

THE LOGISTIC VIEW VERSUS THE NATIONAL INCOME VIEW OF FOREIGN TRADE DEPENDENCE, WITH SPECIAL REFERENCE TO JAPAN*

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I. *Introduction*

The realm of international trade's relation to national income remains a dark continent in studies of economic growth. Recently, for the case of Japan, efforts have been made to identify some of its landmarks. It has generally been assumed that Japanese experience as such should provide "lessons" for other countries now attempting to follow the path of development. There has been some difficulty, however, in deciding just what these lessons are. In the present paper, again, the lesson refers to a method of analysis rather than to policy prescription; it is incidental that our data happen to be Japanese. Conveniently, the argument can be summarized in terms of two classic works on the Japanese economy which methodologically are at odds. In showing how and why they are at odds we may at the same time cast light on the pure relation between international trade and national income.

The first work, a study of Japanese foreign trade, was prepared during World War II under the direction of Arthur B. Hersey in the U.S. Department of State as a basis for administrative policy in the Occupation then to come.¹ The document conceived of foreign trade not in terms of maximizing Japan's income, but rather as a means of supplying her minimum subsistence requirements. It was a "guide to problems of Japan's self-sufficiency in postwar years" and embodied a logistic rather than an economic point of view. Attention was focused on a hypothetical period, "1950," by which date it was assumed conditions of peace would be fully restored. Given an estimate of population one-fourth larger than that of 1930, given specified resources and plant capacity, and given a minimum per capita living level, Hersey's problem was to use the production experience of the prewar peacetime economy (the years 1930, 1936, and 1938 were selected) to answer the following: What level of domestic production could be expected in "1950," and to what degree must the latter be supplemented by imports of raw material and food in order to maintain the minimum level of living? Technological rather than marginal analysis was used to identify the deficit commodities, which were thereby projected as "necessary imports."

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¹ U.S. Department of State, *The Place of Foreign Trade in the Japanese Economy* (Washington, 1946); hereafter cited as the Hersey study.

As opposed to the logistic approach, William W. Lockwood adopts a dynamic view of the economic role of foreign trade in Japan's development, making a particular study of the contribution of trade to national income.¹ In terms of the national income approach, Lockwood writes, "few nations have become more fundamentally dependent on the world market for the essentials of national existence."² Lockwood's statistical evaluation, however, is based largely on evidence provided by the Hersey study. This confounds the issue, for it then appears that "prewar Japan remained less dependent on foreign markets than is often supposed."³ From Hersey's data, moreover, Lockwood infers that historically it was in the home market rather than in the foreign market that the Japanese economy "found its chief stimulus to growth."⁴ Indeed, there seem to be errors, inconsistencies and neglected qualifications in Lockwood's use of Hersey's results. The practical consequence, moreover, is confusion in the current debate about whether Japan's Five Year Plan should or should not emphasize expansion of the home market as an alternative to international trade.

II. *Foreign Trade as the Source of Specified Minimum Physical Requirements*

Hersey's methodology must first be described. His analysis proceeds at the outset with a distinction between "dependent" and "domestic" export industries. Admittedly, the distinction depends upon cutting a continuum; the criterion for it is as follows: Where the principal raw material used in the exports of a particular industry is imported in a volume equal to or greater than the volume embodied in exports, the industry is classified as "dependent." Where the principal raw material used in an export product is produced domestically in sufficient volume for exports as well as for domestic utilization, the industry is classified as "domestic." Exports of agricultural products and fish form a third and final category of export industries. "Dependence" in the Hersey study, therefore, is concentrated on the idea of import requirements to be utilized for exports on the one hand, and imports for domestic consumption on the other. The degree to which imports are *not* embodied in exports is defined in terms of "retained imports." And the "core of the analysis" is achieved in the separation of import value totals into (a) imports required for exports, and (b) retained imports used for final consumption in Japan.⁵ That portion of exports complementary to imports required for exports is referred to as "originated exports," that is, the component added by domestic production.⁶

There remains a basic qualification in Hersey's procedure which refines the concepts of both originated exports and retained imports. The qualification is expressed in terms of the concept of "offsets." As applied to imports not treated as materials for exports,

¹ William W. Lockwood, *The Economic Development of Japan* (Princeton, 1954).

² *Ibid.*, p. 316.

³ *Ibid.*, p. 340.

⁴ *Ibid.*, p. 369.

⁵ *Ibid.*, I, I, iv.

⁶ Although a dependent industry is defined on the basis of the source of only its principal raw material component, the "originated export" calculation may discriminate with regard to the source of each of the component commodities included in exports. The extent to which Hersey's results include such discrimination is not always clear.

offsets are defined as "estimated quantities against which there were equal quantities of the same or similar exports."¹ Depending on the point of view, an exchange of "similar" commodities may be regarded as either offsetting imports or offsetting exports. The concepts of originated exports and retained imports each exclude the element of offsets.

In terms of the purpose of the Hersey study, the concept of offsets is significant because it draws attention to its real commodity or "bill of materials" basis. It makes an explicit issue of the fact that *in a physical sense*, the net contribution of offset—or cross-hauling—transactions to the volume of real commodities needed, to provide a specified per capita supply of such commodities, is zero.² The calculation of offsets thus is justified as part of the larger calculation of a minimum bill of import materials. When retained import requirements have been ascertained, total import requirements may then be calculated by adding thereto the estimated volume of imports embodied in exports. Total exports, in turn, have been estimated in such fashion that, taking account of the proportion of domestic value added, total exports will pay for total imports including retained imports and imports to be used in exports. That is, the secondary problem is one of calculating the volume of originated exports that would exchange for the indicated required level of retained imports. Thus although it is the *export* industries which Hersey classifies as either "dependent" or "domestic," it is the calculation of minimum *import* requirements which is the basis for determining into which class a given export industry will fall.³

Notice, however, that no economic explanation is given of the process whereby an increment of imports will be associated with an increment of national income, nor is any attempt made to predict what the increments will be. There is no marginal analysis. Rather, starting from specified minimum per capita subsistence requirements, national income is stated as an aggregate of these requirements, in effect as an aggregate ration. (The aggregate for "1950" is not expressed by Hersey in money terms, not even in standard prices.) The aggregate ration for postwar Japan is to be partly domestic, partly supplied from abroad.

Conceivably, in some other analysis, the estimate might start the other way around. That is, retained imports and originated exports might be taken as given, and the associated level of national income might be estimated. But that sort of estimate is not attempted in the Hersey study.

¹ *Ibid.*, I, I, xiv.

² The results, it is true, have been expressed in money values. But these are deflated and are used merely as a convenience in calculation. The essential estimates upon which the results depend have been performed at a strictly technological level. "The estimated breakdown of imports into retained imports and imports for exports is based on data and estimates of various sorts: production, consumption, changes in stocks, and technical coefficients for equating quantities at different stages of processing or for equating measurements in weight and volume." Hersey study, I, I, v.

³ Whereas for Hersey the export analysis is derivative from the import requirements, for Lockwood it is the reverse. "This function of trade [imports] was secondary, or derivative from the first, in that ability to buy such supplies grew out of advancing technology" and its attendant creation of exports. Lockwood, p. 378.

III. *Lockwood's Version of the Hersey Study*

Whereas Hersey's view of the place of trade in the Japanese economy is that of a cupboard from which minimum per capita rations of specified commodities are eked out, Lockwood regards it as a creative factor in economic development, as a dynamic agent with a life of its own. He is concerned with "the true place of foreign trade in the dynamics of Japanese development."¹ From this point of view, with reference to Hersey's results, "retained imports furnished about 15% of the national income" in 1930.²

1. *Offsets*

In the first place, as we have seen, retained imports exclude offsets. The reason they were excluded by Hersey is that in a ration list, subtraction of an apple by exports can be balanced only by the addition through imports of an apple of the same description. From the point of view of national income, however, an apple in September does not have the same value as an apple in April. The concept of offsets, consequently, which is a prime ingredient in Hersey's methodology, makes a specific issue of the gap which is found between an estimate of the level of trade in providing commodities from abroad on the one hand, and an estimate of the role of trade in the formation of national income on the other. For although it may be said that in a particular moment of time cross-hauling contributes nothing to the formation of physical product as defined in a catalogue of goods, it may not be said that cross-hauling contributes nothing to the formation of values which enter into the national income accounts.

Offset shipments give rise to money incomes received by the traders who ship them, and thus reflect increments to national income. Throughout the economy, offset shipments contribute to national income through the additional infra-marginal transactions which they make possible. An example of the role of offsets appears in Japanese bilateral agreements. When both Japan and her trade arrangement partner are short of a particular commodity, Japan sometimes contracts to export it in order to receive back some other commodity which is also in short supply. The former deficit commodity is then restocked by Japan through trade with some third country.

Quantitatively, offset transactions are an important component of Japanese trade both because of their size and because of their volatility. According to Hersey, they amounted to 9 percent of total exports in 1930 and 7 percent in 1936. By an estimate of the writer, they amounted to 2 percent of total exports in 1950 and 11 percent in 1954.³ As a rule, when trade increases, trade partners tend to exchange an increasing volume of similar commodities; thus the volume of offsets may be presumed to rise as the volume of trade rises. A measure of trade dependence which excludes offsets, therefore, would apparently become increasingly biased as the volume of trade to which it refers increases.

¹ Lockwood, p. 309.

² *Ibid.*, p. 385.

³ Leon Hollerman, *Japanese National Income and International Trade: A Structural Analysis* (unpublished Ph. D. dissertation, University of California, Berkeley, 1957), p. 177.

2. *The Dependency Ratios*

The statement that "retained imports furnished about 15% of the national income" seems inconsistent within the context of Lockwood's analysis. For elsewhere, in discussing the ratio of originated exports to national income, he states that "this ratio may be taken as representative of the overall dependence on foreign and Empire markets attained by Japan..."¹ In the period under discussion, the latter amounted to 20 percent. Now if "over-all dependence" refers to the dependence of national income on export markets, then clearly to the 20 percent contribution here should be added the 15 percent "furnished" by retained imports; total dependence would then be 35 percent. Lockwood fails to draw this conclusion, however, and thus appears unwilling to accept the consequences of his own logic. If he were to do so, incidentally, it would upset his thesis that in merely quantitative terms the importance of foreign trade to Japanese national income has commonly been exaggerated.

3. *The "Dependent Industry" Concept*

Within its own frame of reference, the Hersey study provides a measure of Japan's foreign trade dependence alternative to that selected by Lockwood. As opposed to the ratio of either retained imports or originated exports to national income, the study makes a direct evaluation of the importance of the dependent industry sector within the Japanese economy. For 1930, Hersey found that less than half of Japanese exports were included in the dependent industry category. In 1950, on the other hand, according to an estimate by the writer in which Hersey's criteria were used, 75 percent of total Japanese exports were produced by dependent industry; in 1954 the figure was 64 percent.² This result contrasts strikingly with the conclusion which might be drawn by Lockwood from the fact that total Japanese imports in 1950 were only one-third their real volume of 1936. The latter evaluation fails to relate the *composition* of the domestic and international sectors and thus ignores a basic objective of the national income approach. Proper use of Hersey's methodology would reveal the important qualification that so far as the export sector is concerned, dependence in the postwar Japanese economy has *increased* as compared with prewar.

4. *Different Interpretations of the Same Results*

Even with regard to the years analyzed by Hersey, moreover, there are differences between Hersey and Lockwood in the interpretation of the results. These differences occur with regard to the following ratios:

$$\begin{array}{l} \text{I} \quad \frac{\text{originated exports}}{\text{real net product}} \\ \text{II} \quad \frac{\text{retained imports}}{\text{real net income}} \end{array}$$

In the Hersey study, these ratios are discussed in the static context of the physical presence of a supply of real goods. In Lockwood's study, they are discussed in terms of the "dynamics of Japanese development." In interpreting the role of retained imports, however,

¹ Lockwood, p. 345.

² Hollerman, p. 162.

Lockwood oddly minimizes its importance whereas Hersey explains that its importance is greater than ratio II suggests:

Because of the large proportion of raw materials among Japanese imports, the total dependence of Japanese net product and net income upon external trade was much *greater* [italics added] than these ratios...suggest. If proper allowance were made for the value added domestically in transforming imported raw materials into goods finally consumed (or added to fixed capital and working capital), it might be estimated that as much as a half of Japanese realized income in the early 1930's was either (1) provided by retained imports of foods, fertilizer, materials, and manufactured goods, or (2) provided by domestic production based on these retained imports. (Hersey study, I, I, 28, n. 1.)

That is, Japanese national income is augmented by the fact that "a large part of domestic production for domestic use was based on retained imports of raw materials."¹ Consistent with his thesis that the quantitative evaluation of the contribution of trade to Japanese income has been exaggerated, Lockwood argues the reverse. In 1930,

...retained imports furnished about 15% of the national income, the aggregate net flow of goods and services from all sources in Japan to support the nation and add to its capital stock. Actually the figure is somewhat *smaller* [italics added]. For the export deductions...are confined mainly to the principal raw materials used in each export industry. By way of illustration, iron and steel imports are deducted insofar as they were exported in the form of sheets, wire, machinery, pots, and pans; but no allowance is made for steel going into plant and equipment to be devoted to making export chemicals or cotton goods. Nor is imported coal, or oil, or building materials used in export industries reckoned in; or imported machinery devoted to making export products. (Lockwood, p. 385.)

It will be observed that in making this interpretation, Lockwood draws attention to the incomplete statistical coverage of imports embodied in exports. But Hersey has discussed this point also, and again his manner of expressing it is the reverse of Lockwood's. Hersey explains that many exports

...required the use of imported materials or fuels, either directly or indirectly as subsidiary raw materials. Thus the dependence of Japanese exports as a whole upon imports is understated both by the relative magnitude of exports of "domestic industries" and by the amount of imported raw materials allocated...as offsets or...as materials used for exports. (Hersey study, I, I, 69.)

The difference here is verbal rather than analytical. That is, instead of saying, as Hersey does, that the dependence of Japan's export industries upon imports is understated, Lockwood says that net receipts from originated exports are less than as calculated by Hersey, and thus the ratio of originated exports to real net product is overstated. Hersey's version refers to the degree of reliance of export products upon imported raw materials; Lockwood's version refers to the extent to which export sales provide a favorable net foreign exchange balance.

IV. Conclusion

A useful approach to the analysis of foreign trade dependence may be made in terms of the contribution of foreign trade to national income. This approach, however, presupposes a distinction. On the logistic plane—as in the supply of rations to Japan during the Occupation—the contribution of trade may be expressed simply as the list of commodities which trade provides. But on the plane of marginal analysis, trade may be regarded as a dynamic agent in creating income. Offset, or cross-hauled commodities, identify the gap in dependence estimates obtained via the two versions respectively. For

¹ *Ibid.*, p. x.

whereas offsets add nothing to logistic availability as such, by virtue of the additional infra-marginal transactions which they induce offsets do contribute to the formation of economic values which enter into the national income accounts.

The basic problem is that of finding an adequate descriptive measure for dependence at the aggregate level. For countries like Japan, the commodity composition of retained imports complicates the task of describing the relation between retained imports and originated exports. Originated exports represents the complement within total exports of imports included in exports, subsuming almost all commodity categories; whereas retained imports, which is the complement of imports included in exports, has a heavy concentration of consumption goods. The latter cannot readily be imputed as a charge against any particular set of outputs, which tends to confound the search for what "contribution" they make to national income. Even if this stage of the analysis were successful, we would have merely the point of departure for a truly dynamic explanation. In the meantime, study of originated exports and retained imports may provide helpful clues, but these will probably be found only in disaggregated data.