

Larry E. Westphal

Fostering Technological Mastery by Means of Selective Infant-Industry Protection

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Chapter 12

Fostering Technological Mastery by Means of Selective Infant-Industry Protection

Larry E. Westphal

I. INTRODUCTION

A number of cross-country comparative research studies on the relationship of trade policy to industrialization have been completed over the past decade. Although there are important differences of detail in the conclusions reached, the various syntheses of this research all agree on one central conclusion: greater uniformity of incentives across activities and higher levels of export achievement—individually and in combination—are associated with improved industrial performance as measured by the growth of manufacturing output expressed in either domestic or world prices.¹ This conclusion is often interpreted in the following terms: though modest levels of promotional incentives to infant industries may be in

¹ See, for example, Little *et al.* (1970), Balassa and associates (1971), Bhagwati and Krueger (1973), Balassa (1978), Bhagwati (1978), Krueger (1978), Bhagwati and Srinivasan (1978), and Krueger (1980).

order, the closer the policy regime is to free trade, the better the industrial performance is because a free-trade regime necessarily means uniformity of incentives vis-à-vis trading opportunities and empirically appears to assure the requisite high levels of export achievement.

The foregoing interpretation admits of the possibility that the "optimal" policy regime may depart significantly from free trade in the treatment of some industries because it does recognize the possible need for measures to promote the development of infant industries. But there has been very little empirical research focused on issues directly relevant to the promotion of infant industries. To my knowledge, none of the underlying country studies [including Westphal and Kim (1982)] traced the evolution of particular infant industries over time to see what lessons might be drawn, nor do any of the syntheses provide an empirically grounded discussion of appropriate means and levels of infant-industry promotion. The central question concerning infant-industry promotion thus remains largely unanswered. The question is, "Under different measures that could be used to promote the development of infant industries, what are the benefits, what are the costs, and do the former exceed the latter?" Obviously, infant-industry promotion is warranted only if its benefits exceed its costs, and the promotional measure that should be used—if any should—is that which yields the greatest excess of benefits over costs.

An *infant industry* is any newly established type of activity for which the economy's existing endowment of skills and human capital does not provide immediate technological mastery. *Technological mastery* consists in command over technological knowledge as manifested in the ability to use it effectively. The costs of infant-industry development are thus the costs of acquiring technological mastery, and the benefits are those associated with the attainment of increased technological mastery. The question of whether infant industries ought to be given promotional incentives turns on whether there would otherwise be adequate incentives for the acquisition of increased technological mastery, which in turn depends on whether individual producers realize all of the socially relevant costs and benefits of their own technological effort and whether they evaluate costs and benefits in a manner consistent with social objectives.

It is not possible to make a quantitative assessment of the need for—or, more generally, of the merits of—infant-industry promotion without empirical evidence concerning costs and benefits. But, even were such evidence available, it would not be conclusive. To assess the need for promotion requires knowledge of what would happen (or, for an *ex post* assessment, of what would have happened) under various alternatives with regard to the provision of promotional incentives. Such knowledge comes only in the form of predictions that cannot be verified directly, except per-

haps in the case pertaining to the alternative actually followed. In any event, because they require the comparison of alternatives, at least one of which is counterfactual, estimates of costs and benefits are of uncertain reliability. Thus there may always be legitimate disagreement about the need for infant-industry promotion, but the scope for disagreement is, at present, magnified by the lack of empirical evidence.

The remainder of this chapter reviews the evidence that does exist, for the purpose of framing some hypotheses about policies to promote infant industries. The evidence with which I am concerned is of two types. First, as a result of recent research on technological change in developing countries, there is considerable information about the nature of the costs and benefits of infant-industry development, together with a tentative indication of the magnitude of the costs. Second, the recently completed cross-country comparative research gives a basis for stating some tentative lessons about the promotion of infant industries by means of trade policies. These lessons concern both the merits of protecting infant industries from imports and the efficacy of fostering infant-industry exports. To give the lessons substance, they will be illustrated by the experience of the Republic of Korea, the developing country I am most familiar with.

II. THE NATURE OF INFANT-INDUSTRY COSTS AND BENEFITS

As just indicated, infant-industry costs are the costs of acquiring technological mastery in newly established activities. The benefits are increases in the productivity with which the economy's resources are employed as a result of technological changes brought about by applying the newly acquired technological mastery. It is often thought that the costs are small, on the grounds that infant industries are typically established through transfers of production technology from abroad. But the costs of acquiring technological mastery include more than the price that is paid for imported technology. They also include what is needed in order to assimilate the technology.

The extent of indigenous effort involved in the assimilation of technology has only recently begun to be appreciated, as case studies have been undertaken of technological changes that have occurred within firms in newly established industries. These case studies have shown that "manufacturing technology is characterized by a considerable element of tacitness, difficulties in imitation and teaching, and uncertainty regarding what modifications will work and what will not" (Nelson 1979, p. 18). That is, important elements of the technology appropriate to a particular situation

can be acquired only through effort to adapt existing technological knowledge to that situation. To bring any venture to fruition—in particular, to establish a new production activity—requires a great deal of iterative problem solving and experimentation as the original concept is refined and given practical expression, and this sequential process lasts for as long as changes continue to be made in the operation of the venture. Research at the firm level has demonstrated that this process can continue indefinitely, that it is central to the acquisition of technological mastery, and that it produces technological changes that greatly increase productivity.

Dahlman and Fonseca (1978), for example, examined the technological history of an integrated Brazilian steel producer whose first plant was established under the equivalent of a turnkey contract. In order to increase the plant's production capacity, the firm gradually built up its technological mastery through a carefully managed process of selectively importing technical assistance where needed to supplement its own engineering efforts. As a result, the plant's capacity was more than doubled from its initial nominal rating through a sequence of capacity-stretching technological changes, which took place over seven years. Because these changes required very little additional capital investment and no additions to the work force, they more than doubled the plant's total factor productivity. Moreover, the acquisition of the increased technological mastery initiated by this process eventually enabled the firm to design and execute further additions to its capacity and to sell technical assistance to other steel producers, principally in Brazil, but elsewhere in Latin America as well.

More generally, firms have been found to undertake substantial technological effort in order to achieve a wide variety of technological changes.² These changes include stretching capacity through various adaptations (as in the example just cited), breaking bottlenecks in particular processes, improving the use of by-products, extending the life of equipment, making accommodations to changes in raw material sources, and altering the product mix. Some of the firms studied appear to have followed explicit technological strategies aimed at specific long-term objectives; others seem merely to have reacted defensively to changes in their circumstances or to obvious needs to adapt imported technology. In turn, some of the firms have undertaken no appreciable technological ef-

² The largest block of firm-level research has been carried out under the auspices of the Regional Program of Studies on Scientific and Technical Development in Latin America, jointly sponsored by the Inter-American Development Bank, the United Nations Economic Commission for Latin America, and the United Nations Development Program. For a review of this research, see Katz (1978) and Chapter 13.

fort and so have experienced no technological change.³ There have not yet been a sufficient number of case studies to generalize about the determinants of the extent and direction of technological effort by individual firms, though it is apparent that economic forces have an impact, as do characteristics peculiar to individual firms and types of technology.

Most of the technological changes uncovered in this research may be characterized as minor, in the sense that they do not create radically new technologies but rather adapt existing ones. Nonetheless, as shown by the example of the Brazilian steel plant, a sequence of minor technological changes can have a pronounced cumulative effect on productivity. In fact, judged in terms of their impact on the productivity with which the economy's resources are employed, the cumulative sequence of technological changes that has been observed to follow the establishment of a new activity may be more important than the initial establishment of the activity. This possibility has not been explored, as far as I know, but it is consistent with what has been learned about the process of technological change in the industrialized countries.

Studies of major technological changes in these countries have found it useful to distinguish between what Enos (1962) refers to as the *alpha* and *beta* stages. The former includes all of the effort leading to and including the introduction of a radically new technology. The latter covers all of the subsequent minor technological changes undertaken to modify and adapt it. In his own analysis of the development and diffusion of six new petrochemical processes between 1913 and 1943, Enos found that the cumulative reduction in production cost per unit achieved during the beta stage was greater than the initial reduction obtained in the alpha stage. Studies of other major technological changes show them to have followed the same pattern: the economic impact of replacing the old technology by the new is generally less than the cumulative impact of the gradual improvements made after its introduction.

The assimilation of a new technology imported from abroad is a major technological change from the standpoint of a developing economy. The initial transfer is parallel to Enos's alpha stage. The comparable beta stage is the subsequent, gradual improvement in the productivity with which the technology is used. But the significance of the beta stage in assimilating a technology transfer appears to be far greater than is suggested by the analogy. To introduce a radically new technology into the world requires mastery of that technology; in contrast, to import a technology does not require complete mastery of it, certainly not at the outset. Indeed, the

³ For an example and a highly illuminating discussion of why technological effort is not automatically or necessarily undertaken, see Bell *et al.* (1980).

case study research suggests that it is in the beta stage that most of the increase in technological mastery is achieved.

Part of the impact of that increase is reflected in higher productivity using the particular technology, but much of the impact spills over into related activities. For example, the mastery gained in assimilating one technology enables greater indigenous participation in subsequent transfers of related technologies, thereby increasing the effectiveness with which they are assimilated. In more general terms, increased mastery gained through experience with previously introduced technologies contributes to an economy's capacity to undertake independent technological efforts, which may be to replicate or adapt foreign technologies or to create new technologies. Further evidence of the achievement of technological mastery in a number of semiindustrial countries is found in the fact that they are exporting technology to other developing countries, and doing so on an increasingly expanded scale (Lall, 1980).

To summarize the preceding discussion: A number of firms in developing countries have been found to engage in a purposive technological effort to increase productivity and accommodate changing circumstances, an effort that typically takes place in the context of day-to-day operations outside that of formal research and development. Such effort appears to be a primary means of acquiring technological mastery and is the principal reflection of its acquisition. Moreover, such effort has been found to produce large increases in productivity, which translate into substantial reductions in domestic resource costs vis-à-vis foreign-exchange savings (or earnings).⁴ Judging from various case studies in addition to that of the Brazilian steel producer previously cited, it may not be exceptional for the unit domestic resource cost of production in a particular type of activity to fall at an annual rate of around 10% during the first five to ten years of production.

Insofar as the cost of infant-industry development is the cost of providing experience needed to gain technological mastery, it is reflected in reductions over time in the unit domestic resource cost of production. In addition to providing valuable insights into how technological mastery is achieved in relation to processes of technological change, the research on technological change at the firm level in developing countries implies that

⁴ Domestic resource cost per unit of foreign-exchange savings (or earnings) is the appropriate indicator of changes in productivity. Properly measured, it incorporates changes in the use per unit of output of all inputs. In order to determine foreign-exchange savings (or earnings) in net terms, both output and internationally traded inputs are valued at border prices. Factor and other nontraded inputs are valued at shadow prices, which properly reflect relative scarcities. For a lucid exposition of the domestic resource cost indicator, see Bruno (1972).

this cost can be quite high, to the extent that unit domestic resource costs of production may initially be more than twice what can be achieved on the basis of less than a decade of experience. But this research clearly cannot be taken to mean that experience *necessarily* leads to greater technological mastery and hence to increased productivity. Whether experience produces these results depends crucially on the extent and character of directed effort to capitalize upon it by undertaking technological changes, and such effort is by no means automatically forthcoming. Nor should this research be considered to suggest that all infant industries must depend equally on internal experience to gain technological mastery or that all infant industries initially realize levels of productivity that are equally low relative to what can be attained over time.

Infant industries can obtain technological mastery by means other than their own internal experience. Most importantly, mastery acquired in relation to one type of activity can—to varying degrees, depending on the similarity of the underlying technologies—be applied in relation to other types of activities. Thus, as indicated earlier, preceding generations of infant industries provide benefits to succeeding generations by augmenting the economy's technological mastery. The use of existing technological mastery by an infant industry reduces the cost of its development by raising the level of productivity with which it starts. Indeed, the use of know-how derived from previous experience in closely related types of activity sometimes provides immediate technological mastery, making the newly established activity internationally competitive at its inception.

Infant industries can also benefit from foreign technological mastery. But the important lesson from research on technological change at the firm level, as from other research more directly focused on international transfers of technology, is that technological mastery cannot be achieved through the passive reception of technology imports.⁵ As stated previously, the capacity to use technology effectively results from the effort that is associated with the assimilation of technological knowledge. Although transfers of technology can assist the process of assimilation, they cannot wholly substitute for it. Nonetheless, through direct foreign investment, infant industries can be developed solely on the basis of foreign technological mastery; domestic assimilation of the technology can then proceed over time by gradually increasing the involvement of local manpower in various aspects of the industry's operation. However, it is an open question whether direct foreign investment provides a generally applicable means of greatly minimizing or even avoiding the costs of infant-

⁵ For further discussion, see Stewart (1979) or Dahlman and Westphal (1981).

industry development. Case studies of firms created with direct foreign investment have uncovered increases in productivity equally as large as those found in domestic firms. In fact, the Brazilian steel producer discussed previously started as a joint venture involving Japanese interests.

To conclude: There clearly is no basis for expecting the costs of infant-industry development to be the same irrespective of the type of activity,⁶ the industrial base that exists at the time of its inception, or the manner in which it is established. The case study research that was just summarized can thus be used only to infer that infant-industry costs may sometimes be quite high. The inference is unfortunately weakened by the fact that none of the case study research with which I am familiar makes clear whether the observed increases in productivity led to international competitiveness or to something more or less than "best practice" levels of productivity. Thus, none of this research has attempted to quantify infant-industry costs directly in terms of the implied level of promotional incentives.

Nevertheless, the research does suggest that, even for an "efficient" infant industry, the domestic resource cost of production—evaluated at prices that properly reflect relative scarcities—might initially be as much as twice the value of the foreign exchange saved (or earned), with up to a decade being required to bring costs down to competitive levels. Assuming that production subsidies are used, the implied starting rate of subsidy in relation to value added is as much as 50%. Alternatively, assuming that protection is the instrument of infant-industry promotion, the rate of effective protection implied at the start of production is as much as 100%.⁷ These rates greatly exceed those that are either explicit or implicit in the policy advice derived from the syntheses of cross-country comparative research cited previously.

III. CONVENTIONAL PRESCRIPTIONS VERSUS ACTUAL PRACTICE

Conventional prescriptions about promotional incentives for infant industries concern both the measures to be used and the appropriate magnitude of the incentives. In regard to choosing among measures, there are well-known theoretical arguments against using protection to promote infant industries. Baldwin (1969) provides a particularly compelling state-

⁶ Because it appears obvious, I do not seek to rationalize the point that the costs of gaining technological mastery are unlikely to be equal for different technologies.

⁷ Throughout this chapter, reference is to the rate of effective protection after downward adjustment to remove the effect of currency overvaluation, i.e., to the so-called net rate [see Balassa and associates (1971, pp. 324 ff)].

ment of the theoretical case, by first indicating that the problems of infant industries are not necessarily peculiar to them alone and then demonstrating that protection may easily fail—where “more direct and selective policy measures” would succeed—either to offset these problems or to induce the appropriate behavior.

In fact, many governments do employ direct and selective policy measures to promote infant industries, though the policies appear frequently not to be “first best:” preferred access to credit on preferred terms may be interpreted as a means of overcoming imperfections in capital markets and differences in private and social evaluations of risk; use of public enterprises or the sanctioning of cartels or monopolies, as a means of ensuring that the returns from technological effort are appropriable; industrial planning that includes such things as project identification and preliminary feasibility studies, as a means of subsidizing the acquisition of initial technological information; sharing in the costs of labor training and “research and development,” as a means of promoting the direct outlays necessary to achieve socially “optimal” levels of knowledge and training; etc.

Nonetheless, nearly all of the same governments also protect their infant industries against imports. And, whether for practical reasons or otherwise, a number of economists have strongly argued in favor of some degree of infant-industry protection. Balassa (1975), for example, gives a particularly detailed and complete set of policy prescriptions derived from the cross-country comparative research. He argues for modest levels of infant-industry protection and, thus, advocates a two-tier system of protection: uniform effective protection at no more than 10–15% (p. 375) for all manufacturing activities other than infant industries for which “exceptional cases aside, it does not appear likely that rates of effective protection more than double those for mature industries would be warranted on infant industry grounds” (p. 376).⁸ In addition, protection to individual infant industries should be temporary, according to a preannounced schedule that declines to the level of the first tier over a period of, say, five to eight years.

In another paper also concerned with deriving policy implications from the empirical evidence, Balassa (1978, p. 50) further argues against “differential [or, deliberately discriminatory] treatment to particular manufacturing industries,” and states that exceptions from the two-tier system “should be made only in cases when it is well established that an industry generates substantially greater (lesser) external economies than

⁸ Reference here is to “potential” effective protection rates; “realized” rates may, of course, be less in some activities and to that degree need not be uniform.

the average" and "in the form of direct measures [e.g., direct subsidization of research and development] rather than higher rates of protection." As do many other researchers in the field, Balassa (1978, p. 50) bases his argument again on "tailor-made" [or, "made-to-measure," in Corden's (1980) terminology] protection on "ignorance as regards interindustry differences in social benefits."

But, not only do most governments protect their infant industries, many appear to rely on protection as the principal instrument of promotion by granting infant industries effective protection at rates well in excess of 20 to 30%. Included among the latter are the governments of some of the most successfully industrializing countries. The effects of initially giving much higher protection to infant industries have by no means always been inimical to successful industrialization. I have not tried to document this observation formally with the care and precision needed, but I am quite certain that it can be supported by the historical experience of at least several countries. For example, the Republic of Korea (or South Korea; hereafter referred to simply as Korea), widely touted for its outward-looking strategy, appears to have used quite high initial rates of infant-industry protection with successful results—success here being indicated by the rapid achievement of international competitiveness by a number of the industries that have been so promoted.⁹ High starting levels of protection have also been associated with the successful development of various infant industries in other semiindustrial economies, in Latin America and elsewhere. (It should not go unnoticed that the indicator of success that is being used here is far removed from even a crude assessment of net benefits, but it is the only readily available indicator.)

Additionally, some countries—for example, Korea—appear to have fostered the rapid achievement of international competitiveness by infant industries that, on deliberately discriminatory grounds, were initially granted whatever levels of effective protection were required to secure an adequate market for their output as well as a satisfactory rate of return on investment. (In Korea, "tailor-made" infant-industry protection has typically been afforded via quantitative restrictions on imports, with starting levels of effective protection of as much as 100%.) This obviously does not necessarily imply that differential treatment and high levels of protection are the "optimal" means to promote infant industries; but, signifi-

⁹ Evidence of the use of infant-industry protection in Korea is given in Westphal and Kim (1982), which is summarized in Westphal (1978). In turn, there is a variety of circumstantial evidence of its successful results, some of which is given in these papers, albeit not in a form that makes the case as directly as it might be made. Definitive evidence in this regard may be forthcoming from ongoing research by two of my World Bank colleagues, Garry Pursell and Yung W. Rhee, who are engaged in an exhaustive analysis of Korea's export performance.

cantly, it does imply that differential treatment and high levels of protection may effectively be used to promote infant industries.

It is not my purpose to inquire why most governments appear to favor protection as the principal instrument of infant-industry promotion or to argue that they are correct in this respect. Instead, I simply want to establish that infant-industry protection can "work" in the sense of fostering the rapid achievement of internationally competitive levels of productivity. This is admittedly a weak conclusion, for it does not even follow that the benefits of infant-industry protection necessarily exceed the costs in those cases where protection works. Moreover, infant-industry protection has not always worked. As will be shown later, the cross-country comparative research provides a possible explanation for this. And, for governments that choose to rely on protection as the principal instrument of infant-industry promotion, this research also suggests how the conventional prescriptions can be reformulated to take account of the possible need for very high initial rates of effective protection. The reformulation leaves intact the most important element of the two-tier system of protection advocated by Balassa, though it does prescribe highly selective differential treatment to infant industries chosen on deliberately discriminatory grounds.

IV. REFORMULATION OF THE PRESCRIPTION FOR INFANT INDUSTRIES

Hereafter I shall be concerned with the question: How should protection be applied if it is to be the principal instrument of infant-industry promotion? The rest of the chapter thus assumes that protection is the chosen instrument. In addition, following from the previous discussion of the costs of infant-industry development, it will be assumed that the costs of acquiring technological mastery are sometimes sufficiently great to require effective protection at rates close to 100% in order initially to ensure adequate infant-industry incentives. Do these assumptions imply that all or a very large subset of the not-yet-established potential infant industries should simultaneously be given effective protection at such high rates?

The results of the cross-country comparative research clearly indicate that the answer is no. The countries that have followed this approach are those that have opted for an inward-looking strategy of extensive import substitution. These countries by and large have experienced considerably poorer industrial performance than those that have pursued a more outward-looking strategy involving greater selectivity in import substitution and more attention to the promotion of export growth. Nonetheless, as

previously indicated, some of the latter countries—certainly Korea—have used the same means to promote selectively chosen infant industries as have been used on a more wholesale basis by the former countries.

The comparative evidence does not definitively establish that the promotion of fewer infant industries at a time results in the more rapid achievement of international competitiveness. Nor does it demonstrate that faster achievement of international competitiveness by infant industries is largely responsible for superior industrial performance. Other elements associated with the difference between inward- and outward-looking orientations are almost certainly of greater importance. To cite but one such element: in company with many other commentators, Díaz Alejandro (1975) maintains that the debilitating effects of the "stop-go" macroeconomic policies stemming from poor overall export achievement are among the most important factors in explaining the relatively poor performance that seems to attend an inward-looking orientation. But, regardless of its relative contribution, accelerated productivity improvement in infant industries should, in virtually all plausible circumstances, lead to faster-paced industrial growth overall.

Thus the real question is whether greater selectivity (i.e., the promotion of fewer infant industries at a time) results in infant industries that either immediately upon their establishment are more efficient or after their establishment experience more rapid gains in efficiency, efficiency being judged by comparing domestic resource costs with foreign-exchange savings (or earnings) at prices that properly reflect relative scarcities. In view of the paucity of empirical evidence having a bearing on this question, it delimits a priority area for further research, though various arguments can be made to suggest why the number of infant industries simultaneously being promoted ought to affect the speed with which efficient production is reached. For example, greater selectivity in import substitution undoubtedly accompanies the delay in construction of initial plants until the market has grown to an appropriate size; it permits scarce investment resources to be concentrated in one or a few sectors at a time and thereby enables greater exploitation of economies of scale and of the linkages among closely interrelated activities. Greater selectivity equally allows the concentration of scarce entrepreneurial resources and technical talent and thereby avoids spreading the agents of technological change so thinly that no industry has the critical mass that may be necessary to initiate a sustained process of efficiency improvement through the acquisition of technological mastery. These arguments imply that the warranted degree of selectivity depends on "initial conditions" within a particular country, including the overall size of its economy and the availability of high-level manpower of various types.

To summarize: absolute protection to infant industries appears to offer a viable means of fostering rapid industrial development, but only if a relatively small number of infant industries are promoted at any one time. "Absolute" protection here means whatever is necessary to secure an adequate market for the industry's output as well as a satisfactory rate of return on investment. Absolute protection reflects the efficiency of the industry; thus, the level of absolute protection is something that can only be determined "endogenously," for example, by basing protection on import quotas (but see the qualification regarding sales for use in the production of exports that appears in Section VI). As regards the precise number of infant industries that it is warranted to promote simultaneously, not much can be said without further research.¹⁰

V. THE EVIDENCE RECONSIDERED

Absolute, selective infant-industry protection is consistent with low and uniform effective incentives to all other industrial activities.¹¹ Indeed, the cross-country comparative evidence indicates that applying low, uniform effective incentives to activities that are not being selectively promoted is critically important, because it both avoids capricious discrimination among these activities and benefits export activity. All syntheses of the evidence agree on this fundamental point, as they also concur on the importance of incorporating other incentive measures together with protection in evaluating an industrial policy regime and of distinguishing between the two aspects of the structure of incentives. Of the latter, *industry-bias* refers to the variance of the structure as regards the degree to which differential incentives are given to different activities; *trade-bias*, to the overall effect of the structure as regards the encouragement given to import substitution (or domestic sales) vis-à-vis export activity.

Bhagwati and Srinivasan (1978), for instance, in seeking to answer why "the superior-export-performance countries do better compared with both their own earlier growth performance under restrictive trade regimes and other countries with inferior export performance" (p. 17), observe: "It would appear that the pattern of incentives, and hence of ex-

¹⁰ Observe that the level of aggregation at which industries are delineated matters a great deal in this regard.

¹¹ "Effective incentives" extends the effective protection concept to incorporate the impact of all incentive policy instruments, including such measures as cash subsidies, preferential interest rates, and direct tax reductions, in addition to protection and whatever other measures are actually employed in a given setting. A quantitative implementation of this concept is found in Balassa's (1971) measure of the effective subsidy rate.

port promotion, is less skewed [with respect to both trade- and industry-bias] in practice than the chaotic pattern of import-substituting incentives under the restrictive trade regimes" (p. 17); thus, "one could argue" that the more "neutral" incentives found under the liberalized trade regimes must provide some of the explanation for the greater efficiency of the industrialization process that is empirically associated with the export-promoting strategy (pp. 18-19). By stating the case in such cautious terms ("one could argue"), Bhagwati and Srinivasan apparently seek to distance themselves from those [including Westphal (1978)] who have in fact argued the case. But, even so, Bhagwati and Srinivasan in effect appear to accept its basic validity.

It would nonetheless be wrong to conclude that neutral incentives lead to superior performance, and not merely because industrial incentive policies provide only a part of the explanation for better performance. Equally important is that some degree of industry-bias is warranted on infant-industry grounds. In this respect, the selectivity with which infant industries are promoted appears to be of far greater consequence than the relative magnitude of the effective incentives initially granted to them. This result holds irrespective of the part played by protection in the provision of effective incentives. In turn, as previously indicated, absolute and selective protection to infant industries appears to have been effective in fostering the rapid achievement of international competitiveness in at least one (if not more) of the "superior-export-performance" countries. Correspondingly, the single most important policy prescription emanating from past cross-country comparative research on trade policy in relation to industrial strategy concerns, not the treatment of infant industries *per se*, but rather the efficacy of giving low, uniform effective incentives (hence protection also) to all industrial activities except a small number that are being promoted on infant-industry grounds.

This is a paradoxical conclusion. Countries that have followed a strategy of wholesale import substitution have undoubtedly done so, among other reasons, in the expectation that it offers the best means to promote the development of infant industries. Yet, by providing very high effective incentives to a large number of infant industries simultaneously (and indiscriminately), they have failed in effect to provide adequate incentives to any one infant industry relative to all other industrial activities, including the other infants. In fact, the degree of industry-bias in favor of any one infant industry in an inward-looking economy may well be far less than that in an outward-looking economy that has practiced greater selectivity in the promotion of infant industries and provided low, uniform effective incentives to activities that are not being selectively promoted.

Though further research is needed to confirm it, the result appears to be that the infant industries of the inward-looking economies are by and large retarded relative to those of the outward-looking economies. Consequently, simultaneous promotion of a large number of infant industries "from the start" does not necessarily lead over time to greater breadth and depth of industrialization; the sequenced, selective promotion of subsets of these industries may, over the same period of time (which need not be very long), nurture the same industries to greater efficiency.

VI. EXPORT PERFORMANCE

Low levels of effective incentives—in particular, low levels of effective protection to domestic sales—for activities other than those being selectively promoted are also required in order to avoid an antiexport trade-bias and thereby to ensure adequate export performance. Indeed, the improbability of there being adequate export performance if effective incentives discriminate against exports vis-à-vis domestic sales is perhaps the most robust finding from the cross-country comparative research.¹² Owing to the practical difficulty of subsidizing exports at high rates and the likelihood that large subsidies would in any event invite retaliation from overseas, provision of adequate effective incentives to exports relative to domestic sales precludes anything more than low nominal protection to the latter because export subsidies of one kind or another are required to offset whatever protection is given to domestic sales. Again, as a practical matter, satisfactory export performance has also been shown empirically to necessitate access at world prices for tradable inputs used in export production and zero or very low exchange-rate overvaluation, the latter to ensure that the prices of nontradable inputs are appropriate (Balassa, 1978).¹³

The only effective way to guarantee that exporters pay no more than world prices for tradable inputs, including those that they purchase from

¹² There is, of course, one exception: namely, an export tax is optimal for commodities facing less than infinitely elastic foreign demand. However, this exception does not apply in practice for the case of most manufactured exports, though the exercise of monopoly power is warranted for products subject to import restrictions overseas.

¹³ Unless there is justification for temporary additional incentives to enter new foreign markets, exports ideally should receive incentives equal to those given to domestic sales in relation to value added. However, implementation of the policies indicated here often has the effect of giving higher effective incentives to exports; production for domestic sale does not necessarily benefit from access to tradable inputs at world prices and may not be fully compensated for this by the nominal protection that it receives.

domestic producers, is to give them unrestricted access to and tariff exemptions on imported inputs (together with exemptions from indirect taxes on all inputs).¹⁴ Thus domestic producers of intermediate and capital goods should be denied any protection against imports that would be used in the production of exports.¹⁵ For all industries—including selectively promoted infant industries—protection should be given, if at all, for only that part of their output that is *not* sold for use in the manufacture of exports.¹⁶ To reflect this in the ensuing discussion, it is necessary to introduce several terms: *indirect exports* will denote that part of an industry's output that is sold for use in the manufacture of exports; *non-export-related sales* will denote an industry's total sales less its export-related sales, i.e., less its exports and its indirect exports.

Industries that have attained internationally competitive levels of productivity are responsible for the bulk of export-related sales under the "optimal" industrial incentive policy regime. The prescription that adequate effective incentives be provided to exports relative to domestic sales applies to these industries and is further implemented by providing low nominal protection to their non-export-related sales, something that, in principal, is easily accomplished (given the proper exchange rate) by virtue of their efficiency. In turn, it might be expected that giving absolute protection to non-export-related sales by selectively promoted infant industries would, in the absence of high offsetting subsidies, preclude their exporting, either directly or indirectly (i.e., by sales to exporters). However, certainly in Korea, this is not the case.

Infant industries in Korea begin exporting—both directly and indirectly—at a very early stage, often at once, notwithstanding that these sales do not receive subsidies sufficient to offset the absolute protection

¹⁴ Even with slight protection in the domestic market and low currency overvaluation, unrestricted access to and tariff exemptions on imported inputs lead to a bias in favor of using imported as opposed to domestically produced inputs in the production of exports. To offset this bias, the Korean government provides the full range of its export incentives to producers of inputs supplied to exporters.

¹⁵ Satisfactory export performance clearly requires that exporters be permitted to import capital goods without any restrictions, so that they are able to use the most appropriate production methods. However, this may not preclude levying modest tariff rates on such imports. In most industries, capital charges account for a small proportion of total production cost (particularly in comparison to intermediate input costs). Thus giving capital goods producers modest protection against imports of capital goods by export manufacturers would generally have only minor effects on the cost competitiveness of exports. Such protection may be justified by the unique role of capital goods production in acquiring technological mastery.

¹⁶ This is the qualification to the meaning of absolute protection to which I referred in the concluding paragraph of Section IV.

that is granted only to non-export-related sales.¹⁷ For infant industries in Korea (as elsewhere), effective incentives, including all of those measures for which quantification is possible, are far greater for non-export-related sales than for export-related sales. But many of these industries are either monopolized or operate as cartels, which implies that export-related sales may be explained in terms of discriminating monopoly.

The theory pertaining to discriminating monopoly indicates that non-competitive firms may find it profitable to sell some of their output at world prices even though these prices are less than the prices received for non-export-related sales.¹⁸ The theory states that a monopoly or cartel that sells the same product in several distinct markets will allocate its sales so as to equate marginal revenues across markets, one to another and to the marginal cost of production. As a result, there will be an inverse relation between the prices charged and the demand elasticities in the various markets. On the highly plausible assumption that the elasticity of demand for non-export-related sales is less than the elasticity of demand for export-related sales,¹⁹ the price in the protected segment of the domestic market will exceed the border prices for direct and indirect exports.²⁰ Thus, assuming that protection enables separating the market for non-export-related sales from the markets for export-related sales and that the separable costs of entering into export activity are negligible, a monopolized or cartelized industry that acts to maximize its total profits may reasonably be expected to engage in export-related sales up to the point where the marginal cost of production equals the marginal revenue from these sales and to adjust its production and non-export-related sales accordingly.

There is evidence that the Korean government has sanctioned non-competitive market structures in order to elicit export-related sales from infant industries.²¹ Moreover, the government has at its disposal several

¹⁷ Direct exports from selectively promoted infant industries never appear to have accounted for more than at most a quarter of Korea's manufactured exports. (Comparable information is not available with regard to indirect exports.)

¹⁸ For the application of this theory to international trade, see Corden (1967), Pursell and Snape (1973), White (1974), or Caves (1978).

¹⁹ Note that the "small-country assumption," under which the country is assumed to be a price-taker in international markets, implies that export demand is infinitely elastic. On this assumption, the derived demand for indirect exports is also, in essence, infinitely elastic.

²⁰ Border prices for direct and indirect exports are not equal; respectively, they are the FOB export price and the CIF import price.

²¹ The sheltering of non-export-related sales as a means of encouraging export-related sales has not gone unnoticed by other observers of the Korean scene; see, for example, Krueger (1978, Chapter 12).

policy instruments that, in combination, may be used to stimulate direct and indirect exports from noncompetitive infant industries. Chief among these is the export targeting system, which applies to both direct and indirect exports and under which indicative export targets are set jointly by the government and the various exporters' associations (virtually every industry of any consequence has an exporters' association). And subsidies to export-related sales sometimes appear to have been jointly negotiated simultaneously with export targets.²² But the government's leverage over these industries derives primarily from its control of the banking system and, thereby, of credit rationing. Preferential access to credit for financing of fixed investment as well as working capital has been a potent instrument in the promotion of new industrial activities.

VII. INFANT-INDUSTRY EXPORTS

I do not know for certain whether other governments similarly encourage infant industries to engage in export-related production; it is nonetheless pertinent to analyze the costs and benefits associated with infant-industry exports (here taken to include both direct and indirect exports), for there is evidence that export activity can tremendously hasten the process and greatly reduce the costs of achieving technological mastery. But before turning to this evidence, it is necessary to indicate that there may also be costs. These costs stem from the fact that an infant industry may practice discriminatory pricing such that export-related production leads to an increase in the price at which non-export-related sales are made. Granted that an infant industry experiences a low level of efficiency, cross-subsidization of sales at border prices by non-export-related sales at higher prices is required unless there are offsetting subsidies, as there typically appear not to be.

It is widely appreciated that protection imposes real costs on domestic consumers, at least in the short run. These costs may be increased by the practice of discriminatory pricing on the part of infant industries. Under the usual assumptions, including that economies of scale are not substan-

²² One of these subsidies operates through the "wastage allowance" that is permitted when determining tariff-free raw material imports for use in export-related production. To subsidize direct and indirect exports, this allowance is usually in excess of actual wastage. Because profits can be earned by using the excess imports to produce goods for sale on the protected segment of the domestic market, control over the amount of tariff-free imported inputs allowed in relation to the volume of export-related sales (and hence, implicitly, over the amount of excess imports) gives the government a means to influence the division between export-related and non-export-related sales.

tial in relation to the size of the market for non-export-related sales, export-related production that results from discriminatory pricing can be shown to impose greater costs on domestic consumers: that is, compared with a situation in which the industry produces only for non-export-related sales, production for export-related sales leads to lower non-export-related sales (even though total output rises) and, thereby, to a price for non-export-related sales higher than that which would obtain were there no export-related production.²³

This result depends critically on the assumption that there are no economies of scale to be exploited through export activity. But most industries are characterized by increasing returns to scale up to a nonnegligible size. And developing countries sometimes appear to establish individual industries well before the market for non-export-related sales has attained the size at which increasing returns are exhausted. In such cases and to the degree that it is associated with larger scale production, even with discriminatory pricing, export activity can reduce unit costs of production and thereby lead to domestic prices lower than those that would prevail in its absence. It is therefore not unreasonable to expect that export-related production, though associated with discriminatory pricing, may sometimes lower the costs imposed on domestic consumers by the promotion of infant industries.

But, this consideration aside, it is very likely that infant-industry exports will yield sizable net benefits because export activity appears to accelerate the acquisition of technological mastery and hence to hasten productivity improvement and efficiency gains. Insofar as they result from inadequate technological mastery (as opposed to the exercise of monopoly power), the costs imposed by infant-industry protection are transitory and diminish over time as technological mastery is acquired. Anything that accelerates the attainment of technological mastery also quickens the pace at which the costs of infant-industry protection decline. Correspondingly, even if infant-industry exports initially impose additional costs, owing to the practice of discriminatory pricing, they can nonetheless yield substantial net benefits over time as a result of their effects leading to more rapid productivity improvement and efficiency gains.

There are various grounds for asserting that export activity must lead infant industries to realize faster technological change. To the degree that efficiency improvement and other forms of technological change derive from experience in production and in capacity expansion, export activity must necessarily lead to greater technological change if it is associated with greater volumes of production over time. But the direct effects of

²³ For the reasoning leading to this result, see any of the following references: Corden (1967), Pursell and Snape (1973), White (1974), and Caves (1978).

export activity in both enforcing and fostering technological mastery are undoubtedly the most important. As to enforcing technological mastery, exporting, whether directly or indirectly, requires the ability to meet world standards in matching specifications given by the type and quality of product involved. In turn, as to fostering technological mastery, efforts to maintain and increase penetration in overseas markets lead to the gradual upgrading of product quality. In addition, and perhaps most important, there is clear evidence from Korea as well as from elsewhere that exporters enjoy virtually costless access to a tremendous range of technological improvements that are diffused to them through various activities of the buyers of their exports [see Westphal *et al.* (1981)]. Not only do buyers contribute product designs and help to install or improve methods of quality control, they also contribute to achieving greater efficiency and lower costs through such things as suggesting changes in individual elements of production processes and improvements in the organization of production within plants and in management techniques more generally.

A strong case can thus be made that the promotion of infant-industry exports provides an effective means to hasten the achievement of international competitiveness. The argument may not pertain, however, to exports from infant industries created by establishing subsidiaries of multinational corporations, for there is no assurance that the activities of these firms will contribute to domestic human capital formation or in other ways yield real externalities through the diffusion of technological mastery to local producers. (In this respect it is pertinent to note that most of Korea's exports are produced by wholly local firms.) In any event, further research is needed to verify that export activity induces faster technological progress, as well as to examine whether and how export activity conditions the direction of technological change and to demonstrate that infant-industry exports do indeed result in positive net benefits over time to the economy as a whole.

VIII. CONCLUSION: IMPLICATIONS FOR INDUSTRIAL STRATEGY

The foregoing discussion provides one possible reason why the industrial sector in a country like Korea, following an outward-looking strategy, performs so well; namely, the possibility that its selectively promoted infant industries exhibit superior performance as a result of their export activity. This is by no means to suggest that it is the only possible reason. But, if valid, its relative importance must increase as the time period of analysis lengthens because the number of infant industries that

achieve international competitiveness can be expected to increase with the length of the time period, as can the relative contribution of these industries to the economy's total industrial production.

The questions that remain concern how the choice of infant industries for selective promotion affects industrial performance. Does it make any difference which industries are selected; if so, how should infant industries be chosen? The issues involved in the selection of infant industries appear to be far more complex than those relating to how they are to be promoted. Comprehensive discussion of these issues must therefore be left to future research. But several issues do deserve brief discussion here.

Potential infant industries are by no means similar in their need for selective promotion, which is most likely to be warranted where the costs of acquiring technological mastery are quite high. But selective promotion is warranted only if the benefits of attaining technological mastery appear to outweigh the costs, and then only if the necessary technological effort is unlikely to be undertaken by individual producers in the absence of selective promotion. Many potential infant industries can—and therefore should—be established without selective promotion. This is particularly true for those that can benefit from previous experience in closely related types of activity. Indeed, many of the most successful infant industries in Korea have not benefited from selective promotion, including a number of important export industries. Thus it is critically important not to discriminate against the development of infant industries that are not being selectively promoted. This is, in fact, one of the strongest arguments for low, uniform effective incentives—in particular, low and uniform effective protection to non-export-related sales—for all activities except those being selectively promoted. It provides an equally strong argument against the use of quantitative import restrictions (as opposed to tariffs), as well as against the use of various forms of restrictive controls on new undertakings.

It must also be recognized that the choice of infant industries for selective promotion is not something to be done without regard to existing circumstances or without active consultation between government and prospective producers. Choices must be made with a view to existing levels of technological mastery and to the transferability of technological mastery across successive generations of infant industries. A substantial expenditure of effort in searching for and making use of technological and economic information is needed to make sound choices. Much of this effort should be, and often is, undertaken by prospective producers, but their forecasts of costs and benefits require independent appraisal. Furthermore, choices should be subject to revision in the light of additional

information and experience gained in successive phases of identification and implementation. Indeed, it is to be expected that some mistakes will be made in the initial identification of particular types of activity as being suitable for selective promotion. It is therefore very important to recognize mistakes and take remedial action quickly, as well as to learn from past mistakes in making future choices. These and many other considerations imply that selective infant-industry promotion requires a high level of competence in its administration. Such competence can be learned, but it is apparent that conditions conducive to its being learned and effectively applied are not present in all countries.

Finally, what importance should be attached to trading possibilities in the choice of infant industries for selective promotion? Even granted that comparative advantage is not innate but is acquired through effort to achieve technological mastery, it does not follow that trading possibilities should be neglected. What is remarkable in this respect about a country like Korea is that infant industries often appear to be selectively promoted on the grounds of their export potential, whereas infants selectively promoted on other grounds are also expected to develop exports, either directly or indirectly. Moreover, the Korean government has, on several occasions, put aside its initial plans for selectively promoting particular industries when additional information indicated that they would not achieve international competitiveness within a reasonable length of time.

These may be the most important distinguishing characteristics of an export-promoting strategy. In turn, as already suggested, the efficacy of this strategy might also be found in the impact of export activity on the speed with which technological mastery is acquired and the pace at which technological change takes place. These observations could provide a large part of the explanation for why such a pronounced difference in growth performance is associated with a strategy of export promotion as contrasted with one of import substitution. But further research is needed to confirm that the dynamics of technological change are indeed central to understanding this difference and that the implications for industrial policy conform to the reformulation of conventional prescriptions previously given.

IX. POSTSCRIPT

To the degree that the foregoing arguments rest on what I believe underlies Korea's successful industrialization, it is important to give explicit recognition to the fact that Korea's industrialization appears recently to have faltered somewhat. In particular, substantial difficulty has been en-

countered in developing its most recent set of infant industries, which are in the so-called heavy industries. What I know about the situation suggests that the difficulty stems from the Korean government's initial decision to promote too many infant industries at once and from its subsequent—and newly acquired—reluctance to abandon or radically revise its plans on the basis of information and experience accumulated over time. Thus, Korea's recent problems may provide additional evidence to support the need for selectivity in the promotion of infant industries.

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REFERENCES

- Balassa, B. (1971). "Development Strategies in Semi-Industrial Countries: Outline and Methodology (revised)," mimeo. Washington, D.C.: World Bank.
- Balassa, B. (1975). "Reforming the System of Incentives in Developing Countries." *World Development* 3, 365–382.
- Balassa, B. (1978). "Export Incentives and Export Performance in Developing Countries: A Comparative Analysis." *Weltwirtschaftliches Archiv* 114, 24–61.
- Balassa, B., and associates (1971). *The Structure of Protection in Developing Countries*. Baltimore, Maryland: Johns Hopkins Press (for the World Bank and the Inter-American Development Bank).
- Baldwin, R. E. (1969). "The Case against Infant-Industry Tariff Protection." *Journal of Political Economy* 77, 295–305.
- Bell, M., Scott-Kemmis, D., and Satyarakwit, W. (1980). "Learning and Technical Change in the Development of Manufacturing Industry: A Case Study of a Permanently Infant Enterprise." Science Policy Research Unit Working Paper, unnumbered. Brighton, Great Britain: University of Sussex.
- Bhagwati, J. (1978). *Foreign Trade Regimes and Economic Development: Anatomy and Consequences of Exchange Control Regimes*. New York: National Bureau of Economic Research.
- Bhagwati, J., and Krueger, A. O. (1973). "Exchange Control, Liberalization and Economic Development." *American Economic Review* 63, Papers and Proceedings, 419–427.
- Bhagwati, J., and Srinivasan, T. N. (1978). "Trade Policy and Development." In *International Economic Policy: Theory and Evidence* (R. Dornbusch and J. A. Frenkel, eds.). Baltimore, Maryland: Johns Hopkins University Press.
- Bruno, M. (1972). "Domestic Resource Costs and Effective Protection: Clarification and Synthesis." *Journal of Political Economy* 80, 16–33.

- Caves, R. E. (1978). "International Cartels and Monopolies in International Trade." In *International Economic Policy: Theory and Evidence* (R. Dornbusch and J. A. Frenkel, eds.). Baltimore, Maryland: Johns Hopkins University Press.
- Corden, W. M. (1967). "Monopoly, Tariffs, and Subsidies." *Economica, New Series* 34, 50-58.
- Corden, W. M. (1980). "Trade Policies." In *Policies for Industrial Progress in Developing Countries* (J. Cody, H. Hughes, and D. Wall, eds.). London and New York: Oxford University Press (for the World Bank).
- Dahlman, C. J., and Fonseca, F. V. (1978). "From Technological Dependence to Technological Development: The Case of the Usiminas Steel Plant in Brazil." IDB/ECLA/UNDP/IDRC Regional Program of Studies on Scientific and Technical Development in Latin America, Working Paper No. 21. Buenos Aires: Economic Commission for Latin America.
- Dahlman, C. J., and Westphal, L. E. (1981). "The Meaning of Technological Mastery in Relation to Transfer of Technology." *The Annals of the American Academy of Political and Social Science* 458, 12-26.
- Díaz Alejandro, C. F. (1975). "Trade Policies and Economic Development." In *International Trade and Finance: Frontiers for Research* (P. Kenen, ed.). London and New York, Cambridge University Press.
- Enos, J. L. (1962). "Invention and Innovation in the Petroleum Refining Industry." In *The Rate and Direction of Inventive Activity: Economic and Social Factors*, National Bureau of Economic Research. Princeton, New Jersey: Princeton University Press.
- Katz, J. (1978). "Technological Change, Economic Development and Intra and Extra Regional Relations in Latin America." IDB/ECLA/UNDP/IDRC Regional Program of Studies on Scientific and Technical Development in Latin America, Working Paper no. 30. Buenos Aires: Economic Commission for Latin America.
- Krueger, A. O. (1978). *Foreign Trade Regimes and Economic Development: Liberalization Attempts and Consequences*. New York: National Bureau of Economic Research.
- Krueger, A. O. (1980). "Trade Policy as an Input to Development." *American Economic Review* 70, Papers and Proceedings, 288-292.
- Lall, S. (1980). "Developing Countries as Exporters of Industrial Technology." *Research Policy* 9, 24-52.
- Little, I., Scitovsky, T., and Scott, M. (1970). *Industry and Trade in Some Developing Countries: A Comparative Study*. London and New York: Oxford University Press (for the Development Center of the Organization for Economic Co-operation and Development).
- Nelson, R. (1979). "Innovation and Economic Development: Theoretical Retrospect and Prospect." IDB/ECLA/UNDP/IDRC Regional Program of Studies on Scientific and Technical Development in Latin America, Working Paper No. 31. Buenos Aires: Economic Commission for Latin America.
- Pursell, G. and Snape R. H. (1973). "Economics of Scale, Price Discrimination and Exporting." *Journal of International Economics* 3, 85-92.
- Stewart, F. (1979). "International Technology Transfer: Issues and Policy Options." World Bank Staff Working Paper No. 344. Washington, D.C.: World Bank.
- Westphal, L. E. (1978). "The Republic of Korea's Experience and Export-Led Industrial Development." *World Development* 6, 347-382.
- Westphal, L. E., and Kim, K. S. (1982). "Korea." In *Development Strategies in Semi-Industrial Countries* (B. Balassa and associates, eds.). Baltimore, Maryland: Johns Hopkins University Press (for the World Bank).

- Westphal, L. E., Rhee, Y. W., and Pursell, G. (1981). "Korean Industrial Competence: Where It Came From." World Bank Staff Working Paper No. 469. Washington, D.C.: World Bank.
- White, L. J. (1974). "Industrial Organization and International Trade: Some Theoretical Considerations." *American Economic Review* 64, 1013-1020.

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