PART 4

MARKET DISTORTIONS AND TRADE

15. Distortions and Static Negative Marginal Gains from Trade

Journal of International Economics
August 1976

JOURNAL OF INTERNATIONAL ECONOMICS
Volume 6, August 1976

DISTORTIONS AND STATIC NEGATIVE MARGINAL GAINS FROM TRADE

In this paper, the method of input-output analysis is used for the case of Korea to demonstrate that the promotion of certain exports can result in static inefficiency to the economy. It appears that Korea lost a significant amount of both capital and labor via trade in competitive goods during 1970-72. Although the simple existence of static losses at any specific point in time does not necessarily imply welfare losses to the economy over the long term, the fact that we can observe such losses implies that we should at least try to justify their existence in terms of dynamic gains.

1.

The application of input-output analysis by Leontief (1954, 1956) and his many followers has been primarily in the testing of the Heckscher-Ohlin theory. At the same time, economists such as Despres (1965) and Bhagwati (1970) have argued, using specific instances from experience with export policy in Pakistan and India respectively, that *some* export promotion may be inefficient and loss-causing to the economy.

In the present paper, the method of input-output analysis is used for the case of South Korea to demonstrate that the promotion of certain exports can result in static inefficiency to the economy. This result should be of interest to those who consider that export promotion is sometimes as chaotic as import substitution and that the chief causes of the difference in the economic performance of export-promoting and import-substituting economies may well lie in other asymmetries between the two developmental strategies, as suggested by Bhagwati and Krueger (1973). This result should also be of interest to anyone who believes in the unavoidability of some temporary

*I am grateful to Jagdish Bhagwati for helpful comments and suggestions. The final version has benefited from the criticisms of Anne Krueger and an anonymous referee. Any remaining errors are my responsibility.

losses in obtaining long-term gains of welfare, because our method can identify the existence of the very static losses which should be justified in terms of dynamic gains.

The 'static inefficiency' in our paper may be understood as the net loss of production factors arising from indirectly satisfying the domestic consumption demand via export production instead of directly satisfying it via import-substitution at any specific time point. Consequently, the dynamic inefficiency might be understood as the net loss of production factors in trade even when (dynamic) external economies, à la infant industry arguments, are taken into account in the long run.

2.

Note first that, from the theory of unified exchange rates, it is well-known that the possibility of wasteful export promotion or import-substitution in any activity, i.e. the static inefficiency in economic activities, is ruled out for a small country with no distortion—policy-imposed or endogenous in Bhagwati's terminology.

Hence, we must necessarily deal with the case of South Korea in section 3 on the realistic and valid presumption that there are a fair number of distortions in the Korean economy. (It is a well-known fact that Korea has strong export incentive systems—see Frank, Kim and Westphal (1975).) It should be useful then to spell out, in the context of the traditional two-sector model of trade theory, the precise manner in which some wasteful export expansion may arise under distortions, before we proceed to compute corresponding estimates for the Korean economy.

Thus, in fig. 1, *AB* is the production possibility frontier in the two-good economy and *PC* is the given foreign price-ratio between commodities *X* and *Y* for this small country. If there were no distortions, the economy would produce optimally at P^* and consume optimally at C^* and trade thus arising would also be optimal (in the static sense). Assume, however, that the economy has a production distortion such that X-production increases and the equilibrium production vector shifts to P, the resulting consumption vector being *C*, and the social welfare reduces from U^* to *U*.

Now, if we were to compare the observed production-cum-trade equilibrium with a *marginal* decrease in *X*-production and trade equilibrium associated therewith, it is clear that we would have increased welfare in the latter situation. (This would be equally true, in this model, if we had an unchanging consumption distortion in both equilibria, ruling out pathologies arising from inferior goods and associated multiple equilibria, as discussed in

Vanek (1965), Bhagwati (1968a) and Kemp (1968).)

And, in this instance, it is clear that the marginal reduction in X-production, say via a production subsidy to Y, would be associated with a *reduced trade volume* (ruling out strong inferiority in X-consumption). Thus, we could conclude that the economy was exporting too much *at the margin*. Hence we have shown that, given a (domestic) distortion, a country could be exporting too much: a conclusion which is, of course, paralleled by the well-known Mill argument for an optimal tariff where the (foreign) distortion represented by the existence of monopoly power in trade under laissez faire implies over-exportation by the country and requires the imposition of a suitable optimal tariff.

3.

Having briefly underlined the possibility of wasteful export expansion and

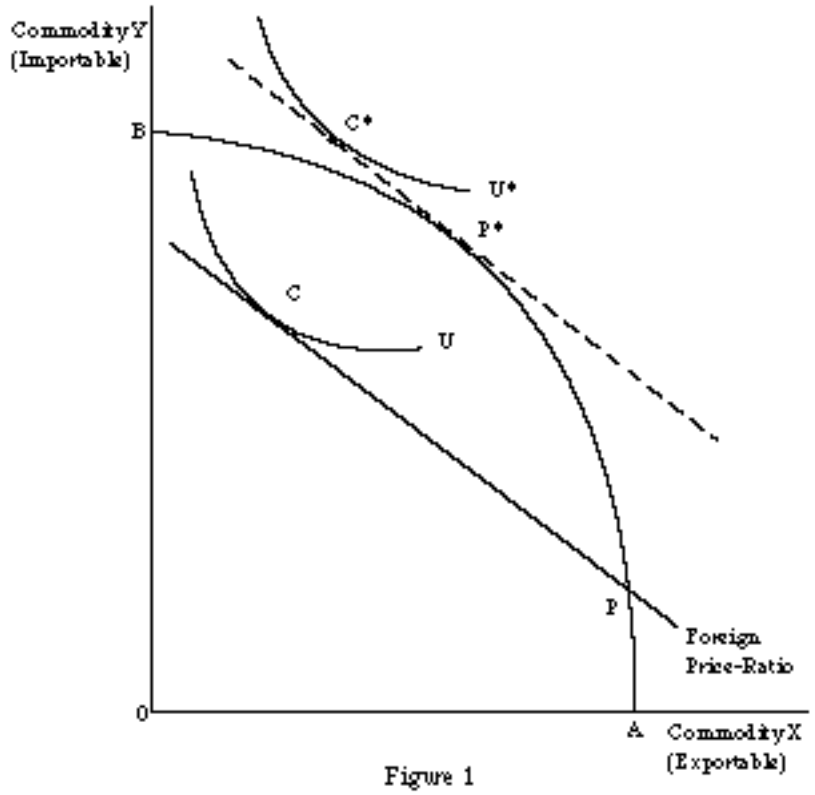

Figure 1

the corresponding static inefficiency under distortions, we now proceed to show how, in the Korean case, export expansion in certain sectors of the economy resulted in static loss in efficiency to the economy This is done simply by showing that the direct-plus-indirect capital and labour requirements for exports of a 'capical-intensive group of commodities' exceed (*both*) the capital and labour requirements for the replacement of 'competitive imports of the same value through direct domestic production'.[1]

If we further assume that (i) the average capital and labour coefficients in different activities will not change as the economy shifts out of these exports into the importables in the above comparison and (ii) the international prices will remain invariant to the required changes in trade volumes as the production shift is carried out, then we can also take the net saving in capital and labour, as computed above, as a measure of the resources/GNP saved by eliminating the wasteful exports.

Note, however, that *no* such conclusions can be simply drawn when the capital and labour requirements of an exported good do *not* dominate both the capital and labour requirments of the competitively imported goods. This happens, for example, to be the case for Korean exports in the 'non-capital-intensive group of commodities' where the capital requirements *fall below* and the labour requirements *exceed* the corresponding capital and labour requriements for importable production. Admittedly, some of these exports may also be wasteful; but only detailed cost-benefit analysis would seem to be capable of determining their welfare-impact.

We turn now therefore to discussing South Korean exports so as to yield the conclusions and estimates of resource-loss from export expansion in certain sectors which were discussed above. We will analyze the period of 1966-72. Due to limited data availability, we will use the 1968 industrial structural relationships (i.e., the 1968 set of factor coefficients and 1968 input-output table) for the entire period in our computation of (direct-plus-indirect) factor requirements.

As can be seen in table 1, in order to produce $100 million (in 1970 dollar prices) worth of commodity exports in 1968, Korea used $92 million worth of fixed capital stock and 82 thousand labor (man-year) plus other nonprimary inputs such as competitive and noncompetitive imports.

With $100 million exports, Korea could finance the same amount of

[1]Since we are analyzing in terms of a two-factor model, our analysis may be vulnerable to Vanek-type (1963) criticism regarding the omission of natural resources. In order to minimize the resulting difficulties, we excluded most of the natural-resource-intensive goods from our computation as noncompetitive imports.

competitive imports, though part of these imports had to be used for export production and hence were not available for domestic consumption. Let us assume that trade (export vs. competitive imports) was balanced at $100 million in 1968. Table 1 shows that the amount of primary factors which would be required to replace $100 million worth of competitive imports (which could be financed by the same amount of exports in 1968) are $120 million worth of fixed capital (in 1970 dollar prices) and 72 thousand labor. However, some of the competitive imports were used as inputs for export production. Since we excluded them from our computation of factor requirements for exports, they should also be excluded from our computation of factor requirements for import replacements. That is, the absence of export production will eliminate the requirements for those competitive and noncompetitive imports which were previously absorbed in export production (see Appendix). Now, if we subtract the factor requirements for competitive imports which were used as inputs in export production we may say that Korea saved $99 million worth of fixed capital (in 1970 dollar prices) and 63 thousand labor through imports of competitive goods in 1968.

Due to limited data availability, we could not compute the factor requirements for noncompetitive imports which should be used as inputs both in export production and import replacement activities. Assuming that they may roughly offset each other, we computed the factor savings from trade in competitive goods. Korea's gain in fixed capital per $100 million worth of trade (exports vs. competitive imports) was equivalent to about 9 percent of the capital used in the export production, and its loss in labor was equivalent to about 23 percent of the labor used in the export production in 1968 (see table 1). That is, by selling labor which is the abundant factor in Korea, it could get some significant amount of capital in return which is the relatively scarce factor in Korea.

However, when we computed such factor gains through trade in competitive goods for the entire 1966-72 period, we found that the amount of gains in capital per labor lost in trade was steadily falling and it became negative in 1970, 1971 and 1972. That is, Korea lost some significant amount of both capital and labor via trade in competitive goods in 1970-72.

We may interpret the above observation in the following fashion. Korea used to produce and export mainly the labor intensive portion of competitive goods, and used to import mostly the captial intensive protion of competitive goods. However, with accumulation of captial, Korea started to produce and export an increasing amount of capital intensive goods. Hence, now Korea is no longer saving any significant amount of capital in its trade of competitive goods. Furthermore, the over expansion of some inefficient sectors seems to

have even resulted in net loss of 'both' capital and labour.[2]

We listed 92 commodity sectors (in 117 I-O sector classification) in the order of the magnitude of direct plus indirect factor requirements (per $1,000 of outputs). Among the top 20 industries which require the largest amount of capital per $1,000 of outputs, eight sectors exported fairly large amount of their products. The exports of cement, chemical fertilizer, chemical fibre yarn, processed sea foods, fishery products, other chemical products, knit products and rolled steel amounted to about 22 percent of total commodity exports in 1970, about 24 percent in 1971 and about 28 percent in 1972. More importantly, except in the cases of fishery and processing of sea foods, their exports were increased sharply only since 1969 or 1970.

Since those eight commodities belong to the most capital-intensive group (measured by the direct plus indirect capital requirements per $1,000 of outputs) among the 92 commodity sectors, they directly and indirectly took about 36 percent of total capital employed for export production in 1970, about 40 percent in 1971 and about 43 percent in 1972. Hence we can understand that, by exporting such capital intensive goods, Korea could not save much capital in its trade of competitive goods.

However, the more important fact was that this 'eight capital-intensive commodity group' took directly and indirectly about 27-33 percent of total labor employed in export production during 1970-72, while their exports amounted to about 22-28 percent of total commodity exports during the same period. This more than proportionate requirements of not only capital but also labor for the export production of the eight capital-intensive commodity group may reflect either the extraordinarily high rate of domestic value added content or inefficiencies in these sectors, or both.

In order to check whether this eight capital-intensive commodity group used extraordinarily small amount of imported goods, we computed the factor requirements to replace competitive imports used in ($100 million worth of) their export production which were excluded from our computation so far, i.e. we computed the differences between the results of the A matrix and A^d matrix in our factor requirement computation for ($100 million worth of) this eight commodity group, where A is the matrix of domestic and competitive

[2]On the other hand, when we similarly computed the gains from trade in exports of competitive goods vs. imports of noncompetitive goods, we found that the rates of gain in capital and loss in labor were quite stable during the entire period, and more importantly, we could see that Korea was saving really substantial amount of capital in its trade of noncompetitive goods. Hence the specialization and trade a la Heckscher-Ohlin seem to have mostly been limited to trade in exports of competitive goods vs. imports of noncompetitive goods [see Hong (1973)].

import input coefficients and A^d is the matrix of domestic input coefficients.

The capital requirements to replace competitive imports used in $100 million worth of this eight commodity group amounted to $19.0 million in 1970, $21.3 million in 1971 and $20.4 million in 1972, and the labor requirements amounted to 8.6 thousand in 1970, 8.9 thousand in 1971 and 8.8 thousand in 1972. These results were very similar to those for total commodity exports as a whole.[3] Therefore, although we could not compute the noncompetitive import content of their export production, we can argue that the more than proportionate requirements of not only capital but also labor in their export production reflect inefficiency rather than an extraordinarily high rate of domestic value added portion in their production.

We then computed the factor earnings ratio in the trade of competitive goods during 1970-72, excluding those eight capital-intensive commodities, which reduced the magnitude of total commodity exports by 22-28 percent. We found that the earnings of capital per $100 million worth of trade in competitive goods were about 23 percent of those required for $100 million worth of export production, and the loss of labour was about 15 percent of them in 1970; and furthermore Korea gained some significant amount of *both* capital (26 percent) and labor (2 percent) via trade in competitive goods in 1972 (see table 1).

Therefore, we can conclude that were it not for those eight capital-intensive export commodities, Korea would not have registered negative earnings of 'both' capital and labor during 1970-72.[4]

[3]The 'additional' capital and labor required to replace competitive imports used in $100 million worth of export production of the eight capital-intensive commodity group (i.e. the 'difference' between the results of A matrix and A^d matrix in our factor requirement computation) were as follows (per $100 million exports; in million 1970 dollars or thousand persons; using 1968 factor coefficients and 1968 input-output table).

	1970		1971		1972	
	Capital	Labor	Capital	Labor	Capital	Labor
Eight commodities	19.0	8.6	21.3	8.9	20.4	8.8
Total exports	17.6	8.3	19.4	8.7	20.4	8.9

[4]However, the wasteful exports (in static sense) of this eight commodity group do not necessarily imply the inefficiencies of only those eight sectors themselves. Since we included the indirect requirements when we computed the total factor requirements for production, what we observed may be the result of either the inefficiency of those eight sectors themselves or the inefficiencies of other sectors which supplied intermediate inputs to these sectors, or a combination of both. That is, what is implied

Although the selection of only those eight commodities for our exercise is a little bit arbitrary, we can still deduce some useful implications from our observations.

First, under the static analytic framework and with the fixed input coefficients assumptions, Korea's gains from trade in this eight capital-intensive commodity group was negative and, more broadly speaking (since the selection of those eight items was more or less arbitrary), we can say that the marginal gains from trade were negative in the sense that a cut in the export production and expansion in import substitution, which result in decreased trade volume of competitive goods, may have saved factors of production in Korea during 1970-72.

The second implication is that if we want to justify the vigorous export expansion policy of the Korean government which resulted in such perverse results, we may have to justify it under a dynamic framework such as the infant (export) industry argument in the sense of Bhagwati (1986b), Johnson (1965) or Keesing (1967). Otherwise, a phenomenon such as 'negative earnings' of both capital and labor in trade of competitive goods should be taken as a signal that the export promotion policy needs some adjustments in its extent and direction, and that import substitution should get more attention even though export promotion might be a superior strategy to the import-substitution oriented strategy in the sense of Bhagwati and Krueger (1973).

APPENDIX

In computing domestic factor requirements for exports or import replacements, the demand for what they defined as noncompetitive imports is assumed to be completely satisfied by foreign sources. With what they defined as competitive imports, since stepped-up domestic production can be an alternative to imports and vice versa, the final demand to replace imports or to export might not be assumed to automatically result in demand for competitive imports. Especially when we want to compute the domestic factor requirements to 'replace' current competitive imports, we logically have to assume that whatever the demand for competitive imports (to replace the competitive imports themselves) might be, it will be satisfied entirely by domestic output. Hence, for the computation of domestic capital and labor requirements to replace competitive imports, the use of the A matrix is justified.

is the simple fact that, under the given industrial structure, the 'exports' of these eight commodities were (in static sense) wasteful.

However, when we want to compute the 'domestic' factor requirements for 'current' exports, we cannot arbitrarily assume that current export production does not use competitively imported inputs. Therefore, we have to use A^d, the matrix of domestic input coefficients, instead of A, the matrix of domestic and competitive import input coefficients, when we compute 'domestic' capital and labor requirements for 'current' exports.

The basic data used for our study are the 1968 input-output table (117 sector classification), sectoral capital coefficients, sectoral labor coefficients and foreign trade statistics. We obtained these data from Han (1970), Economic Planning Board (1972), the Bank of Korea (1970), the Korea Development Bank (1970), the Office of Customs Administration (1970-72), and Ministry of Finance (1966-69). For detailed discussions on statistical data, see Hong (1973).

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Receivecd January 1974, revised version received December 1975