the evidence we have marshaled to suggest that industrial policy had a limited effect on growth and maintains that something that cannot be measured conventionally oc-

11. The monitoring role provided by exports was first articulated by Jones and SaKong (1980).

12. For figures and a description of Japanese technology licensing activities, see Nagaoka (1989).

curred in the three nations that was attributable to its industrial policy. Would this constitute a justification for a very poor nation to embark on such a program? Obviously we would recommend caution. First, the policies deployed were exceptionally complex and were implemented in the Asian countries under conditions of political stability by highly competent bureaucracies. Attempts to emulate their experiences in the absence of these political precursors could easily result in counterproductive interventions and corruption. Second, a proper evaluation must include the second-round effects that may have manifested themselves, at least partly, in the financial crisis, particularly in Korea in the late 1990s and in Japan since 1990. Third, the external environment is modestly less hospitable than it was a generation ago. The WTO's tightened rules and the greater willingness of developed countries to use its strengthened dispute settlement process in the post-Cold War world make it somewhat more difficult to employ some of the instruments used by the three early starters. Fourth, there were alternatives to the government's "picking winners," as the experiences of both Hong Kong and Singapore show.

Final Thoughts

A large part of the "Asian Miracle" was attributable to nonmiraculous good macroeconomic policy, including limited government deficits, low rates of inflation, and very stable real exchange rates. These were conducive to high rates of saving and investment, important components of the growth story. Another component was the Asian countries' slight bias toward exporting, which may have generated some benefits that would not have accrued from domestic sales (Pack 1997).

The path of Japan, Korea, and Taiwan is more likely to generate "growth with equity" as capital is accumulated, and less likely to run into problems with allocating natural-resource-derived rents. The politics of industrial policy are likely to be less contentious, and since they are implemented in the manufacturing sector, they are more likely to be "leaning with the wind" of comparative advantage. In any event, the strategy may be irreproducible: some of the subsidies carried out by the Asians in the past can no longer be pursued as openly. The end of the Cold War and the concomitant willingness of the United States and other major trading powers to assert their economic interests, together with the existence of a stronger subsidies code and dispute settlement in the WTO, foreclose some, though not all, of the options that existed in the past.

Countries that have experienced slower growth than expected despite relatively good macroeconomic policies may be tempted to pursue industrial policies. The large number of experiments with import-substituting industrialization suggests this strategy has not been very successful. The Asian experience, especially in Korea and Taiwan, provides some guide-

lines to avoiding some of the potential harmful consequences if industrial policy is nevertheless pursued. Yet even in these successful nations, the evidence suggests that the benefits were limited. Countries with less dedicated and less competent bureaucracies and policymaking apparatuses that are more amenable to lobbying pressures could expect even smaller net benefits.

While it is understandable that countries that have gotten the basics right are impatient that growth has not accelerated, it is nevertheless particularly problematic to identify broad sectors of growth, let alone specific ones. The difficulty of demonstrating that the major source of either manufacturing or aggregate economic growth was sectorally targeted industrial policies is not equivalent to denying the importance of a significant government role other than macroeconomic management in stimulating economic growth. Growth-enhancing measures in the Asian countries, which did not differentiate among sectors, included large expenditures on primary and secondary education, the building of large and efficient social infrastructure, a favorable attitude toward international technology transfer, including both technology licensing and direct foreign investment, and a substantial investment in public technology institutions. Governments seeking a more active role in accelerating growth should consider these policies rather than selective industrial policies.