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TREND AND FLUCTUATION IN THE TERMS OF TRADE OF PRIMARY EXPORTS*

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Introduction

Underdeveloped primary exporting countries have been confronting difficulties especially since 1952 or 1953, for their terms of trade seem to turn to long-run downward movements accompanying wide cyclical and short-run fluctuations. Was the prosperity of primary exports during the second World War and Korean War merely a short-lived dream? Prospects for primary exports are really unpromising.

In this paper, we hope first to find in what the difficulties of primary exports are rooted and to set forth two characteristics of behavior of the terms of trade of primary exports as a whole: viz., upward rigidity and a downward secular trend on the one hand and wide cyclical and short-run fluctuations on the other.

Second, a basic equation will be presented in order to make our thinking systematic and in order to depict theoretically the causes and mechanism of behavior of the terms of trade. Third, along the lines of our theoretical framework, we shall examine different patterns of long-run trend in the terms of trade of various primary commodities, and several causes of cyclical and short-run fluctuations by commodity. Lastly, we shall suggest remedies obtainable from our analysis for the difficulties of underdeveloped primary exporting countries.

I. *Difficulties in Primary Exports*

(1) *Shifts in the Pattern of Comparative Advantage*

The reasons why primary producing countries have fallen into difficulties, primarily because of low and declining income elasticities of demand by advanced industrial countries for primary imports, have been thoroughly examined in Ragnar Nurkse, *Patterns of Trade and Development*, Wicksell Lectures 1959; United Nations, *World Economic Survey 1958*; and elsewhere. The difficulties of primary producing countries today are, it seems to me, deeply seated in shifts in the determinants of comparative advantage from the pattern of the 19th century to that of post second World War.

Let us suppose that goods are produced by the combined inputs of three factors of production: *L*-labor with some skills, *N*-natural factors (land, fertility, climate, natural resources, etc.), and *C*-capital stocks. It is complicated and practically useless to apply the theory of

* The research was originally done as a project of the Institute of Asian Economic Affairs, Tokyo. I am indebted to the member of the project, Messrs. O. Abe, H. Aihara, K. Henmi and S. Noda, and also to Mr. Arlon R. Tussing for his help in polishing English expressions.

factor endowments (the Heckscher-Ohlin theorem) to three factor case. If one of the three factors can, however, be regarded to have no influence in determining comparative advantage, we may conceive three patterns of comparative advantage, viz., $N-L$ pattern, $C-L$ pattern, and $N-C$ pattern. It can be said that the increase in world trade was determined mainly by the $N-L$ pattern in the 19th century and by the $C-L$ pattern in post second World War.

In the 19th century, world trade was structured by differences between abundant skilled workers with limited natural factors in Britain and huge unutilized natural factors with scarce labor in the newly settled countries. Capital stocks (the third factor, C) moved freely and were indifferent for both countries in determining comparative advantage. Since the natural factor was not easy to change, the international specialization of this $L-N$ pattern was stable, durable and mutually complementary, and brought about the transmission of economic growth through trade expansion.¹

In the 20th century, particularly since the second World War, trade among manufactured goods and among industrial countries has increased rapidly while primary exports (especially when oil is excluded) have relatively stagnated.² The importance of natural factors has been displaced by that of capital due mainly to a rapid and wide progress of industrial technology. Increases in world trade today are mainly determined by different C/L endowment ratios between industrial countries. Since primary product inputs for manufacturing are available at almost the same price for different industrial countries, the third factor, N , can be regarded as making no significant difference to comparative costs among the industrial countries. A shift in expansion of world trade from the $N-L$ pattern to the $C-L$ pattern has forced primary producing countries into immiserizing growth³ and made their industrialization, somewhere in a large common market, indispensable.⁴

The $C-L$ pattern of trade brought difficulties to industrial countries also. It involves an intrinsic instability of trade, since both C and L factors being variable in the long run, a saw-saw behavior in the C/L endowment ratio and successive changes in international specialization between industrial vs. industrializing countries are unavoidable. In order to stabilize the intrinsic instability in the trade of manufactured goods and also to utilize economies of scale, a large common market like the European Economic Community is aimed at among industrial countries.⁵

An international trade in oil exploited in less developed countries, and heavy machines and equipment produced in advanced countries is a representative example of the $N-C$ pattern of specialization, where the L -factor hardly affects the determination of comparative advantage.

Due to the shifts of world trade from the $N-L$ pattern to the $C-L$ pattern, the growth of advanced economies does not today tend to transmit itself to the periphery, because of a

¹ See the excellent explanation of Ragnar Nurkse, *Patterns of Trade and Development*, Wicksell Lectures 1959, Stockholm 1959, pp. 13-19.

² See Ragnar Nurkse, *ibid.*, pp. 19-22; GATT, *International Trade 1959-1960*, Geneva 1960, Part I; and United Nations, *World Economic Survey 1958*, New York 1959, Part I, Chap. 1.

³ For an ingenious formal presentation of the theory of immiserizing growth, see J. Bhagwati, "Immiserizing Growth: A Geometrical Note," *Review of Economic Studies*, Vol. XXV, No. 3, June 1958 and "International Trade and Economic Expansion," *American Economic Review*, December 1958.

⁴ See, for example, United Nations, *The Latin American Common Market*, U.N. Department of Economic and Social Affairs, 1959.

⁵ I would like to mention, among others, only J. R. Hicks, *Essays in World Economics*, Oxford, 1959, pp. 267-268, and Tibor Scitovsky, *Economic Theory and Western European Integration*, London 1958.

declining proportional expansion in demand for crude materials and foodstuffs. Not only has the transmission of growth through trade expansion, as was seen in the 19th century model of world trade, almost ceased, but less developed countries today are also suffering from "backwash effects" because of an unfavorable trend and instability in the terms of trade. Only the *N-C* pattern of trade retains some "spread effects."⁶

What are then forces which brought about the shifts of world trade from the *N-L* pattern to the *C-L* pattern? Although Nurkse⁷ and others mention several reasons, I would like to stress four main causes. First, the leader of world trade has shifted from Britain, a small island with limited natural factors, to America, a large continental country with abundant and various natural factors. Britain promoted international specialization by concentrating herself in manufacturing and contracting agriculture, and wanted to complement her needs for raw materials and foodstuffs by developing new periphery countries. But America aimed at balanced growth and proceeded more or less, particularly compared with Britain, towards self-sufficiency.

Second, technical progress has proceeded towards the displacement of natural raw materials by synthetic substitutes produced from a few basic elements of mostly local origin, and toward economizing natural materials in industrial use. Third, agricultural protectionism based upon national defense and full-employment considerations in advanced countries has adversely affected the *N-L* pattern of trade. National defense considerations have also stimulated technical progress away from the *N-L* pattern of trade.

Fourth, in primary producing areas, development of the increasing returns type in fertile and sparsely populated lands has almost come to an end and now it is displaced by development of the decreasing returns type in densely populated areas in Asia and Africa, where the incremental costs of expanding agricultural production are higher than in advanced countries. This makes it difficult and unbeneficial for less developed countries to continue and expand the *N-L* pattern of trade. In spite of the fact that primary exports are not advantageous even to presently less advanced countries, their production is being expanded not only in established producing countries but also in new areas, for it is easy for an increasing labor force to enter agriculture, while it is more difficult to quit agriculture and to shift resources to industry because of lack of capital and skills.⁸

The first three structural changes in world trade boil down to the low and declining income elasticities of advanced industrial countries' import demand for primary products. While the demand for primary exports increases at a slow and declining rate of growth, their supply, because of the fourth reason, increases fairly rapidly, and the terms of trade for primary products should certainly fall as a long-run tendency. What is worse, because of difficulties in improving productivity in over-populated countries, the fall in the terms of trade means the decline of real income and compels an immiserizing growth. These are deep-rooted difficulties in primary producing countries.

⁶ The "backwash and spread effects" are Gunnar Myrdal's terminology. See his *Economic Theory and Under-developed Regions*, London 1957, pp. 27-33.

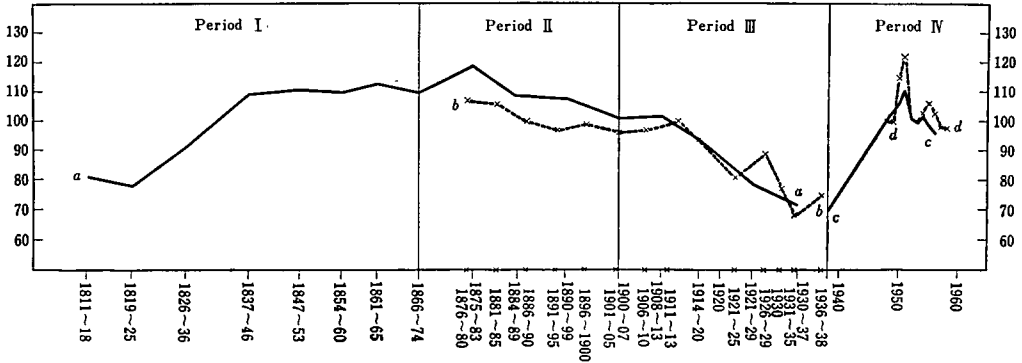
⁷ Ragnar Nurkse, *Patterns of Trade and Development*, *ibid.*, pp. 23-24.

⁸ See Charles P. Kindleberger, *The Terms of Trade: A European Case Study*, New York, 1956, pp. 270-275, and p. 306.

(2) *Secular Downward Trend in the Terms of Trade*

It is true that there are many difficulties and questions⁹ involved in calculating and interpreting the terms of trade between primary exports and manufactured imports or between

CHART I. COMMODITY TERMS OF TRADE



- Series a: British Import Price/British Export Price (1913=100). W. A. Lewis, *Economic Survey, 1919-39*, London 1950, pp. 195, 202.
- Series b: Price (in gold) of World Primary Products/Price (in gold) of World Manufactured Articles (1913=100). League of Nations, *Industrialization and Foreign Trade*, 1945, reprinted by the United Nations, 1948, p. 157.
- Series c: Dollar Unit Values of Primary Products/Dollar Unit Values of Manufactures (1953=100). P. Lamartine Yates, *Forty Years of Foreign Trade*, London 1959, p. 40.
- Series d: Terms of Trade in ECAFE Primary Exporting Countries: Dollar Unit Values of Exports/Dollar Unit Values of Imports (1953=100). United Nations, *Economic Survey of Asia and the Far East 1959*, Bangkok 1960, pp. 63, 108.

CHART 2. TERMS OF TRADE OF DEVELOPING COUNTRIES



(Reproduced from U.N., *World Economic Survey 1962*, Part II, p. 50.)

⁹ See Robert E. Baldwin, "Secular Movements in the Terms of Trade," *American Economic Review*, May 1955, and Jacob Viner, *International Trade and Economic Development*, Oxford 1953, p. 114.

underdeveloped countries and advanced industrial countries. However, a number of "commodity terms of trade" series drawn in Chart 1 show an interesting secular trend. In period I, from the early 19th century to 1861-65, the terms of trade experienced a long-run upward trend¹⁰ in favor of British imports or primary products.

Around the 1860's, the terms of trade turned to a secular downward trend unfavorable to primary products or to primary producing countries. The secular downward trend can be divided into three periods, each of which associated with a great war—the Prussian-French War (1870-71), World War I and World War II and the Korean War. In each period, some great shocks raise primary exports' terms of trade abruptly. The steep rise shoots to a peak and returns to a long-run downward trend. We may characterise such behavior of primary exports' terms of trade, as clearly shown in period II and III, as *upward rigidity and long-run downward trend*.

Indices in period IV should be cautiously compared with other periods, for the base year is different. But Yates' index (series *c* in Chart 1) in 1938 shows only five points difference, i.e., 75 when 1913 is the base year¹¹ and 70 when 1953 is the base year. Post-war terms of trade may, therefore, be regarded as quite favorable to primary products as compared with the pre-war level or as a position in the secular downward trend since the 1860's. Here remains the question whether the abrupt rise in primary products' terms of trade inspired by the second World War and Korean War had already reached its peak in 1951 and since then the terms of trade have returned to the long-run downward trend, as happened in periods II and III. This is occurring again as Chart 2 clearly shows.

It seems to me that upward rigidity and a long-run downward trend are historical characteristics of primary products' terms of trade since the 1860's. We have to inquire what forces and mechanisms have worked in bringing about these characteristics. Shifts in world trade from the *N-L* pattern to the *C-L* pattern may certainly have important causal relationships with the historical characteristics.

(3) *Narrowness of Free Market for Primary Exports*

It is widely recognized that primary exports, in their total revenues, in prices as well as in quantities, experience cyclical fluctuations which are synchronized with, and much wider than, industrial countries' business cycles.¹² The wider cyclical and short-run fluctuations are another characteristic of primary exports' terms of trade. As one of their causes, we have to pay attention to the narrowness of free market for primary exports.¹³

Considerations from the viewpoint of national defense and full employment are still powerfully observed in protecting the production of primary products in advanced industrial countries. The same considerations inspired technical progress towards synthetic industries, bringing about shifts in comparative advantage from *N-L* pattern to *C-L* pattern. Advanced

¹⁰ Concerning this trend up to the 1860's, see W. W. Rostow, *The Process of Economic Growth*, Oxford 1953, Chap. IX.

¹¹ Taking 1913=100, Yates' terms of trade before the second World War are, 1876-80=107, 1896-1900=86, 1913=100, 1928=89, 1929=89, 1937=82, and 1938=75. P. Lamartine Yates, *Forty Years of Foreign Trade*, London 1959, p. 39.

¹² See a few instances shown later in Section III of this paper.

¹³ The narrowness of free market in sugar, for example, is pointed out in V. P. Timoshenko and B. C. Swerling, *The World's Sugar, Progress and Policy*, 1957, pp. 340-345.

industrial countries wish to produce food and raw materials within their borders as much as possible, under strong protection and by synthetic industries if necessary. They wish to secure primary products as safely as possible in one or another kind of sheltered market, e.g., in colonies, satellite or protected countries, or by long-range and preferential purchase contracts, preferential quotas, etc.

The advanced industrial countries' attitudes have, along with other causes, resulted in, first, the fact that underdeveloped countries have to concentrate on a limited number of primary products—i.e., monoculture—and also to concentrate their markets in limited specific advanced countries. Here is one deep root of instability in the underdeveloped economies. Second, a free market, in which producers want to sell to any customer indifferently and to which any exporter can supply without discrimination, is becoming narrower and still narrower.

Thirdly, advanced industrial countries certainly favor the adjustment of demand and supply, first, in their domestic market and then in their sheltered market, and only the residual, unadjustable part of the imbalance is offered to free market. Exports from free markets are now depending upon the rather volatile mercy of advanced countries. Since the sheltered market, including the advanced countries' market, is very large while the free market is limited, even a small fluctuation of the imbalance in sheltered markets causes a great percentage change in demand in the free market and incurs wide fluctuations of primary export prices there.

To sum up, the fundamental causes of difficulties in primary exports are shifts in the expansion of world trade from *N-L* pattern to *C-L* pattern, which bring about, one way or another, upward rigidity and a downward long-run trend on the one hand, and wider cyclical and short-run fluctuations on the other, in the primary exports' terms of trade.¹⁴ We would like to examine further the facts and mechanism of, and the remedies for these two characteristics.

II. *Framework of Theoretical Analysis*

Presenting some fundamental equations which determine the behavior of the prices of primary products may be of great use in making clear the causes and mechanism of, and remedies for, difficulties in primary exports.

The national income (denoted by Y) of advanced industrial countries is assumed to be increasing at the continuous rate $R_Y \left(= \frac{1}{Y} \cdot \frac{dY}{dt} \right)$. The productive factors represented by labor (denoted by L) in a typical primary producing country is assumed to be increasing at the continuous rate $R_L \left(= \frac{1}{L} \cdot \frac{dL}{dt} \right)$. The price (denoted by P) of primary products in terms of manufactured goods is assumed to change at the rate $r_P \left(= \frac{1}{P} \cdot \frac{dP}{dt} \right)$, which may be

¹⁴ The two characteristics of secular downward trend and wider cyclical fluctuations are considered in many studies. The first of the post-war studies may be United Nations, *Relative Prices of Exports and Imports of Under-developed Countries*, New York 1949, p. 7. Our intention is to make clear, by introducing random shocks, the mechanism and the causes of the two characteristics.

positive, negative or zero.

The advanced industrial country's demand (denoted by D) for primary imports is assumed to be a function of Y and P , and the primary producing country's supply (denoted by S) of primary exports is assumed to be a function of L and P . In symbols,

$$D=f(P, Y) \dots\dots\dots(i)$$

$$S=\phi(P, L) \dots\dots\dots(ii)$$

The demand/supply ratio (denoted by B) of primary products in a free world market will be

$$B=D/S \dots\dots\dots(iii)$$

Differentiating this by t , and using the symbols defined above and others, we obtain

$$R_B=(\eta_D+\eta_S)(-r_P)+\epsilon_D R_Y-\epsilon_S R_L \dots\dots\dots(iv)$$

where

$$R_B=\frac{1}{B} \cdot \frac{dB}{dt},$$

$$\eta_D=-\frac{P}{D} \cdot \frac{\partial D}{\partial P} \dots\text{the price elasticity of advanced country's demand for primary imports,}$$

$$\eta_S=\frac{P}{S} \cdot \frac{\partial S}{\partial P} \dots\text{the price elasticity of primary country's supply of primary exports,}$$

$$\epsilon_D=\frac{Y}{D} \cdot \frac{\partial D}{\partial Y} \dots\text{the income elasticity of advanced country's demand for primary imports,}$$

$$\epsilon_S=\frac{L}{S} \cdot \frac{\partial S}{\partial L} \dots\text{the productive-factor elasticity}^{16}\text{ of primary country's supply of primary exports.}$$

In the long-run, demand and supply should be kept in equilibrium, or R_B should be zero. In order to keep that $D=S$, equation (iv) becomes¹⁶

$$r_P=\frac{\epsilon_D R_Y-\epsilon_S R_L}{\eta_D+\eta_S} \dots\dots\dots (1)$$

We may insert into this such random shocks as μ, ν , which will be explained presently, and R_k , the rate of change in stocks of primary exports; then we obtain

$$r_P=\frac{(1+\mu)\epsilon_D R_Y-(1+\nu)\epsilon_S R_L+R_k}{\eta_D+\eta_S} \dots\dots\dots (2)$$

These two expressions are our basic analytical equations.¹⁷

The first basic equation expresses, first, that a divergent rate of growth in demand ($=\epsilon_D R_Y$) and in supply ($=\epsilon_S R_L$) are potential pressures for long-run changes in the terms of trade of primary exports. The long-run downward trend should result from the fact that $\epsilon_D R_Y$ is smaller than $\epsilon_S R_L$. It may, however, due either to $R_Y < R_L$ or $\epsilon_D < \epsilon_S$, or to their combination.

¹⁵ This may alternatively be called the output elasticity of supply if you put total output, say O , instead of productive-factors L . Nurkse uses "output elasticity of supply" in our sense of productive-factor elasticity. See Ragnar Nurkse, *Patterns of Trade and Development, ibid.*, p. 58. The productive-factor elasticity of supply is determined by a tendency with which productive factors are appropriated to primary export production and their productivity in it.

¹⁶ The manner of derivation of equation (1) is fundamentally the same as Harry G. Johnson's. See his *International Trade and Economic Growth*, London 1958, pp. 96-100, and "Economic Development and International Trade," *Nationalökonomisk Tidskrift*, 1959, 97 Bind 5-6 Hefte, pp. 270-271.

¹⁷ Our basic equations are applicable both to primary exports as a whole and to a single primary export commodity by taking properly two groups of countries for each case. According to the grouping of countries, not only other parameters but also R_Y and R_L will vary.

Some items of primary exports may be much more influenced by one factor than others.

Secondly, the divergence in the numerator, $\varepsilon_D R_Y - \varepsilon_S R_L$, is offset and demand and supply are brought into equilibrium by changes in the terms of trade, r_P , which are influenced by the denominator, the sum of price elasticities, $\eta_D + \eta_S$. If both η_D and η_S are positive, the stability condition is satisfied. The smaller the sum of price elasticities, the larger will be the fluctuations in the terms of trade. If the sum is smaller (or larger) than unity, price fluctuations are wider (or smaller) than the divergence in $\varepsilon_D R_Y - \varepsilon_S R_L$.

The second basic equation is useful in explaining the mechanism bringing about upward rigidity in the long-run trend and the wider cyclical and short-run fluctuations in primary exports' terms of trade. A random shock μ is positive when advanced countries' demand abruptly increases because of war or other emergency, while it is negative when synthetic substitutes and other technical progress are introduced, and when the production of primary goods is stimulated by protection or other policy measures in the advanced countries and their sheltered markets. A second random shock ν is positive when production starts anew in the case of war, for example, in areas which hitherto were not engaged, or when new mines and new oil fields are developed, or when harvests are good, while it is negative when harvests are bad. A third random shock R_k is a short-run change in national and international buffer stock of primary products.¹⁸

As far as the upward rigidity in primary exports' terms of trade is concerned, its mechanism will be the following: War raises primary products' price abruptly as compared with manufactured goods and this favorable price change and the urgent necessity for primary products inspire, on the one hand, negative μ in advanced countries and their sheltered markets and, on the other hand, positive ν in primary producing countries. Which becomes effective first, either $-\mu$ or ν , depends upon the kind of commodity and the circumstances. As one of them becomes effective, the abrupt rise in primary exports' price reaches its peak, and as both of them come to be effective, primary products in the world as a whole tend toward over-production and their price inevitably returns to the long-run downward trend. In the long-run, $-\mu$ and ν are incorporated in and modify ε_D , the income elasticity of the advanced country's demand, and ε_S , productive-factor elasticity of the primary country's supply, so as to reduce the former and to increase the latter.

As far as we are concerned with wider cyclical and short-run fluctuations in the primary exports' terms of trade, alternative explanations can be developed from our equation (2). It is widely held that the low price elasticity of primary exports both in demand and supply is the main cause of wide price fluctuations. It is hardly believable, however, that the sum of price elasticities, $\eta_D + \eta_S$, is less than 0.5, but it may be around unity. Even if it is only 0.5, half of the wide price fluctuations should be explained by other factors in the numerator of the equation (2). There is hardly any remedy for the smallness of price elasticities. I would like to stress, therefore, the importance of fluctuations in the volume of trade.

Let us divide the world market of primary products into a sheltered market, which includes demand and supply in advanced industrial countries and their sheltered areas, and a

¹⁸ It may be better to divide our random shocks into two sub-groups. The first group is those that have long-run effects and will be incorporated in and modify the income elasticity, ε_D , and the productive-factor elasticity, ε_S , in the long-run process. The second group are those whose effect is confined to the short-run. Precisely speaking, both μ and ν involves both sub-groups. In the following, however, we treat μ and ν as mainly the first-group and R_k as the second group.

free market. Let "excess demand in sheltered market/supply capacity in free market" be called *imbalance ratio*. This imbalance ratio experiences incessant fluctuations due to random shocks, especially R_k and some of μ and ν , and fluctuations are great because of the narrowness of the free market relative to the big sheltered market.

In short, it can be said theoretically, first, that the long-run downward price trend is brought about by a tendency for $\varepsilon_D R_Y$ to become smaller and smaller than $\varepsilon_S R_L$. Second, the mechanism of upward price rigidity is well explained by random shocks, μ and ν . Third, wider price instabilities are due to fluctuations in the imbalance ratio much more than to the smallness of price elasticities.

III. Character of Changes of Primary Product Prices

We had hoped to study the behavior of primary exports' terms of trade in detail by commodity along the lines of our theoretical framework, but it was not possible because of the shortage of data. We have tried, therefore, to show merely a few instances from published sources which are relevant to our theoretical analysis.

(1) Long-run price trend by commodity

P. L. Yates presents us 12 valuable graphs¹⁹ which show long-run year-to-year changes from 1913 to 1955 in quantum and price (unit value) of 34 primary exports, including 18 kinds of food, 9 kinds of agricultural raw materials and 7 kinds of minerals and metals. Since the unit value index (1920-38=100) of each primary product is deflated by the unit value index of all products entering international trade in the corresponding year, it shows the terms of trade of each primary product.

We may divide the 34 primary products into three types from the viewpoint of price behavior, although it is not easy to classify definitely each commodity, since, as mentioned in connection with Chart 1, the indices are broken by the two world wars and the trend since the second World War was not yet certain in 1955 when his book was written.

FIG. A

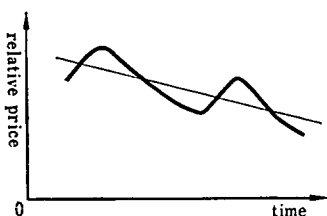


FIG. B

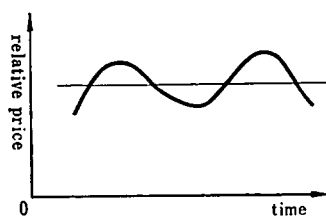
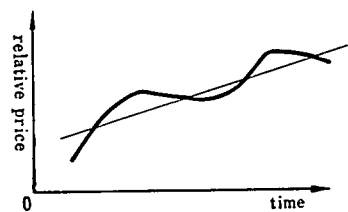


FIG. C



A-type: Downward long-run price trend

As shown in Fig. A, primary exports of this type experience upward rigidity and a long-run downward trend in their terms of trade. They have, therefore, the most typical characteristic of primary exports. Commodities of this type are 19 kinds; *Food*—wheat, maize, rice,

¹⁹ P. Lamartine Yates, *Forty Years of Foreign Trade*, *ibid.*, pp. 68, 78, 83, 86, 94, 97, 108, 115, 118, 134, 141 and 152.

eggs, salted cod, cheese, cocoa, coffee, linseed oil, edible oil, butter: *Agricultural Raw Materials*—cotton, wool, jute, sugar, rubber, newsprint: *Minerals and Metals*—copper, aluminium. It should be noted that they are almost all food and agricultural raw materials and that demand for them (=export volume) is generally increasing.

B-type: Constant long-run price trend

As shown in Fig. B, primary exports of the B-type experience a constant long-run price trend with cyclical fluctuations. They are 13 kinds: *Food*—beef, bacon, mutton, tea, dried fruit, citrus, bananas; *Agricultural Raw Materials*—tobacco, chemical woodpulp; *Minerals and Metals*—tin, lead, zinc, crude oil. They are mainly primary products of stagnant demand such as either luxury foods or tin, lead and zinc. Exceptions are chemical woodpulp and crude oil, for which demand is increasing, but they may be controlled by administered prices.

C-type: Upward long-run price trend

As shown in Fig. C, primary exports of this type experience, quite contrary to the A-type, a long-run upward trend and downward rigidity in their price. They are, however, limited only to 2 items: softwood and coal. It is certain that demands for these primary products are stagnating while the law of decreasing returns presses strongly their price behavior.

Now, it is interesting to know that A-type commodities occupy the majority, 19 out of 34 or 56%. The C-type is an exception and may be thought of as the last and decaying stage of the life cycle of a commodity. The total of A- and B-type amounts to 32 out of 34. The first stage in the life cycle of primary exports is A-type, where demands increase rapidly, relative to other types, and it turns to the B-type in the second stage when demands become stagnant, and it reaches the C-type in the last stage when demands are declining. The price trend traces a U-shape through the whole life cycle of a commodity. This may be true also in primary exports as a whole. The majority of primary exports have been of A-type and a part of them B-type and only a limited number of them are already in C-type. All of them may gradually shift to C-type.

From the viewpoint of price behavior, the C-type or even the B-type seems to be more favorable than the A-type to underdeveloped countries. But it is not true, for demands for them are declining or stagnating and costs are increasing. Increases in costs may be greater than the rise of prices. The upward rigidity and long-run downward trend may be said to be working not only in types A and B but also in C-type if we compare the terms of trade with changes in relative costs (or productivity) between primary products and manufactures.

The A-type should be thought of as still the most favorable relative to other primary exports, since demands for these products increase most rapidly. Because of the greater increase in demand for type A than for other primary exports, its production is stimulated more strongly both in sheltered and free markets, and frequently random shocks, $-\mu$ and ν , are experienced. The upward rigidity and the long-run downward trend work typically and effectively.

From our observation in the above, it may be said that in non-tropical foodstuffs, both ϵ_D and ϵ_S are small but $\epsilon_D < \epsilon_S$, which is the main cause of long-run downward price trend. In tropical luxury foodstuffs, both ϵ_D and ϵ_S are large but $\epsilon_D \leq \epsilon_S$, and, therefore, the long-run price trend is downward or constant. In agricultural raw-materials which take the strongest

downward trend, R_Y may be greater than R_L ²⁰, but because of frequent random shocks, $-\mu$ and ν , the long-run elasticity, into which the effects of random shocks are incorporated, is such that $\epsilon_D < \epsilon_S$ and especially ϵ_D declines. In minerals and metals, though their character is similar to agricultural raw materials, the unfavorable effects of random shocks are yet small.

If more detailed study is done by commodity, by type A, B and C as shown in the above, or by some classification such as non-tropical foodstuffs, tropical foodstuffs, agricultural raw materials and minerals and metals, we may be able to find the causes of different long-run price trends among them, e.g., the value of ϵ_D , ϵ_S , R_Y and R_L and difference between ϵ_D and ϵ_S and between R_Y and R_L , and the frequency and effects of random shock, μ and ν , in different commodities. The study will help to find relevant remedies differing by commodity.

(2) *Wider Price Fluctuations by Commodity*

There are several ways to show that primary exports, in their total revenue, prices as well as quantities, experience cyclical fluctuations which are synchronized with but much wider than the industrial centers' business cycles. It may be enough to present here Chart 3, which clearly shows that the South-East Asian commodity price index,²¹ computed by the Japanese Economic Planning Agency, fluctuated in coincidence with, but in wider amplitude than, the American industrial production index.

We have theoretically interpreted the wider price fluctuations of primary exports as due not only to the low price elasticities both of demand and supply but also, or much more, to fluctuations in the imbalance ratio defined above. Let us show a few facts which support our interpretation.

In most reliable studies, United Nations, *Instability in Export Markets of Under-developed Countries*, 1952, and United Nations, *World Economic Survey 1958*, we may find important facts. First, a commodity of larger quantity fluctuation experiences also wider price fluctuation. Average of year-to-year fluctuation for fifty years between 1901-51, for example, was 29.0% in quantity and 20.7% in price for rubber, 20.7% and 11.6% for rice, and 10.3% and 8.8% for tea respectively.²² Since the larger quantity fluctuation is a sign of rapider long-run demand increase, we may put it in another way that the greater the demand increase in the long-run, the greater will be the imbalance ratio and the wider will be the price fluctuation.

Second, the above example shows that fluctuations in quantity are greater than those in price. The other study shows, however, that the average of the all group of selected primary exports fluctuated by 8% in quantity and 16% in price for 1920-38 and 8% and 11% respectively for 1948-57.²³ This means that the instability of quantity has not changed but that of price has decreased.²⁴ It is important for us that fluctuation in quantity is almost equally

²⁰ As it has been noted above (note 17 in Section II), R_Y and R_L vary in different commodity.

²¹ The index covers 6 South-East Asian primary exports: rubber (39%), tea (20%), copra (12%), cotton (11%), tin (10%), and jute (8%), the percentage in the bracket being the quantity weights used in the computation of the price index. The index is published in the Japanese Economic Planning Agency, *Kaigai Keizai Geppo* (Monthly Bulletin on Overseas Economies).

²² United Nations, *Instability in Export Markets of Under-developed Countries*, New York 1952, pp. 11 and 30-31.

²³ United Nations, *World Economic Survey 1958*, New York 1959, p. 40, Table 13.

²⁴ This is shown in detail by commodity in United Nations, *World Economic Survey 1958*, *ibid.*, p. 41, Table 14 and p. 42, Table 15. These tables show, it should be noted, that instability in quantity has increased mainly in foodstuffs and agricultural raw materials.

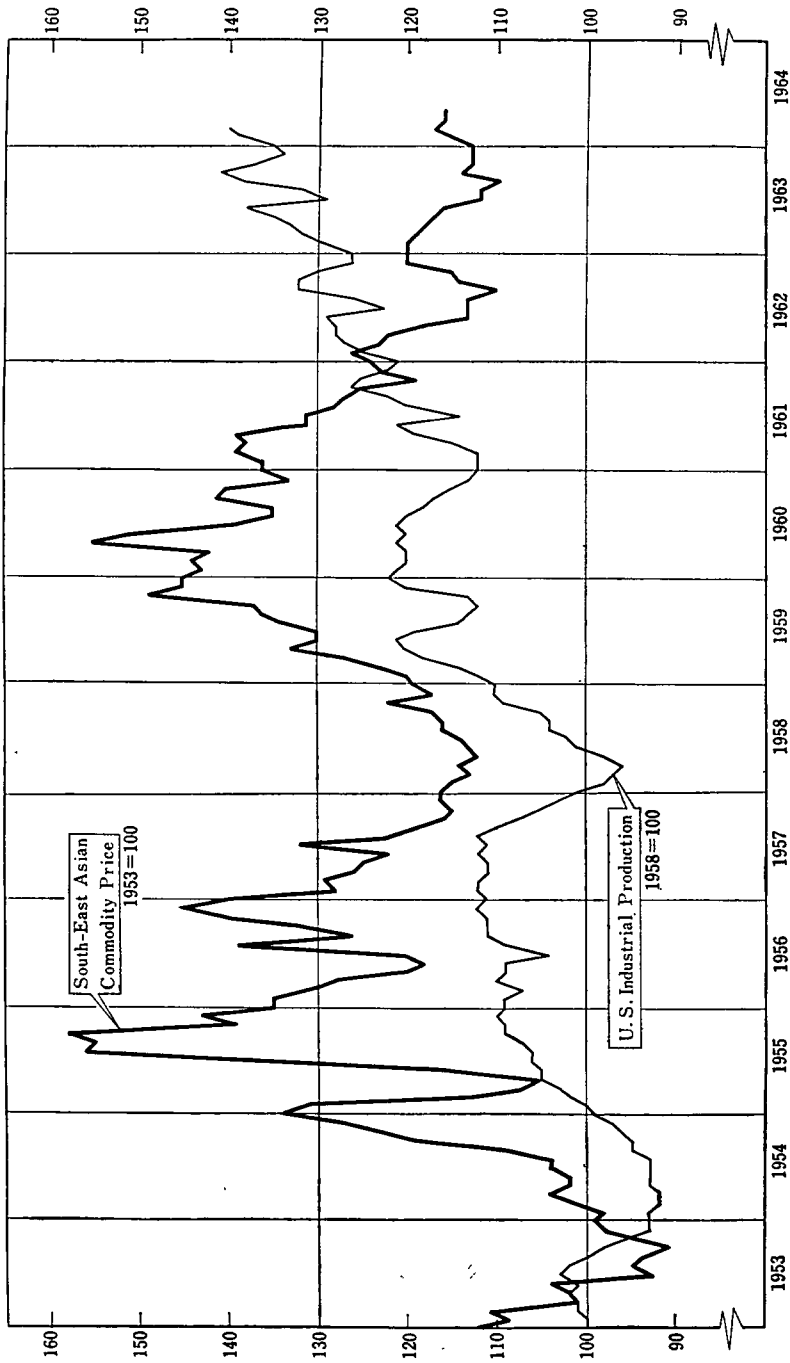


CHART 3. U. S. INDUSTRIAL PRODUCTION AND SOUTH-EAST ASIAN COMMODITY PRICE

wide as price instability. From this fact, we may interpret according to our basic equations that the sum of price elasticities, $\eta_D + \eta_S$, is roughly unity, though it varies by commodity.

Third, it is shown that the self-sufficiency ratio of agricultural products in OEEC countries and American share in world exports of agricultural products have greatly increased in the post-war period.²⁵ It is also shown that one per cent decline of primary production in industrial countries (OEEC countries and America) induces a very great change in primary imports, amounting to, in the average of selected commodities, 9.4% increase in the net primary imports.²⁶ GATT's study shows that primary exports trading in sheltered channels relative to those trading in unsheltered channels expanded greater in volume and fluctuated less in price.²⁷ These facts indicate that random shocks, $-\mu$, introduced in the industrial countries and their sheltered market bring about a large fluctuation in the imbalance ratio and work in the long-run unfavorably to the primary exports from free market.

Fourth, it is well-known that changes in stockpiling, i.e., R_k in our equation (2), of industrial countries causes enormous shocks in prices of primary exports. Purchase of rubber for emergency stockpiling and its release by America, for example, seems to determine short-run changes in the international rubber price.

The stockpiling policy, national as well as international, is a double-edged sword. It may increase in the instability but it can also be wisely used to stabilize fluctuations.

Fifth, though it has not yet been studied thoroughly, the instability of primary exports of a country depends upon the degree of concentration²⁸ in export commodities as well as in the countries to which it exports. It may be expected that the more a country's exports are diversified in commodity and in country, the less will be the instability of short-run fluctuation.²⁹

IV. Suggestions for Remedies

We can derive a few suggestions for the remedy of the difficulties of the underdeveloped primary exporting countries from our analysis above, especially along the line of our basic equations.

As far as wider cyclical and short-run fluctuations are concerned, measures should be taken so as to lessen amplitudes of the imbalance ratio.

First, an effective buffer stock policy, national as well as international, should be

²⁵ United Nations, *World Economic Survey 1958*, *ibid.*, p. 70 and p. 76 (Table 25).

²⁶ *Ibid.*, p. 78, Table 26.

²⁷ GATT, *International Trade 1957-58*, Geneva 1959, pp. 24-29.

²⁸ The concentration of trade is studied by Albert O. Hirschman, *National Power and the Structure of Foreign Trade*, California 1945, and M. Michaely, "Concentration of Exports and Imports: An International Comparison," *Economic Journal*, December 1958, and "The Shares of Countries in World Trade," *Review of Economics and Statistics*, August 1960.

²⁹ This instability problem is quite different from the problem that the concentration of exports may or may not bring about greater gains from trade than otherwise in the long-run. In this connection we have to pay attention to Kindleberger's study of "detailed index" which shows that the more advanced, dynamic and diversified countries, even though they are primary exporting countries, enjoy more favorable long-run terms of trade than other primary exporting countries. See, Charles P. Kindleberger, *The Terms of Trade, A European Case Study*, New York 1956, Chap. 10, and "The Terms of Trade and Economic Development," *Review of Economics and Statistics*, February 1958 Supplement.

established. It is not discussed here, for there are many excellent studies.³⁰

Second, the free market of primary exports should be widened by liberalizing the advanced industrial countries' agricultural protection.³¹ Ideally, a global free market should be established. Without this, the buffer stock policy which adjusts the stock in the limited free market is ineffective, and the free market suffers from a backwash effect from the advanced sheltered market.

Third, if the liberalization of advanced countries' protection is not easy to realize, an underdeveloped country which has belonged to the free market or has recently entered the free market at the time of independence may be better off if it shifts itself into the sheltered market of some industrial center. This may be, however, defeatism and not a positive solution.

Fourth, industrialization based on a large integrated market or a common market may be the best solution. The common market of underdeveloped countries will be their own sheltered market for primary products. It increases their own use of primary products and lessens their export dependence on the free market.³² Solution by industrialization through a common market will be recommended from other reasons.

Next, as far as the upward rigidity and downward trend in the terms of trade are concerned, their cause is that the growth rate of demand for primary exports, i.e., $\epsilon_D R_Y$, becomes smaller and smaller than that of supply, $\epsilon_S R_L$, via the introduction of random shocks, μ and ν .

First, random shocks, both μ and ν , work incessantly and unfavorably in agricultural products but they are not yet effective in minerals and metals. Therefore, underdeveloped countries should, if possible, shift and diversify their primary exports from agricultural products to minerals and metals.

Second, industrialization of underdeveloped countries is recommended as a policy to reduce ϵ_S , the productive-factor elasticity of supply of primary exports. If it is adequately reduced and $\epsilon_S R_L$ will be equal to or less than $\epsilon_D R_Y$, the long-run terms of trade will be kept unchanged or turn in favor of primary exports. In other words, industrialization of underdeveloped countries should be promoted until the tendency of primary products' overproduction is stopped and reversed. The terms of trade, then, will be determined by a decreasing cost trend in manufactures and increasing or constant cost trend in primary products.

Now we reach to the conclusion that industrialization of underdeveloped countries is one of the best remedies for the difficulties which they confront, although it involves many difficulties and obstacles. Industrialization should, however, be accompanied and induced by the rise of agricultural productivity. It should also be based upon a large market to realize the economies of scale. A common market or regional economic integration is necessary even to underdeveloped areas. Primary products will play there a new role by providing funds for importing investment goods from advanced countries and food and raw materials for increasing regional consumption.

As far as the South-East Asian countries are concerned, their difficulties are greatest and their prospects for primary exports are most unpromising.

³⁰ See especially two symposia in *Kyklos*: "The Quest for a Stabilization Policy in Primary Producing Countries," *Kyklos*, 1958, Vol. VI Fasc. 2, and "Stabilization and Development of Primary Producing Countries," *Kyklos*, 1959, Vol. XII Fasc. 3.

³¹ See the Haberler report in GATT, *International Trade 1956-57*, Geneva 1958.

³² An interesting study has recently been presented by A. Maizels, "The Effects of Industrialization on Exports of Primary Producing Countries," *Kyklos*, 1961, Vol. XIV Fasc. 1.

First, their main exports are foodstuffs and agricultural raw materials, external demands for which are stagnating and easily substituted by synthetic products. They are not abundantly endowed with oils and other promising minerals and metals.

Second, their exports are mainly narrow free market commodities and concentrated in a limited number of commodity and country.

Third, they are densely populated and rapid population growth countries, and, therefore, their scarce natural factors cannot give an incremental comparative advantage in primary production. In other underdeveloped area of sparsely populated and with abundant natural factors, competitive primary production has been and will be greatly expanded at a lower cost.

Because of these difficulties of primary exports in South-East Asian countries, they need a big push to industrialization on regional basis.

Conclusion

In concluding, we would like to emphasize our two findings. First, upward rigidity and a downward trend in the terms of trade of primary exports are mainly due to random shocks: one is $-\mu$, particularly the introduction of synthetic substitutes and agricultural protection in advanced industrial countries, and the other is ν , the expansion of primary production in new and established primary producing areas despite the fact that the primary production is not so favorable as manufacturing. Second, wider cyclical and short-run instabilities are due to fluctuations in the imbalance ratio, which stem from the narrowness of free market, much more than to the smallness of price elasticities.

In view of these difficulties in primary producing countries, effects of buffer stock policy are limited. A more fundamental and large scale remedy is needed. This should be industrialization of underdeveloped countries on large regional basis.