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The Terms of Trade Thesis Revisited

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THE TERMS OF TRADE

THESIS REVISITED

(TITLE)

BY

Richard L. Grabowski

THESIS

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I.

INTRODUCTION

"According to one calculation, non-communist world commodity exports in recent years have amounted to approximately twelve per cent of non-communist world production. If the communist block countries are included and if we add the export of services to commodity exports we will find that the ratio of total world exports of goods and services to world income is about ten percent."[1]

The figures above grossly underestimate the importance of international trade, however. The fact that the proportion of world exports to world income is as low as ten per cent is mainly due to the skewness of the data caused by the unusual position of the United States and the Soviet Union in the world economy. Of the world's total production of goods, it is estimated that about one-half is produced by the United States and the Soviet Union; however, these two countries export a very small fraction of their national income.[2]

If the ratio of the exports to the national income for individual nations is studied the true importance of international trade can easily be seen. Such ratios are presented for Latin American nations in Table I.

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[1]Delbert A. Snider, Introduction to International Economic (Homewood, Illinois: Richard D. Irwin, Inc., 1967), p. 11.

[2]Ibid., p. 12.

TABLE I

RATIO OF EXPORTS TO NATIONAL INCOME

Bolivia	.22	Uruguay	.16
Brazil	.09	Venezuela	.35
Chile	.23	Guatamala	.20
Columbia	.16	Panama	.17
Mexico	.10	Honduras	.32
Paraguay	.17	Nicaragua	.28
Peru	.24		

*Calculated from: Statistics Bureau of the International Monetary Fund, International Financial Statistics (Washington D.C.: International Monetary Fund, Vol. XXV, No. 5) May, 1972, pp. 46-49, 66-69, 82-85, 90-93, 250-253, 208-291, 292-295, 368-371, 372-374, 284-287, 160-162, 170-173, 268-270.

*I have chosen to use only Latin American nations in this table because I will be most concerned with these nations in this paper.

As can be seen, many Latin American nations export an exceptionally large percentage of their total output. International trade is thus very important for most of these nations. For those nations of Latin America whose export sector is relatively small, international trade is still very important because it is the source of technological know-how and capital that is essential for their economic development.[3]

In light of the above evidence of the importance of international trade to underdeveloped nations it is natural that much attention should be paid to the terms of trade. The terms of trade are the terms of exchange or the ratio at which commodities are traded for each other in international trade. If the terms of trade are turning against underdeveloped nations, other things being equal, these nations will

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[3]Gottfried Haberler, "Terms of Trade and Economic Development," in Economics of Trade and Development, ed. by James D. Theberge (New York: John Wiley and Sons, Inc., 1968), pp. 323-324.

have reduced capacity to import. For example, if in one year one bushel of corn produced in country A exchanges for two drill presses produced in country B and the next year one bushel of corn exchanges for only one drill press, the terms of trade have deteriorated against country A. Thus country A is able to buy fewer drill presses with each unit of corn. Supposedly, this reduced capacity of underdeveloped nations to import, due to the deterioration of their terms of trade, will mean that these nations will have to reduce their imports of capital and technology resulting in a slower rate of growth and development. Several economists have, in recent years, presented statistical evidence which seems to show that just such a deterioration in the terms of trade for underdeveloped nations has occurred. These same economists have also developed several theories, which they believe adequately explain this phenomenon. It is the purpose of this paper to show not only that the statistical evidence used by these economists is invalid but also that their theoretical explanations are weak. In addition, this study will show the heterogeneity of the terms of trade experience of underdeveloped nations. Finally, it will be shown that even if the terms of trade tend to move against underdeveloped nations it will have little effect on their rate of economic growth.

The next section of this paper will deal with the different measures of the terms of trade. The third section of this paper will provide an exposition of the three main theories used to explain why the terms of trade tend to deteriorate against underdeveloped nations and also show how dubious are the assumptions upon which these theories are based. The fourth section of this paper will attempt to discredit the statistical evidence which is usually used to support the

deterioration of the terms-of-trade thesis and offer other statistical evidence which will show the heterogeneity of the terms of trade experience of the underdeveloped nations. In addition, this section will show that there is very little relationship between movements in the underdeveloped nations terms of trade and their rate of economic growth. The fifth section will be a summary and conclusion.

II.

MEASUREMENTS OF THE TERMS OF TRADE

The terms of exchange between the goods bought and sold or the ratio at which commodities are traded for each other internationally is, as has been stated above, what is known as the terms of trade. Before the theories concerning the movements in the terms of trade can be examined some practical means of measuring the terms of trade must be found. In the following few paragraphs, five of these measures will be explained.

The most widely used measure is the net barter terms of trade, which is also called the commodity or merchandise terms of trade. It is an index of export prices divided by an index of import prices with the quotient multiplied by 100 so as to be expressed as a percentage

$$\left[\left(\frac{P_x}{P_m} \right) \quad 100 \right] .$$

An increase in the net barter terms of trade means that a given amount of exports are exchanged for a larger quantity of imports. A fall in the net barter terms of trade, a fall in P_x relative to P_m, means that a given amount of exports are exchanged for a smaller quantity of imports. The main problem with this index is that it does not tell us anything about what has happened to the physical quantities of commodities traded. "Only if the values of exports and imports were equal in the base year and in the year under study would an improvement in

the net barter terms of trade mean that a country could actually obtain more imports with a given value of exports."[4]

The second measure of the terms of trade is called the gross barter terms of trade. It is the index of the quantity of exports divided by the index of quantity of imports

$$\left[\left(\frac{Q_x}{Q_m} \right) \quad 100 \right]$$

This measures the rate of exchange between the physical amount of exports and the physical amount of imports. Movements in this measure of the terms of trade can be very confusing and ambiguous. For example, a fall in this index would seem to suggest that the same quantity of exports can be exchanged for a larger quantity of imports, but this could be completely due to a transfer receipt or a capital inflow. Whether a movement in the gross barter terms of trade is favorable or not depends upon the type of transaction which brought the change about.[5]

The third measure is the income terms of trade which consists of a quantity of export index times a price of export index divided by the index of import prices

$$\left[\left(\frac{P_x}{P_m} \right) \quad Q_x \right]$$

A rise in the index means that a country can purchase a larger quantity of imports from the receipts of export sales. The income terms of trade index is many times called the capacity to import, but in reality it does not reflect the total capacity to import. The capacity

[4]M. O. Clement, Richard L. Pfister, Kenneth J. Rothwell, Theoretical Issues in International Economics (Boston: Houghton Mifflin Company, 1967), p. 127.

[5]Ibid., pp. 127-128.

to import also depends upon the amount of financial capital which flows into the nation, as well as receipts from commodity exports. One should be conscious of the fact that it is possible for the net barter and income terms of trade to move in opposite directions. For example, if import prices remain constant but export prices fall by five per cent, the net barter terms of trade deteriorate from one hundred to ninety-five. But suppose the quantity of exports increase by ten per cent. The income terms of trade would rise from one hundred to one hundred four and five-tenths

$$\left[\left(\frac{95}{100}\right) \quad 110 \right] = 104.5.^{6}$$

The next two concepts of the terms of trade relate to the exchange of productive factors embodied in goods exchanged in international trade. The single factoral terms of trade is made up of the net barter index which is then adjusted for productivity changes in the production of exports

$$\left[\left(\frac{P_x}{P_m}\right) \quad \text{Productivity in } x \right]$$

For example, if the export price index falls by ten per cent while the productivity index for exports rises by twenty per cent and the index of import prices remains at one hundred, the single factoral terms of trade are calculated as follows

$$\frac{(90)120}{100} = 108.$$

A rise in the single factoral terms of trade means that the nation would receive more imported goods per unit of productive factors involved in producing exports as compared with the base year. The double factoral

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[6]Ibid., p. 128.

terms of trade involved adjusting the net barter index for productivity changes in both exports and imports

$$\left[\left(\frac{P_x}{P_m} \right) \left(\frac{\text{Productivity in x}}{\text{Productivity in m}} \right) \right]$$

This would involve calculating a productivity index for both exports and imports. For example, suppose that the export price index fell by ten per cent, the productivity index for exports rose by twenty per cent, the productivity index for imports rose by ten per cent, and the import price index remained the same. We would calculate the double factoral terms of trade index in the following manner:

$$\left\{ \left[\frac{(90)120}{(100)110} \right] \; 100 \right\} = \left\{ \left(\frac{108}{110} \right) \; 100 \right\} = 98.2.$$

"This index would show the rate of exchange between a unit of domestic productive factor used in producing exports and a unit of foreign productive factors used in producing imports." The single and double factoral terms of trade, however, are not operational because of the impossibility of defining and measuring a unit of input and therefore of calculating a productivity index. A simple index of labor productivity should not be used as a measure of productivity change for all inputs. To construct a productivity index for exports and imports it would have to include changes in productivity for all factors of production.[7]

In analyzing the different measures of terms of trade we have seen that the double and single factoral terms of trade are not operational because of the impossibility of defining and measuring a unit of input and hence of calculating a meaningful productivity index. A

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[7]Ibid., pp. 128-129.

simple index of labor productivity cannot be used to measure the pro-
ductivity of all inputs. In addition, we have seen above that the
gross barter terms of trade is very ambiguous and for the purpose of
this paper not useful. Thus the net barter and income terms of trade
seem to be the only operational and practical measures. As a result,
in the chapters that follow, I will make use of these two measures of
the terms of trade.

III.

A THEORETICAL EXPOSITION

There are three main theories which have been developed to explain the deterioration of the terms of trade for underdeveloped nations. One was developed by Hans Singer and the other two were developed by Raul Prebisch. In this section I will attempt to give an explanation and a critique of each of these theories.

There are two clarifications that should be made before the analysis. First, both Singer and Prebisch use the term primary products to denote raw material and food products. Secondly, they assume throughout their analysis that all underdeveloped nations are producers and exporters of primary goods and developed nations are producers and exporters of manufactured goods.

Singer's Theory

Mr. Hans Singer argues that productivity increases much faster in the production of manufactured goods than in the production of primary goods. If we assume that both primary and manufactured goods are produced under competitive conditions, then the prices of manufactured goods must decline relative to primary product prices. The result is that in an underdeveloped nation, which exports mainly primary goods and imports primarily manufactured goods, the net barter terms of trade $\left(\frac{P_x}{P_m} \quad 100 \right)$ rises, because the price of manufactured goods

falls faster than the price of primary goods. Thus, other things being equal, the underdeveloped nations are able to purchase a larger quantity of imports, due to their price decline, with the same amount of exports. Thus, Singer argues, because productivity increases much faster in the production and export of manufactured goods rather than primary goods, the terms of trade should turn in the favor of under-developed nations. Strangely, this has not occurred. Mr. Singer states, "It is a matter of historical fact that ever since the eight-een seventies the trend of prices has been heavily against sellers of food and raw materials and in favor of the sellers of manufactured articles."[8] Why has this occurred?

According to Singer the fruits of technological progress are dis-tributed to producers in the form of rising incomes or to consumers in the form of lower prices. However, in a closed economy producers and consumers can be considered to be one in the same. Thus if pri-mary producers pass on productivity increases by lowering prices and the producers of manufactured goods pass on increases in productivity by paying higher factor prices, only an internal transfer of income occurs (from primary producers to manufactured goods producers).[9]

If international trade is introduced, the situation is greatly changed, for producers and consumers are no longer necessarily the same group. Hence, although the producers of export goods live in one country, the consumers of these goods live in other nations. Thus, if the producers distribute the fruits of increased productivity

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[8]H. W. Singer, International Development: Growth and Change (New York: McGraw-Hill Book Company, 1964), p. 164.

[9]Ibid., pp. 166-167.

through lower prices to consumers in a foreign nation, a decline in the terms of trade and an international transfer of income occurs. On the other hand, if the exporting nations distribute the fruits of increased productivity through higher incomes for its own domestic workers and higher profits for the domestic entrepreneurs, no decline in the terms of trade and no international transfer of income occurs.[10]

Mr. Singer believes that in the production of manufactured commodities in the more-developed nations, the fruits of technological progress are distributed to the factors of production in the form of rising incomes, because the factor and goods markets are distorted by monopoly power. On the other hand, in the case of underdeveloped nations exporting primary commodities the fruits of increased productivity are distributed through lower prices, because the primary products are exported under conditions of competition; hence the terms of trade would tend to move against the underdeveloped nations. In other words, the prices of manufactured goods produced by developed nations would tend to remain the same or increase while the prices of primary goods produced by the underdeveloped nations would tend to decline. As a result, the net barter terms of trade decline in the underdeveloped nations.[11]

To summarize Singer's argument one might say that the terms of trade deteriorate against underdeveloped nations because these nations produce their exports under conditions of competition while the developed countries produced their exports under conditions of monopoly.

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[10]Ibid.

[11]Ibid.

Prebisch's First Theory

Raul Prebisch assumes, as does Singer, that underdeveloped nations are producers and exporters of primary commodities and that developed nations are producers and exporters of manufactured goods. He also agrees with Singer that the terms of trade have been turning against the underdeveloped nations, especially the underdeveloped nations of Latin America. His explanation of this phenomenon is a bit different in that he believes that the deterioration of terms of trade phenomenon cannot be understood, "except in relation to trade cycles and the way in which they occur in the centers (industrialized nations) and the periphery (underdeveloped nations)."[12]

According to Prebisch there is persistant inequality between aggregate demand and supply of finished consumer goods throughout the business cycle of the center: demand exceeds supply in the upswing, resulting in rising prices for the goods produced by the center, and supply exceeds demand in the downswing, resulting in falling prices. As the demand for the products of the center rises during the upswing the center's demand for raw materials produced in the periphery will also increase, because these raw materials provide much of the basic input for many of the commodities produced in the center. As a result, the prices of the primary products produced by the periphery will also rise, but, according to Prebisch, they will rise more rapidly than the prices of goods produced by the center. This is due to the fact that competition exists, to a greater extent, in the peripheral nations and that the time required to expand the production of primary goods is

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[12]Raul Prebisch, "The Economic Development of Latin America," Economic Bulletin for Latin America, (February, 1962), p. 12.

longer than that required to expand the production of manufactured goods. As a result of the above reasons Prebisch believes that the terms of trade will favor the peripheral nations during a cyclical upswing in the center.[13]

Although the prices of primary goods rise more rapidly than the prices of manufactured goods in the upswing, they also fall just as sharply in the downswing, losing all the increase of the upswing. In contrast, the prices of manufactured goods rise less than the prices of primary goods in the upswing, but they will not fall as far during the downswing as they rose in the upswing. As a consequence of this contrasting cyclical behavior of prices, there is a widening of the gap between the prices of primary and manufactured products over successive cycles. Thus, the long-run terms of trade will deteriorate against the nations of the periphery. This deterioration in the terms of trade is due, according to Prebisch, to the existence of monopolistic elements in both factor and product markets in the center. Thus, during the cyclical upswing in the center both prices and wages rise, but during the downswing the existence of monopoly in both the factor and product markets creates price and wage rigidity within the center. This rigidity within the center keeps the prices of its goods from falling as much as they would if this rigidity did not exist.[14]

The Singer and Prebisch arguments are both based upon one major premise. This premise is that the tendency for the terms of trade to turn against underdeveloped nations exporting primary products is the result of monopoly in factor and product markets in the developed

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[13]Ibid., pp. 12-13.

[14]Ibid.

nations. Hence, if it can be shown that monopoly in the product and factor markets of developed nations does not cause declining terms of trade, we can for all intents and purposes reject their theories.

I will not deny that technical progress in the developed nations has led to higher money wages with stable or rising prices rather than to constant money income and falling prices; nor will I reject the fact that in many developed nations wage and price rigidity does exist, due to labor union pressure and monopoly. Moreover, I will also accept the idea that a substantial amount of monopoly in the factor and product markets does exist in the developed nations of the world. However, a secular tendency for the terms of trade to turn against the underdeveloped nations and in favor of the developed nations does not follow necessarily from these three ideas. It must be remembered that the existence of monopoly within a nation cannot affect the terms of trade unless its industries also exist as a monopoly on the world market. In other words, even if domestic monopolies succeed in raising prices and wages within the industrial nations, they cannot affect the world prices of manufactured goods unless the exporters possess monopoly power in the world market. If exporters do not possess monopoly power in world markets, they could not raise the prices for their exports without pricing themselves right out of the market.[15] As Kindleberger stated, "A difference between the price and wage policies of the two countries will affect their balance of payments, and through them possibly their exchange rates, but the terms of trade will remain unchanged if the nations lack monopoly power in the world markets."

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[15]Gerald M. Meier, The International Economics of Development (New York: Harper and Row Publishers, 1968), p. 62.

As examples, Kindleberger used Belgium and Italy. Between 1938 and 1952 the price level of Italy increased fifty times while that of Belgium increased only four times and yet the terms of trade for Belgium improved while that of Italy declined.[16]

The issue which we should consider is whether the industrial nations possess monopoly power in world markets for their export goods. Several economists, Kindleberger and Haberler, believe that competition in world markets for manufactured goods is greater now than in the past. Haberler states, "There is much more competition between manufacturers and producers of capital goods now then there used to be one hundred years ago, because there are now many countries that supply capital goods, machinery, industrial know how, while there was only one, England, a hundred years ago."[17] For example, today the United States is facing tremendous foreign competition in the production of automobiles, steel, radioes, televisions, electrical equipment, etc. Ten or twenty years ago the United States was the major source of most of these industrial goods.

Thus the monopoly explanation, which is the basic tenet of both Singer and Prebisch's argument, is subject to a great deal of doubt and does not provide much support for the deterioration of the terms of trade hypothesis.

Prebisch's Second Theory

The third theoretical explanation of the supposed long-term

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[16]Charles P. Kindleberger, The Terms of Trade, A European Case Study (New York: John Wiley and Sons, Inc., 1956), p. 247.

[17]Gottfried Haberler, "Terms of Trade and Economic Development," in Economics of Trade and Development, ed. by James D. Theberge (New York: John Wiley and Sons, Inc., 1968), p. 331.

deterioration of the terms of trade for underdeveloped nations was developed by Raul Prebisch. Prebisch's own explanation of his theory is quite ambiguous and at times contradictory. Therefore, I have had to piece together from his various writings what seems to me to be a fair and logical representation of his theory. On this point I may be open to criticism by Prebisch that I have misinterpreted his theory, but any misinterpretation on my part is most probably the result of Prebisch's unclear presentation of his own theory.

Prebisch's model is basically a two country model. He assumes that there is a country A which is prevailingly industrial (center) and a country B which is prevailingly engaged in primary production (periphery). Each country is further divided into two sectors: the export sector and the domestic sector. The determination of which commodity the periphery will export and which commodity the center will export depends on the physical productivity and wage ratios. The physical productivity ratio is the ratio of physical productivity per man between the periphery and the center. There are as many productivity ratios as there are commodities. The wage ratio is the ratio of the money wage rate paid to individuals in the periphery to that paid to individuals in the center. It is assumed that labor is perfectly mobile within the periphery and the center and thus there exists only one wage ratio.[18] To be able to more clearly understand how the productivity and wage ratios determine which nation will export which commodity, we shall work through the following mathematical example. If W_1 is the amount of total wages paid to labor in nation one and W_2

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[18] Raul Prebisch, "Commercial Policy in the Underdeveloped Countries," American Economic Review, XLIV (May, 1959), pp. 258-259.

is the amount of total wages paid to labor in nation two, and if H_1 represents the total number of hours worked by labor in nation one and H_2 represents the total number of hours worked by labor in nation two; then the wage rate paid to labor in nation one is

$$(1) \quad \frac{W_1}{H_1}$$

and the wage rate paid to labor in nation two is

$$(2) \quad \frac{W_2}{H_2} \quad .$$

In the same manner, if O_1 is the total output of some commodity, say steel, in nation one and O_2 is the total output of steel produced in nation two, then the productivity of labor in nation one in terms of output of steel per labor hour is

$$(3) \quad \frac{O_1}{H_1} \quad ;$$

and the productivity of labor in nation two in terms of output of steel per labor hour is

$$(4) \quad \frac{O_2}{H_2} \quad .$$

Furthermore, the price of steel produced in nation one is

$$(5) \quad \frac{\frac{W_1}{H_1}}{\frac{O_1}{H_1}} = \frac{W_1}{O_1} \quad .$$

And the price of steel produced in nation two is

$$(6) \quad \frac{\frac{W_2}{H_2}}{\frac{O_2}{H_2}} = \frac{W_2}{O_2} \quad .$$

The nation which will export steel will be that nation that produces and sells steel at the cheaper price. Suppose nation one has the lower price, then

$$(7) \quad \frac{W_1}{O_1} < \frac{W_2}{O_2} \quad .$$

Substituting equations five and six into equation seven we have

$$(8) \quad \frac{\frac{W_1}{H_1}}{\frac{O_1}{H_1}} < \frac{\frac{W_2}{H_2}}{\frac{O_2}{H_2}}$$

Rearranging equation eight we get

$$(9) \quad \frac{\frac{W_1}{H_1}}{\frac{W_2}{H_2}} < \frac{\frac{O_1}{H_1}}{\frac{O_2}{H_2}} \quad .$$

Hence nation one will produce steel at a cheaper price, and thus export it, if the ratio of nation one to nation two's productivity is greater than the ratio of nation one to nation two's wage rate. In the same manner, if nation two produces steel cheaper than nation one then

$$(10) \quad \frac{W_1}{O_1} > \frac{W_2}{O_2} \quad .$$

and by substituting equations five and six into ten we have

$$(11) \quad \frac{\frac{W_1}{H_1}}{\frac{O_1}{H_1}} > \frac{\frac{W_2}{H_2}}{\frac{O_2}{H_2}}$$

Rearranging equation eleven we get

$$(12) \quad \frac{\frac{W_1}{H_1}}{\frac{W_2}{H_2}} > \frac{\frac{O_1}{H_1}}{\frac{O_2}{H_2}} \quad .$$

Thus nation two will produce steel at a cheaper price, and thus export it, if the ratio of nation one to nation two's productivity is less than the ratio of nation one to nation two's wage rate. This is the same as saying that ratio of nation two to nation one's productivity is greater than the ratio of nation two to nation one's wage rate.

Prebisch assumes that in nation A the export sector is prevailingly industrial where productivity ranges up to three times as high as that in B. It is assumed that the domestic sector of nation A is engaged in primary production at an unfavorable productivity ratio. In country B the export sector is primarily engaged in the production of primary goods where productivity ranges up to three times that of country A. It is generally assumed by Prebisch that the domestic sector is primarily industrial with a low productivity ratio. He further assumes that the wage rate is the same in both countries and trade is in equilibrium. Thus the wage ratio is one. Thus all industrial activities in country A whose productivity ratio is greater than one will export those commodities. In the same manner, all primary activities in country B whose productivity ratio is greater than one will export those commodities. Prebisch further assumes that the income elasticity of demand for primary products and industrial products is the same and that population and per capita income are increasing at the same rate in both nations. It follows logically that if both per capita income and population are increasing at the same rate then total income is also increasing at the same rate in both nations. Finally, Prebisch assumes that productivity increases at the same rate in both nations.[19]

According to Prebisch, if we accept all of the above assumptions we will find that there is no reason for the terms of trade to deteriorate against underdeveloped nations.[20] If the rate of income growth in the two nations is the same, if the income elasticity of demand for the primary product exports of nation B by nation A is the same as the

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[19]Ibid., p. 261.

[20]Ibid.

income elasticity of demand of country B for the industrial product exports of nation A, then the demand for the exports of both nations is increasing at the same rate. In addition, if productivity improves at the same rate in both countries, then the supply of exports produced in nation A will increase at the same rate as the supply of exports produced in nation B. Thus the demand for and supply of the exports of both nations are increasing at the same rate. The result would be that the terms of trade would not tend to deteriorate against either nation.

Prebisch now changes one of his assumptions supposedly to allow his model to conform more closely to what he believes is reality. He assumes that the income elasticity of demand in nation A for the primary product exports of country B is very low, less than one, for several reasons.[21] One of these reasons pertains to only food and is termed Engel's Law. It states that the proportion of income spent on food declines as income rises. Thus the high income industrialized nations have a relatively low income elasticity of demand for food imports.[22] Another set of reasons explain why materials other than food (minerals, timber, etc.) do not enjoy rapidly increasing demand in the center. First of all, advances in technology have made it possible to use primary inputs more efficiently, thus creating a decline in the raw material-output ratio. A second reason for the lag in the growth of the demand for imports of other primary materials

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[21]Ibid.

[22]H. S. Houthakker, "An International Comparison of Household Expenditure Patterns, Commemorating the Centenary of Engel's Law," Econometrica, Vol. 25 (October, 1957), p. 532.

besides food is due to the increased use of synthetic substitutes.[23]
As a result of the above explanations Prebisch assumes that the income
elasticity of demand for primary products is low (less than one).

Prebisch further assumes that the income elasticity of demand for
the manufactured exports of nation A by nation B is very high (greater
than one).[24] This is supposedly due to two main factors. First of all,
the people and governments of underdeveloped nations are tremendously
interested in economic growth and development for their nations and
this growth and development requires large amounts of capital. Capital
cannot be produced, however, in the underdeveloped nation itself and,
therefore, must be imported. The main sources of these capital goods
are the developed nations; and consequently a high income elasticity
of demand for the exports of developed nations would result.[25] The
second factor leading to a high income elasticity of demand for the
exports of developed nations is the high propensity to import of the
high income groups of the underdeveloped nations. Many economists
believe that this occurs because high income individuals in the less
developed nations are acquainted with the consumption levels of the
West and are psychologically tempted to attain them. This effect was
termed the demonstration effect by Duesenberry.[26]

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[23]Werner Baer, "The Economics of Prebisch and ECLA," in Latin
America: Problems in Economic Development, ed. by Charles T. Nisbet
(New York: The Free Press, 1969), p. 205.

[24]Prebisch, "Commercial Policy in the Underdeveloped Countries,"
p. 261.

[25]M. June Flanders, "Prebisch on Protectionism: An Evaluation,"
in Economics of Trade and Development, ed. by James D. Theberge (New
York: John Wiley and Sons, Inc., 1968), p. 320.

[26]Everett E. Hagen, The Economics of Development (Homewood, Ill-
inois: Richard D. Irwin Inc., 1968), pp. 132-133.

Due to the fact that the income elasticity of demand for the primary product exports of nation B is so low (less than one), according to Prebisch, the growth in the demand for the exports will be very slow. As productivity increases in the export sector of the periphery the supply of exports will increase. Prebisch considers it very unlikely, due to the very slow growth in demand, that the increase in demand will keep up with the increase in supply. Thus the prices of exports produced in nation B will exhibit a tendency to fall.[27]

Would it not be possible to prevent this fall in the prices of the exports by transferring enough labor from the export sector to the domestic sector so as to offset the gain in productivity? Prebisch would say no, the export prices of nation B would still exhibit a tendency to fall. If the reader will remember, we assumed that the productivity ratio of nation B in the domestic sector was much lower than that in the export sector. In fact, since the wage ratio is one, the productivity ratio in the industrial domestic sector of nation B would have to be less than one, or it would be exporting industrial goods. Thus if we would transfer labor from the export to the domestic sector we would be transferring manpower from primary occupations, with a high productivity ratio to industrial occupations, with a low productivity ratio. For example, let us say that the productivity ratio of these workers in primary production is one and five-tenths and that the productivity ratio in the domestic sector is eight-tenths. Thus, the productivity ratio of those workers being transferred from the export

[27]Raul Prebisch, "Development Problems of the Peripheral Countries and the Terms of Trade," in Economics of Trade and Development, ed. by James D. Theberge (New York: John W. Wiley and Sons, Inc. 1968), pp. 287-288.

sector to the domestic sector will drop from one and five-tenths to eight-tenths. As a result, since we are assuming that labor is perfectly mobile and we are operating under conditions of competition, the wage ratio throughout the economy would have to fall. As the wage ratio in the export sector falls the costs of production, under competitive conditions, would fall and as the costs of production fall output would increase. This would result, according to Prebisch, in supply increasing faster than demand bringing about a fall in the prices of exports for nation B.[28]

Nation A enjoys a high income elasticity of demand for its exports (greater than one). Thus the demand for its exports would grow at a very fast rate, and there would be a very good chance that the demand for its exports would tend to at least keep up with the supply of exports produced by nation A, and in many circumstances demand would outrun supply. Thus the prices of the exports of nation A will either tend to remain stable or rise.[29]

The net result of all this is that the price of exports of nation B, which are imported by nation A, will tend to fall, while the prices of the exports of nation A, which are imported by nation B, will tend to rise. Thus the net barter terms of trade $\frac{P_x}{P_m}$ will tend to turn against nation B and improve for nation A. Thus according to Prebisch's theory the terms of trade will turn against underdeveloped nations and in favor of developed nations.

There are several assumptions made by Prebisch in his model which I would like to criticize. First of all, Prebisch assumes that the

[28]Raul Prebisch, "Commercial Policy in the Underdeveloped Countries," pp. 261-262.

[29]Ibid.

income elasticity of demand for the primary products of underdeveloped nations is quite low (less than one). Instead of accepting Prebisch's assumption let us examine some empirical studies concerning the income elasticity of demand for the exports of the underdeveloped nations of Latin America.

Richard Reimer completed a study of the United States demand for imports of materials between the year 1923 and 1960. His results, concerning the income elasticity of demand for the products of other nations by the United States, are summarized in Table 2.

TABLE 2

UNITED STATES INCOME ELASTICITY OF DEMAND

1923 - 1960

Region of Orgin	Income Elasticity of Demand
Total	.807
EPU	.968
Total Europe	.842
Canada	.942
Latin America	.986
Overseas Sterling Areas	.495
Rest of World	1.007

Source: Richard Reimer, "The United States Demand for the Imports of Materials," 1923-1960, Review of Economics and Statistics, Vol. XLVI (February, 1964), pp. 68-69.

As one can see from this table, the income elasticity of demand for the exports of Latin America by the United States is roughly equal to one. This would seem to run contrary to Prebisch's assumption that the elasticity of demand for the exports of underdeveloped nations :.

less than one.[30]

Houthakker and Magee also completed a study concerning income and price elasticities in world trade. They computed the income elasticity of demand for the exports of several Latin American nations. The results are summarized in Table 3.

TABLE 3

WORLD INCOME ELASTICITY OF DEMAND

FOR THE EXPORTS OF SEVERAL NATIONS

(1951 - 1966)

Country	Income Elasticity
Argentina	.87
Brazil	.34
Chile	.99
Colombia	.41
Peru	2.01
Venezuela	1.12
Mean	.93

Source: H. S. Houthakker and Stephen P. Magee, "Income and Price Elasticities in World Trade," The Review of Economics and Statistics, Vol. LI (May, 1969), p. 115.

This table expresses the variety of experiences undergone by underdeveloped nations in Latin America, as far as the income elasticity of demand for their exports. Two nations, Venezuela and Peru, have an income elasticity of demand for their exports substantially larger than one. Two other nations, Argentina and Chile, have an income elasticity of demand close to one. The last two nations, Colombia and

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[30]Richard Reimer, "The United States Demand for the Imports of Materials," 1923-1960, Review of Economics and Statistics. Vol. XLVI (February, 1964), pp. 68-69.

Brazil, have income elasticities of demand for their exports which are substantially less than one. The mean income elasticity of demand for the exports of these six nations is .93. If we looked only at this mean figure the variety of experiences of these nations would have been hidden. Thus it may be that Reimer's aggregation of all Latin American nations, in the study cited in the previous paragraph, may have hidden great disparities in the income elasticity of demand for the exports of the underdeveloped nations of Latin America.

Thus the evidence seems to point to the fact, or at least indicate, that the income elasticity of demand for the exports of Latin American nations varies substantially from nation to nation within Latin America. In other words, the income elasticity of demand for the exports of some underdeveloped nations may be quite high, for other close to one, and for still others less than one. It would also seem to indicate that Prebisch's generalization that the income elasticity of demand for the exports of the underdeveloped nations of Latin America is low (less than one) cannot be taken as an accurate generalization for all nations.

Prebisch also assumed in his model that productivity increases at the same rate in both nation A and B. Thus the supply of exports produced in both nation A and B would increase at the same rate. However, if we assume that productivity is increasing faster in nation A, the industrialized nation, than in nation B, the underdeveloped nation, then the supply of exports from nation A would tend to increase at a faster rate than the supply of exports from nation B.

Prebisch also assumed that per capita income and population would tend to increase at the same rate in both nations. This would result

in total income increasing at the same rate in both nations. The information presented in Tables 4 and 5 seems to show that neither of the above assumptions are realistic. Table 4 indicates that population is increasing faster in many of the underdeveloped nations than it is in most developed nations, but, on the other hand, per capita income seems to be increasing faster in the developed nations. Table 5 shows the variety of experience of developed and underdeveloped

TABLE 4

Nations	Average Annual Rate of Population Increase (1963 - 1969)	Average Annual Rate of Growth of Per Capita Income (1960 - 1968)
Underdeveloped		
Argentina	1.5	1.6
Brazil	2.6	1.1
Uruguay	1.2	- .9
Chile	2.4	2.6
Mexico	3.5	3.1
Venezuela	3.5	1.3
Peru	3.1	2.5
Developed		
Australia	2.0	3.2
France	.9	4.4
Japan	1.1	9.2
Israel	2.9	4.2
Germany	1.0	3.4
United States	1.2	3.7
United Kingdom	.6	2.3

*Calculated from: United Nations,Department of Economic and Social Affairs, Statistical Yearbook 1969, 1970 pp. 60-66, 550-555.

nations concerning growth in total income. For some underdeveloped nations total income is increasing at a faster rate than in many developed nations, for some underdeveloped nations total income is increasing as fast as it is in many developed nations, and for some underdeveloped nations total income is increasing much slower than it is in many developed nations. Hence, even if the income elasticity of demand for primary goods is low and that for industrial goods is quite high, the demand for primary good exports and industrial exports will be quite

TABLE 5

Nations	Average Annual Rate of Increase in Total Income (1960 - 1968)
Underdeveloped	
Argentina	3.2
Brazil	4.1
Peru	5.7
Venezuela	4.8
Uruguay	4.8
Mexico	.4
Chile	5.1
Developed	
Australia	5.2
France	5.6
Japan	10.3
Israel	7.7
Germany	4.5
United States	5.1
United Kingdom	3.0

*Calculated from: United Nations, Department of Economic and Social Affairs, Statistical Yearbook 1969 (E/F 70.XVII.1), 1970, pp. 550-555.

varied, due to the varied rates of income growth. Thus, no generali-
zation can be made concerning whether the demand for primary good
exports will grow slower or faster than that for industrial good exports.

If we will put all of these criticisms together and rework Prebisch's
model, the results will be substantially different. For the moment,
we will still assume that productivity is increasing at the same rate
in both nations and that the income elasticity of demand for the exports
of nation A, the industrialized nation, is greater than the income elas-
ticity of demand for the exports of nation B, the primary producing
underdeveloped nation. We will continue to assume that population is
increasing at the same rate in both nations. The only change which we
will make is to allow per capita income to increase faster in nation
A than in B. The result will be the total income will increase faster
in nation A than in nation B. Hence even if the income elasticity of
demand for the exports of nation B by nation A is low, it very well
might be the case that the greater increase in income in nation A as
compared to B may be enough to more than offset the low income elas-
ticity of demand for B's exports. The result would be that the demand
for B's exports might possibly be increasing faster than the demand
for nation A's exports.

An example of the reasoning presented in the above paragraph can be
easily developed. If the income elasticity of demand for B's exports by
nation A was seven-tenths and income had increased in A by eight hun-
dred dollars, then the demand for B's exports would have increased by
five hundred and sixty dollars. If the income elasticity of demand
for A's exports by nation B was one-and-two-tenths, but income had
increased by only four hundred dollars, in nation B, then the demand

for A's exports would have increased by only four hundred eighty dollars.
Thus the demand for B's exports would tend to expand at a faster rate
than the demand for A's exports. Since we have assumed that productiv-
ity is increasing at the same rate in both countries, this will mean
the supply of exports in each country is expanding at the same rate.
The result would be that the price of nation B's exports would tend
to rise faster than the price of nation A's exports or that the price
of nation B's exports would tend to fall less than that of nation A,
if supply is greater than demand in both nations. Thus if income is
increasing at a faster rate in nation A then it is in nation B, it might
be very possible for the net barter terms of trade to turn in nation
B's favor even in the face of nation A's low income elasticity of
demand for B's exports.

If we further assume that productivity is increasing faster in
nation A than in nation B this would mean that the supply of nation
A's exports would be increasing faster than the supply of nations B's
exports. Thus even if the demand effects postulated in the paragraph
above were not enough to result in improved terms of trade for nation
B, the fact that the supply of country A's exports is increasing faster
than the supply in nation B's exports may result in the price of nation
B's exports improving relative to the price of nation A's exports.

In addition to the above comments, we have also seen empirical
evidence which would at least seem to suggest a great variance in the
income elasticity of demand for the exports of underdeveloped nations
in Latin America. Thus many underdeveloped nations in Latin America
may have quite high income elasticities of demand for their exports,
others may be closer to one, and others will be less than one. This

would seem to suggest a variety of experiences for underdeveloped nations in Latin America as far as movements in their terms of trade are concerned.

In summary, we have shown that depending on the strength of the demand or supply effects the terms of trade need not necessarily turn against nation B the primary producing underdeveloped nation. This combined with the fact that the income elasticity of demand for the exports of underdeveloped nation probably varies greatly certainly casts tremendous doubt on Prebisch's hypothesis that in the long-run the terms of trade will turn against underdeveloped nations. It is my opinion that the direction in which the terms of trade move will depend upon each nation's supply, demand, and income elasticity situation. Since most underdeveloped nations differ as to each of these three aspects it would be logical to conclude that the terms of trade will exhibit no uniform behavior. For some underdeveloped nations the terms of trade will improve, for some they will deteriorate, and for many they will just fluctuate. If the reader is skeptical of this conclusion on my part then possibly the statistical evidence presented in the next section will be convincing.

IV.

EMPIRICAL EVIDENCE

The most important statistical evidence which Prebisch uses as support for the deterioration of the terms of trade thesis is a study done by the United Nations in 1949. The results of the United Nations study are summarized in Table 6.

It is well to remember that Prebisch assumes in his study that underdeveloped nations are the source of primary goods and developed nations are the source of manufactured goods. He further assumes that Britain exported primarily manufactured goods, while importing mainly primary goods. If these assumptions are made the table seems to clearly show that the terms of trade have been turning against underdeveloped nations and in favor of developed nations.

One must examine Table 6 with care. Series two and three are based exclusively on British data. However, the title of series one seems to imply that the prices of primary products and manufactured goods throughout the major trading nations of the world are taken into account. In reality, series one from 1876 up to 1929 uses the Sauerbach British wholesale price index for primary products and Schlotes price data for British trade statistics.[31] Thus, most of the data in series one of Table 6 is based on British data. Consequently

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[31]Theodore Morgan, "The Long-Run Terms of Trade Between Agriculture and Manufacturing," Economic Development and Cultural Change, Vol. VIII. (October, 1959), p. 21.

TABLE 6

SELECTED UNIT VALUE RATIOS, 1976 - 1948

(1938 = 100)

	Ratio		
	Prices of Primary to Prices of Manufactured Commodities in World Trade	United Kingdom Import Prices to Export Prices	
Period		Current Year Weights	Board of Trade Index
	(1)	(2)	(3)
1876-1880	147	163	...
1881-1885	145	167	...
1866-1890	137	157	...
1891-1895	133	147	...
1911-1913	137	140	...
1913	137	137	143
1921	94	93	101
1922	103	102	109
1923	114	107	111
1924	121	122	117
1925	123	125	120
1926	121	119	117
1927	125	122	117
1928	121	123	120
1929	118	122	120
1930	105	112	109
1931	93	102	99
1932	89	102	99
1933	89	98	96
1934	96	101	99
1935	98	103	100
1936	102	107	103
1937	108	107	109
1938	100	100	100
1946	...	...	108
1947	...	...	116
1948	...	...	117

Source: United Nations, Department of Economic Affairs, Relative Prices of Exports and Imports of Underdeveloped Nations (1949.b.3) December, 1949, p. 22.

all three series are based upon British data, and this makes the study subject to criticism for several reasons.

Firstly, to conclude from only British import and export data that the terms of trade are turning in favor of developed and against underdeveloped nations is to make a very dubious generalization. One would have to examine movements in the terms of trade for many nations.

Secondly, it is invalid to infer that the terms of trade between manufactured and primary goods is the same thing as the terms of trade between developed and underdeveloped nations. There are many developed nations which export primary products (coal, wheat, cotton, lumber, woodpulp) and some underdeveloped nations which export manufactures (cotton textiles, burlap, and other rather simple manufactures).

Finally, in Table 6 British exports were valued at the port of exit while British imports were valued at the port of entry. In other words, the value of British imports included shipping or transportation costs while the value of British exports did not. In addition, during the time period covered by the table, the costs of transportation were falling at a rather substantial rate; hence it is possible that the prices received by nations exporting to Great Britain could have remained the same or have risen while the price paid by Britian for these imports could have fallen, due to declines in the cost of transportation. As a result of the fact that British export prices exclude transportation costs, the prices that other nations paid for the export goods of Britain could have fallen even though British port of exit prices rose. Since no allowance is made in the British data for the fact that transportation costs were falling, it

is then invalid to infer from the British data that the terms of trade were falling for primary producing nations trading with Britain.[32]

Professor Theodore Morgan also believes that the data presented in Table 6 is totally inadequate because it does not cover enough years. Data is available from 1801 to 1953, within which Table 6's 1876-1948 period is a very atypical segment. Mr. Morgan's study of Great Britain's terms of trade covers the years 1801 to 1953 and the results are presented in two series in Chart I. Series A, the 1801 to 1929 segment, is the Saurbauck index of British primary product (domestic) prices divided by Schlote's data for the prices of British exports. The 1930 to 1953 portion of series A is the board of trade index number for the prices of imports divided by the board of trade index number for the prices of exports. Series B, 1814 to 1853 segement, is the export price index for manufactures divided by the price index for imports. The 1854 to 1933 section of series B is the price index for manufactures divided by the import price index for raw materials.[33]

The years added to the study by Mr. Morgan change the entire picture. The terms of trade of primary producers sharply improved from 1801 to the 1860's or 1870's, when the decline brought out in Table 6 began. Also from the 1930's to the early 1950's the terms of trade improved in favor of primary good producers. The years 1876 to 1948, therefore, are not typical of the series. What is most notable in Chart I, is the instability of the terms of trade.

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[32]P. T. Ellsworth, "The Terms of Trade Between Primary Producing and Industrial Countries," Inter-American Economic Affairs, Vol. X, Vo. 1 (Summer, 1956), pp. 55-57.

[33]Morgan, "The Long-Run Terms of Trade Between Agriculture and Manufacturing," p. 2.

CHART 1

TERMS OF TRADE BETWEEN PRIMARY AND MANUFACTURED PRODUCTS

1801 - 1953

(British Data)

Source: Theodore Morgan, "The Long-Run Terms of Trade Between Agriculture and Manufacturing," Economic Development and Cultural Change, Vol. VIII (October, 1959), p. 3.

Professor Morgan made studies of the long-term movement in the terms of trade between primary and manufactured products for five other nations: United States, Japan, South Africa, Brazil, New Zealand. Chart 2 gives two series for the United States. Series 1D runs from 1787 to 1953 and is the wholesale price of farm products divided by the price of manufactured goods. Series 2C, from 1913 to 1948, is

the price of raw material imports divided by the price of imported
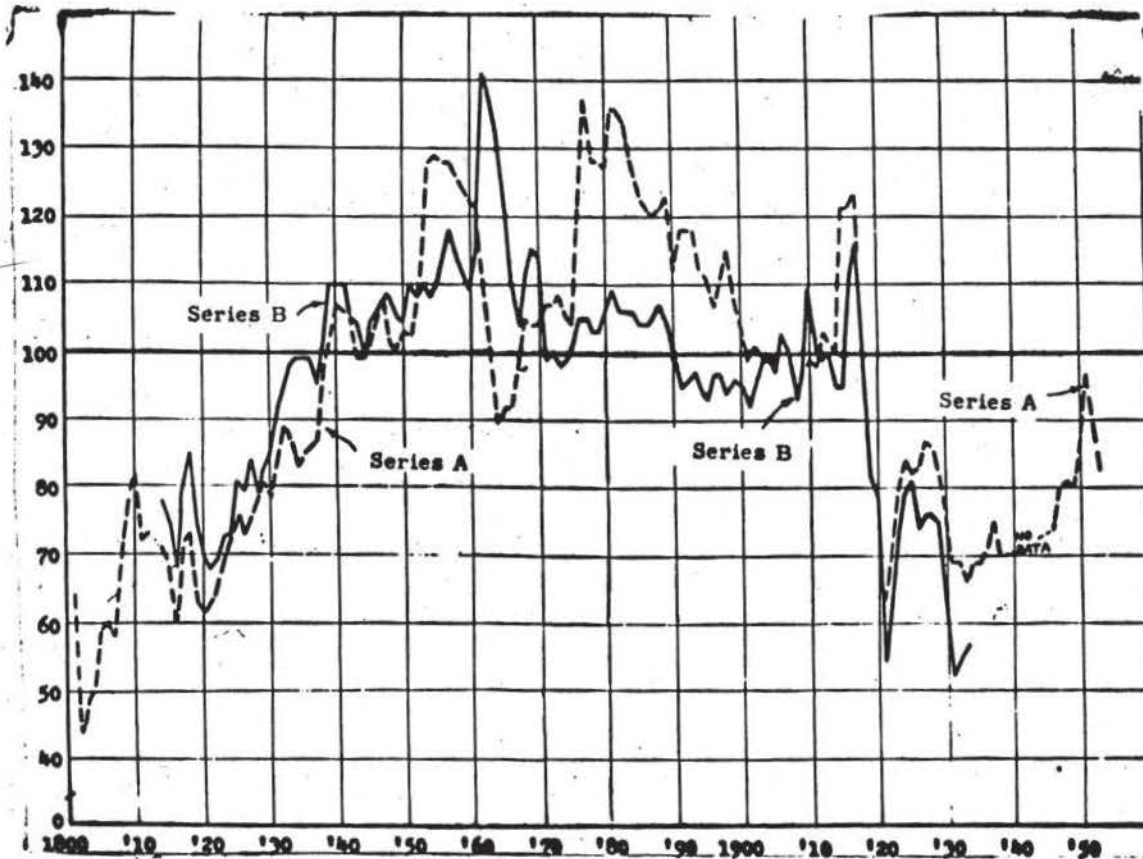
manufactured goods.[34]

CHART 2

TERMS OF TRADE BETWEEN PRIMARY AND MANUFACTURED PRODUCTS
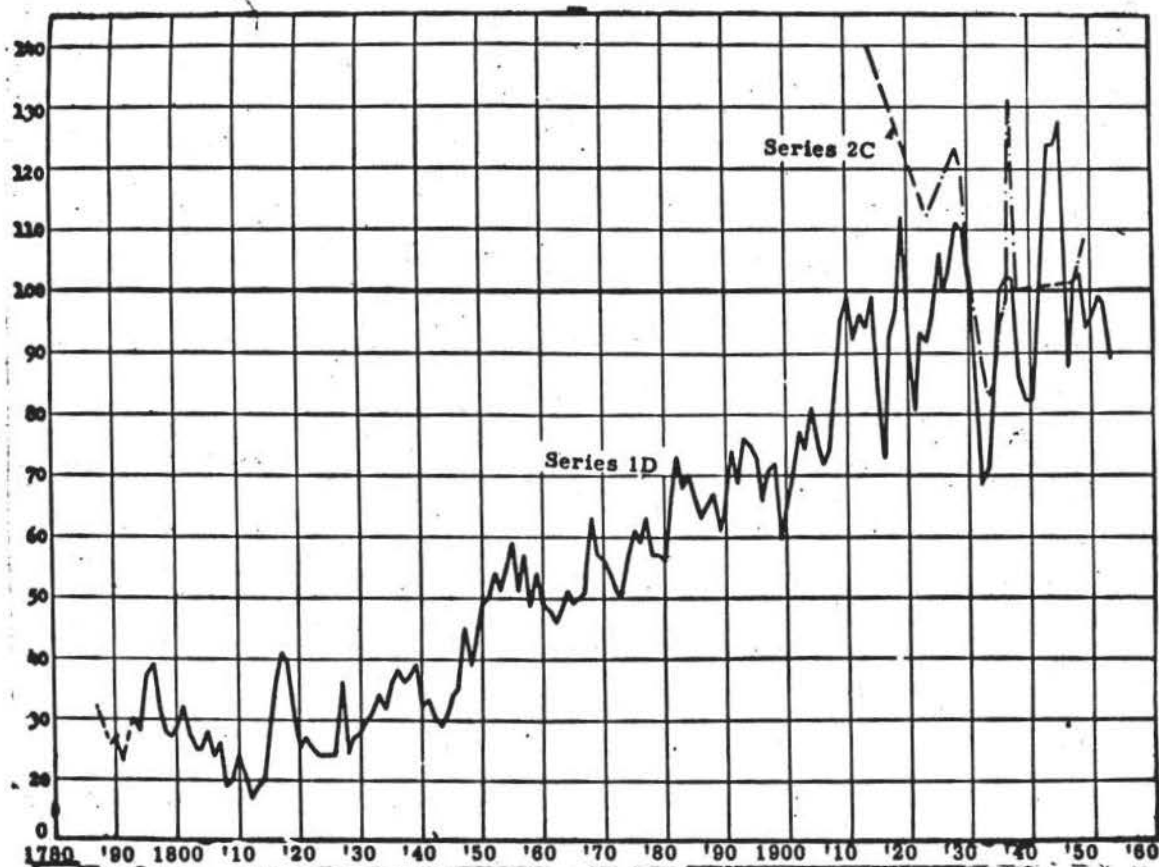
1787-1953

(United States Data)

Source: Theodore Morgan, "The Long-Run Terms of Trade Between Agricul-
ture and Manufacturing," Economic Development and Cultural
Change, Vol. VIII (October, 1959), p. 4.

There can be no doubt concerning the trend of the United States

series. Primary production has gained greatly relative to manufactur-

ing due to a shift in prices in the favor of primary producers.

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[34]Ibid., p. 6.

Professor Morgan also collected data concerning the movements in the prices of primary and manufactured goods for Japan. The data is summarized in Chart 3 in terms of two series. Series 1C, from 1873 to 1934, was taken from customs data for the prices of exports and imports. From 1873 to 1903 the prices of exports (taken as an approximation of primary products) was divided by the prices of imports (taken as an approximation for manufacturers). From 1904 to 1934 series 1C was developed by dividing the prices of exported food and crude materials by the prices of imported manufactured goods. Series 2D, 1887 to 1952, was developed by dividing the price of four cereals representing primary products by the prices of four categories of manufactures.[35]

As one can see, it is impossible to detect any kind of a trend in the movement of the prices of primary commodities, in relation to the prices of manufactured goods, based upon Japanese data. What is apparent is the complete lack of any trend whatsoever.

Data was also collected for New Zealand and is summarized in Chart 4. All three series were based on domestic wholesale price data and were calculated by dividing the price index for selected primary goods by the price index for selected manufactured products.[36]

The general trend for New Zealand seems to be improving terms of trade for the primary producers. It should be noted, however, that the most striking feature of the graph is the tremendous

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[35]Ibid., p. 10.

[36]Ibid., p. 23.

irregularities in the movement of the terms of trade between primary

and manufactured goods.

CHART 3

TERMS OF TRADE BETWEEN PRIMARY AND MANUFACTURED PRODUCTS

1873 - 1952

(Japanese Data)
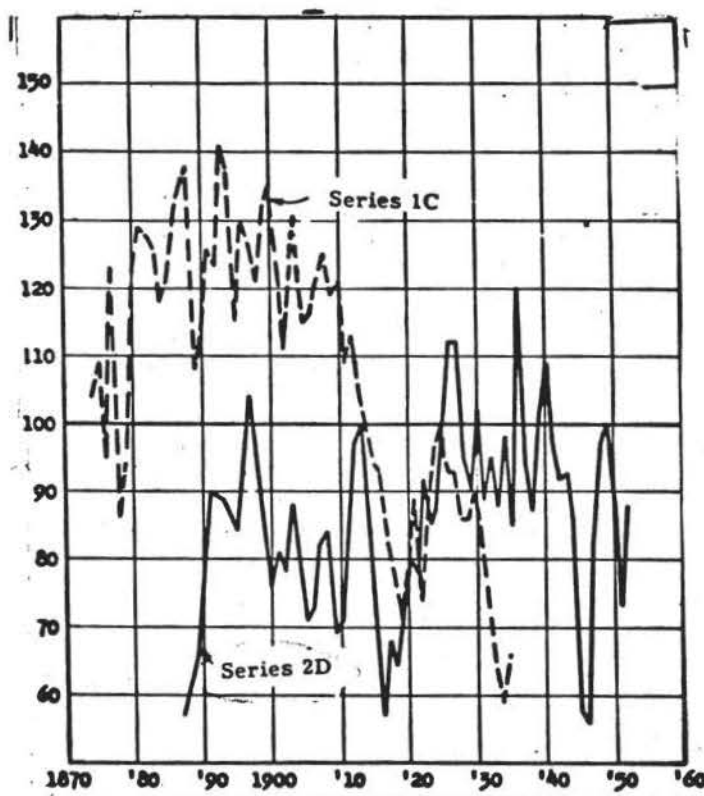
Source: Theodore Morgan, "The Long-Run Terms of Trade Between Agricul-
ture and Manufacturing," Economic Development and Cultural
Change, Vol. VIII (October, 1959), p. 11.

The data concerning the terms of trade between primary and manu-

factured products for the Union of South Africa was collected from

two main sources. Series 1D was the domestic wholesale prices of

the Union of South Africa's goods (mostly primary goods) divided by

CHART 4

TERMS OF TRADE BETWEEN PRIMARY AND MANUFACTURED PRODUCTS

1861 - 1952

(New Zealand Data)

Source: Theodore Morgan, "The Long-Run Terms of Trade Between Agricul-
ture and Manufacturing," Economic Development and Cultural
Change, Vol. VIII (October, 1959), p. 12.

the price index of imports (composed of prices of mainly manufactured

goods). Series 2D was constructed by taking the price index for grains,

meals, potatoes, dairy products, and dividing it by an index for

metals and chemicals. The results are summarized in Chart 5.[37]

CHART 5

TERMS OF TRADE BETWEEN PRIMARY AND MANUFACTURED PRODUCTS

1910 - 1952

(Union of South Africa Data)
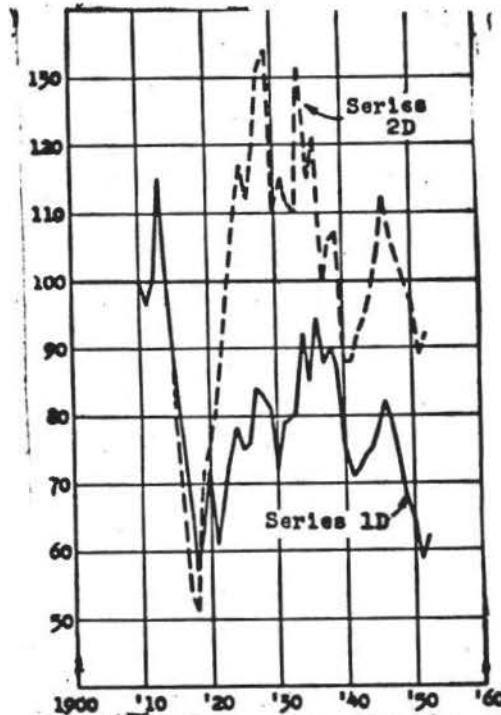
Source: Theodore Morgan, "The Long-Run Terms of Trade Between Agricul-
ture and Manufacturing," Economic Development and Cultural
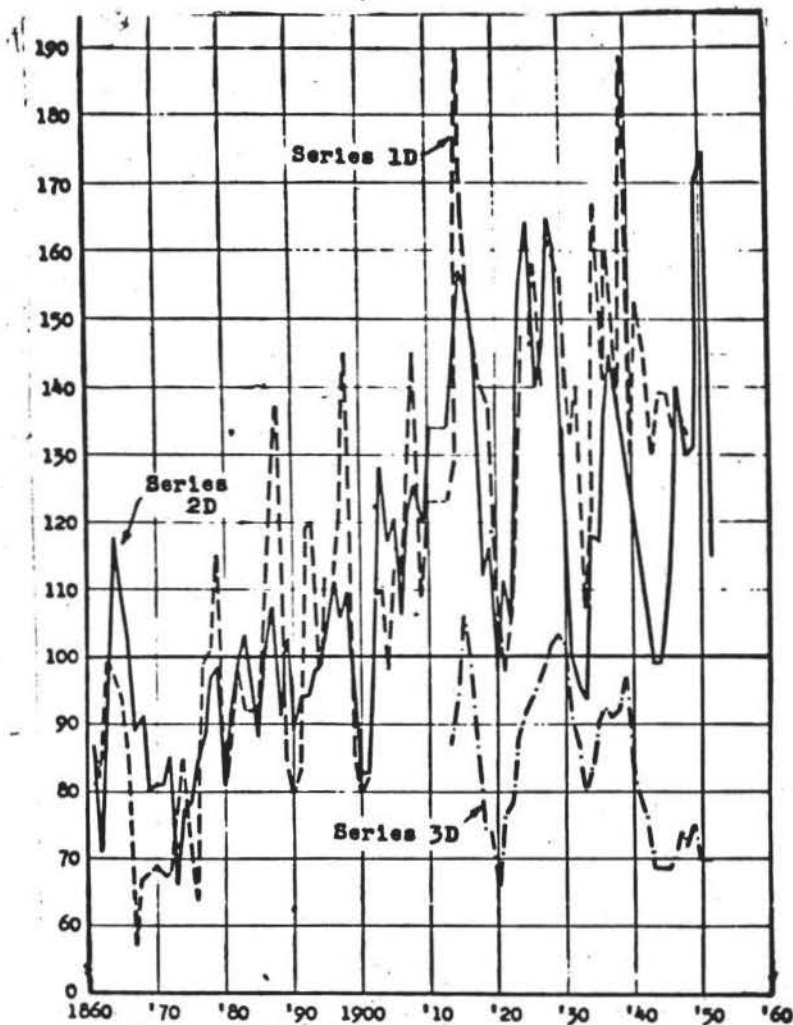Change, Vol. VIII (October, 1959), p. 14.

The data for the Union of South Africa again, as with the pre-

vious nations studied, shows a great deal of diversity in the move-

ments of the terms of trade between the prices of primary and

manufactured goods.

.The last nation studied by Morgan is Brazil. Laspeyre and Paasche

price indices were calculated for twenty-seven export commodities,

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[37]Ibid.

representing from eighty to ninety-seven per cent of total exports,
and for sixty-one import commodities, representing from fourty-one
to sixty-eight per cent of total imports.[38] The data is summarized
in Chart 6.

One can see no trend in the movement of the prices of primary goods
relative to the prices of manufactured goods. Evident again is the
tremendous diversity in the movement of the terms of trade between
the prices of primary and manufactured products.

Thus, the overall impression from the above charts is that of
the wide variety of experience of different nations.[39] This variety
suggests highly diverse demand and supply experiences for the par-
ticular commodities of the different countries covered. As a result,
Prebisch's hypothesis that the terms of trade are turning against
underdeveloped nations producing primary goods seems to lack empirical
support.

Professor Morgan also made a study of price variations for several
individual primary export commodities. The results of his study are
presented in charts seven through fourteen. The tables from which
these charts were constructed are in the appendix.

In Chart 7 the price variations for beef, tea, mutton and lamb,
and bacon and ham are presented. As can be seen, the price of tea in
India exhibits an upward trend while the price of tea in Ceylon ex-
hibits no clear-cut tendency. The prices of the various meats pre-
sented in Chart 7 seem to fluctuate tremendously without exhibiting
any tendency one way or the other.

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[38]Ibid.

[39]Ibid. , p. 16.

CHART 6

TERMS OF TRADE BETWEEN PRIMARY AND MANUFACTURED PRODUCTS

1901 - 1950

(Brazilian Data)
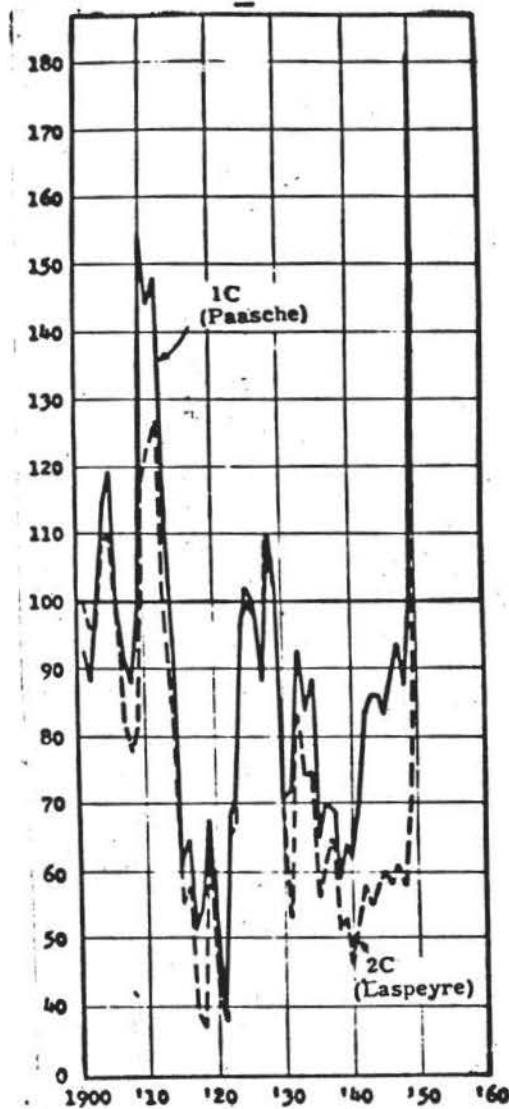
Source: Theodore Morgan, "The Long-Run Terms of Trade Between Agricul-
ture and Manufacturing," Economic Development and Cultural
Change, Vol. VIII (October, 1959), p. 15.

*Laspeyre price index uses base-period quantities as weights $\frac{\sum P_n Q_o}{\sum P_o Q_o}$
while the Paasche index uses the weights that pertain to the year which
is to be compared with the base year $\frac{\sum P_n Q_n}{\sum P_o Q_n}$.
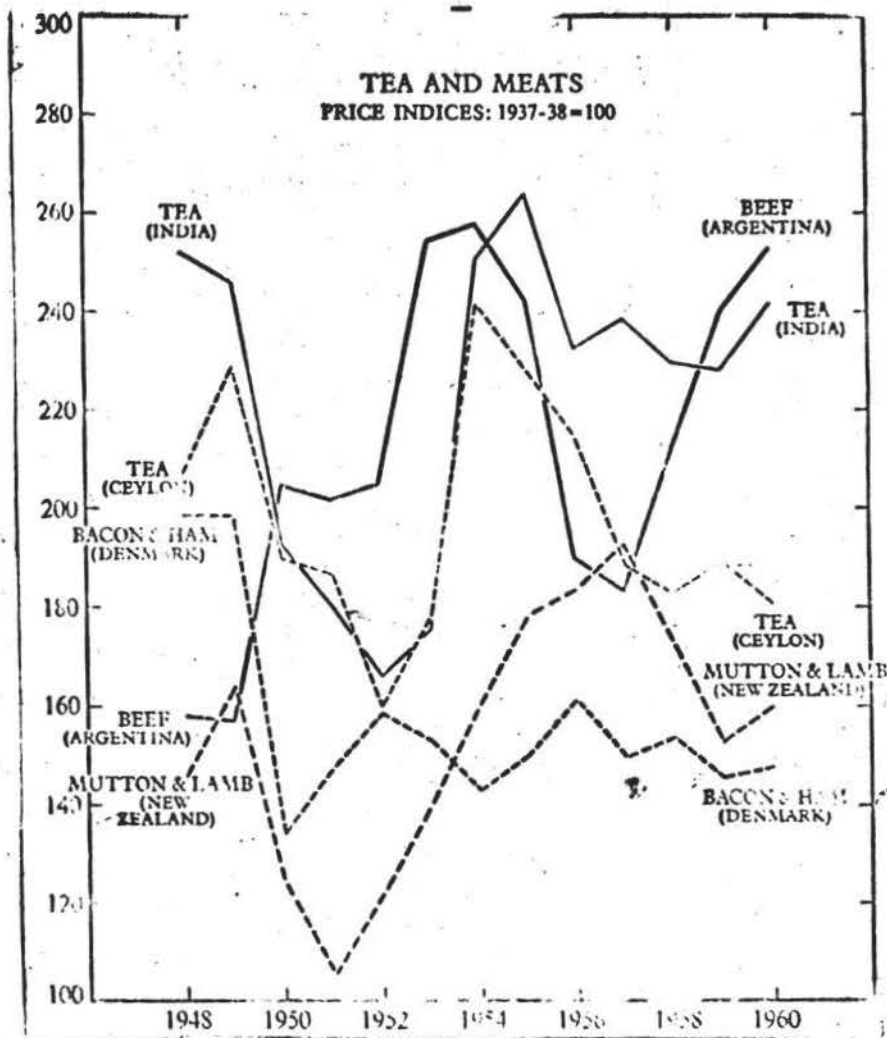
CHART 7

TEA AND MEATS
PRICE INDICES: 1937-38=100

Source: Theodore Morgan, "Trends in Terms of Trade and Their Repercussions on Primary Producers," in International Trade Theory in a Developing World , ed. by Roy Harrod and Douglas Hague (New York: St. Martin's Press Inc., 1963), p. 81.

In Chart 8 the price variations for sugar and butter are presented. Apparently, the price of sugar produced in the Dominican Republic fluctuates substantially while the prices of sugar produced in Cuba and the Phillipines are quite stable. The prices of butter produced in New Zealand, Denmark, and Australia fluctuate with no indication of a downward or upward tendency.

CHART 8

SUGAR
AND BUTTER
PRICE INDICES:
1937-38=100

Source: Theodore Morgan, "Trends in Terms of Trade and Their Repercussions on Primary Producers," in International Trade Theory in a Developing World, ed. by Roy Harrod and Douglas Hague (New York: St. Martin's Press Inc., 1963), p. 82.

In Chart 9 the price movements for cereals and oils are presented. The price of rice produced by Burma exhibits a declining tendency while the price of rice produced in the United States exhibits no tendency at all. The prices of coconut oil produced in the Phillipines and Ceylon seem to exhibit no tendency at all. The prices of that produced in the United States and Canada are quite stable.

CHART 9

CEREALS AND OILS
PRICE INDICES: 1937-38=100

Source: Theodore Morgan, "Trends in Terms of Trade and Their Repercus-
sions on Primary Producers," in International Trade Theory in
a Developing World, ed. by Roy Harrod and Douglas Hague (New
York: St. Martin's Press Inc., 1963), p. 84.

In Chart 10 the price movements for pulp, tobacco, and rubber are
presented. The price for pulp produced in Canada exhibits an extreme
rise in the early 1950s, probably attributable to the Korean War, and
remains relatively stable at that level throughout the middle and late
fifties. The prices of rubber produced in Malaya, Ceylon, and Indonesia
exhibit a large rise and fall in the early 1950s with fluctuations

characterizing the rest of the time period.

CHART 10

PULP, TOBACCO AND RUBBER
PRICE INDICES: 1937-38 = 100
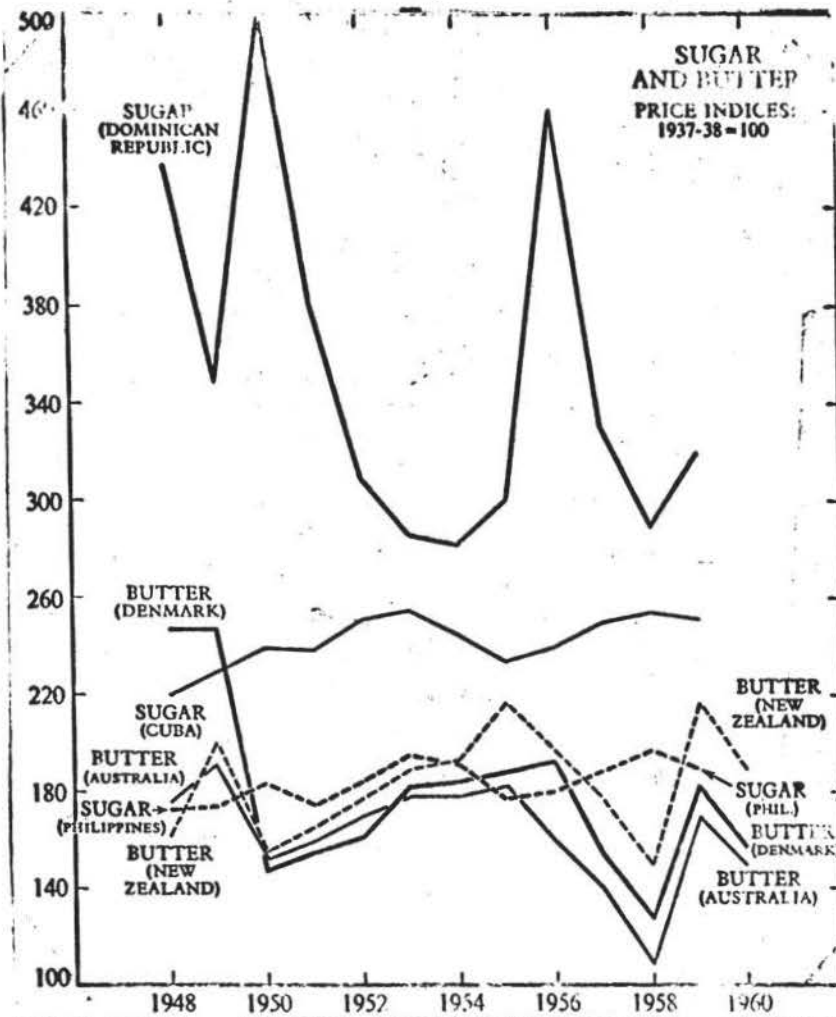
Source: Theodore Morgan, "Trends in Terms of Trade and Their Repercussions on Primary Producers," in International Trade Theory in a Developing World, ed. by Roy Harrod and Douglas Hague (New York: St. Martin's Press Inc., 1963), p. 89.

In Charts 11 and 12 the price movements of lead, coal, tin, nitrate, zinc, and copper are presented. Most of the prices of these metals are subject to extreme fluctuation with a few, such as the price of lead, exhibiting a downward tendency, with others, such as the price

of coal, exhibiting an upward tendency, while most exhibit no tendency whatever.

CHART 11

LEAD, COAL, TIN AND NITRATE
PRICE INDICES: 1937-38=100

LEAD
(CANADA)

COAL
(U.S.A.)
TIN
(MALAYA)

NITRATE
(CHILE)
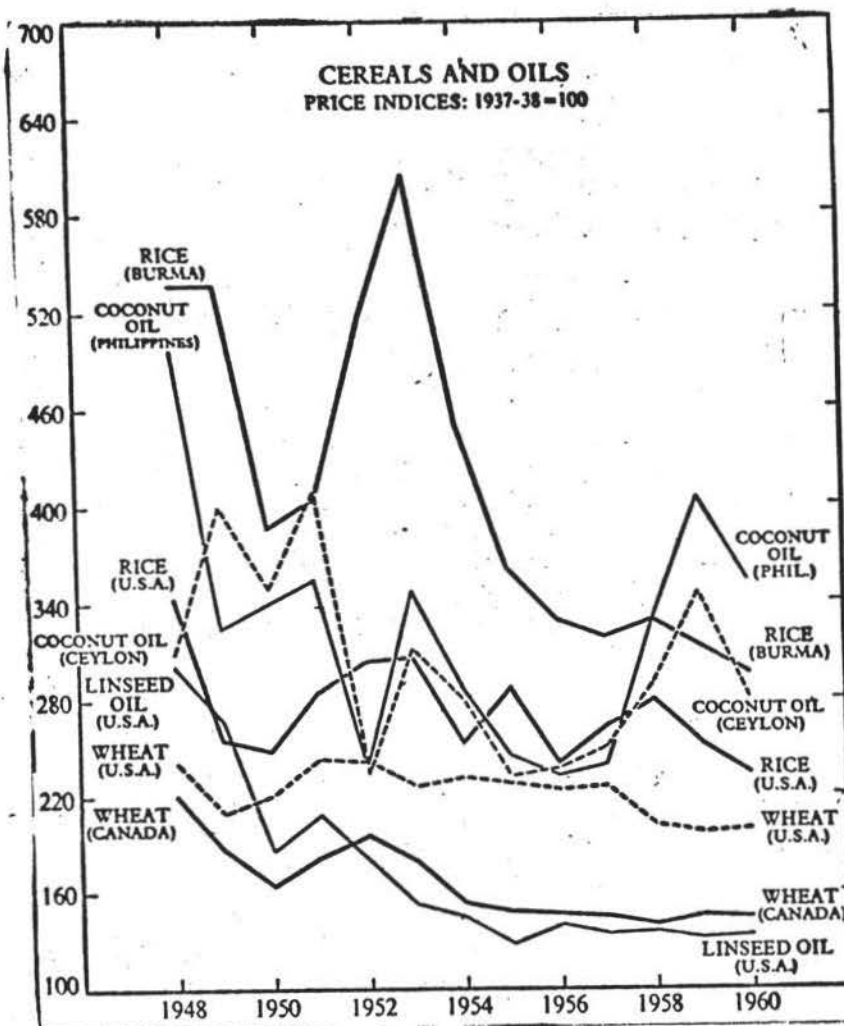
LEAD
(CANADA)

COAL
(U.S.A.)

TIN
(MALAYA)

NITRATE
(CHILE)

Source: Theodore Morgan, "Trends in Terms of Trade and Their Repercus-
sions on Primary Producers," in International Trade Theory in
a Developing World, ed. by Roy Harrod and Douglas Hague (New
York: St. Martin's Press Inc., 1963), p. 92.

In Charts 13 and 14 the price movements for hemp, burlap, cotton,
and jute are presented. All the prices of these products show a great
deal of fluctuation with few indicated trends.

CHART 12

ZINC AND COPPER
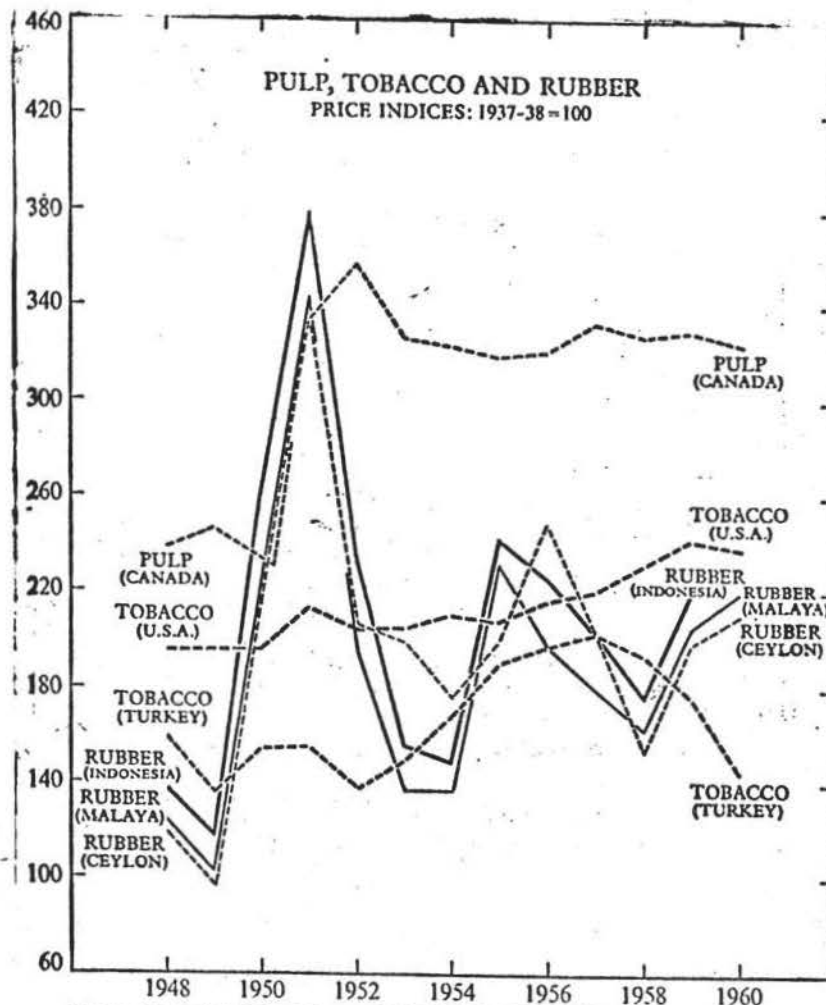PRICE INDICES: 1937-38=100

Source: Theodore Morgan, "Trends in Terms of Trade and Their Repercussions on Primary Producers," in International Trade Theory in a Developing World, ed. by Roy Harrod and Douglas Hague (New York: St. Martin's Press Inc., 1963), p. 91.

In summary, the movements in the prices of these goods are highly diverse. For some of these primary products there does seem to exist a tendency for their prices to fall, but for others there is a persistent tendency for the price to rise. Finally, a majority of the primary products seem to exhibit no clear-cut tendency one way or the other; instead, these products exhibit both rising and falling prices

and no predominant trend. Thus, the evidence does not support the
idea that in the long-run, the prices of primary products exhibit a
tendency to decline.

CHART 13
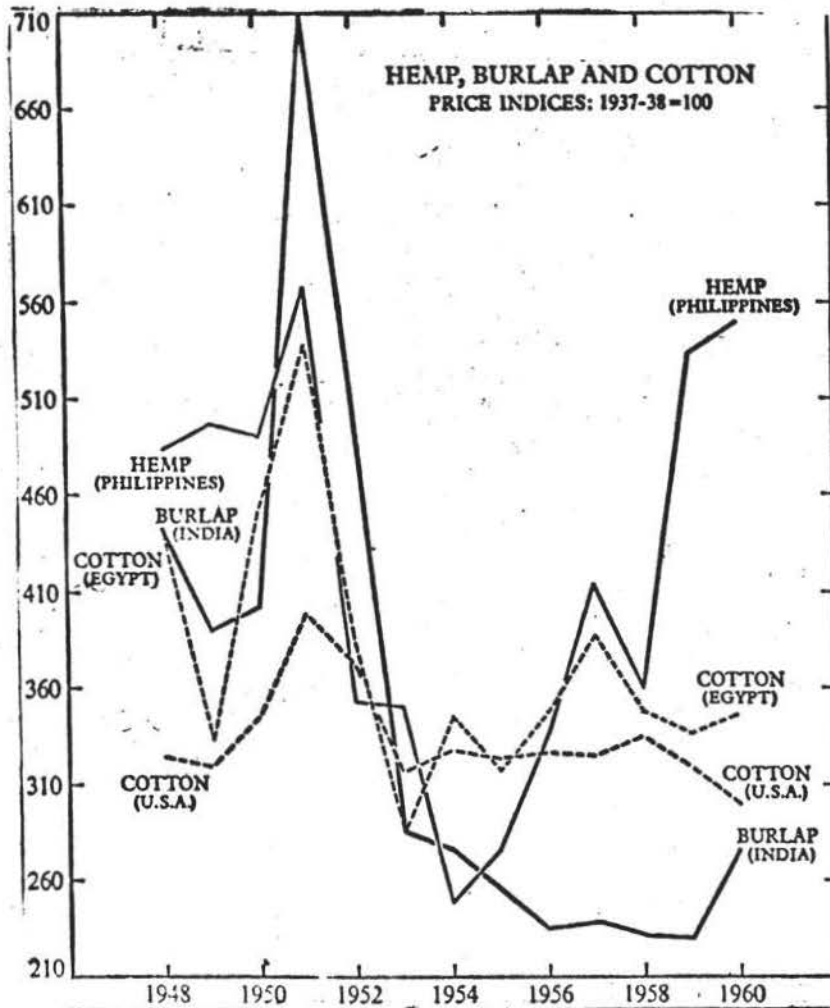
HEMP, BURLAP AND COTTON
PRICE INDICES: 1937-38=100

HEMP
(PHILIPPINES)

HEMP
(PHILIPPINES)

BURLAP
(INDIA)

COTTON
(EGYPT)

COTTON
(EGYPT)

COTTON
(U.S.A.)
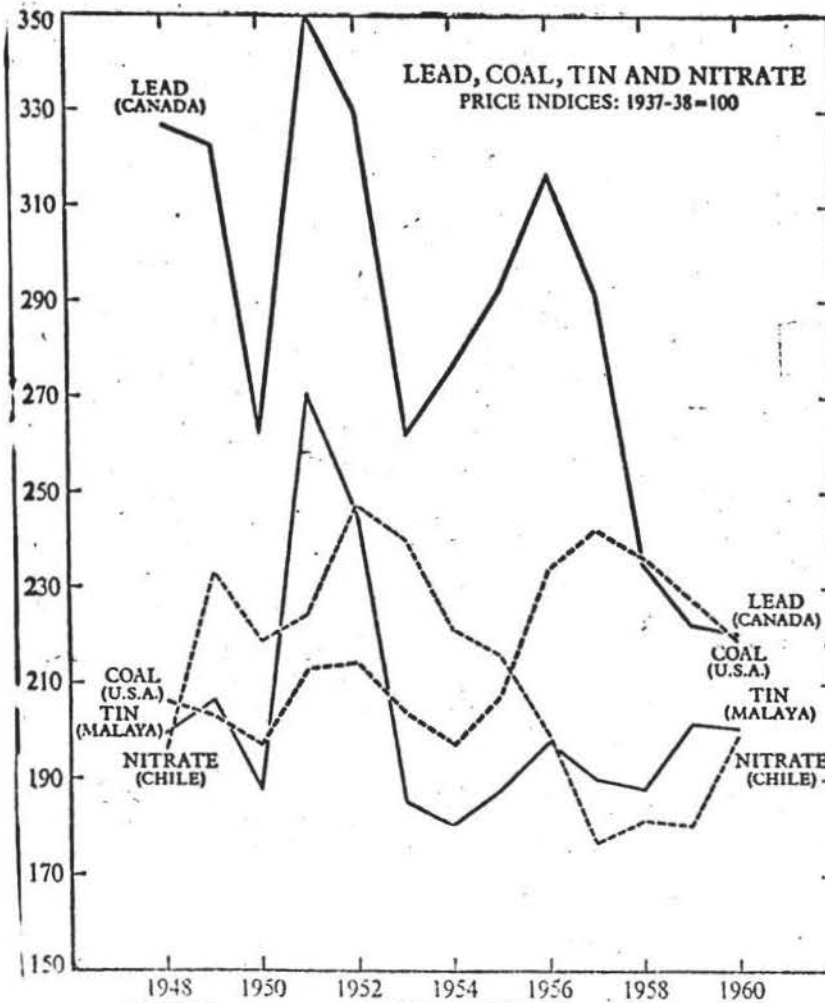
COTTON
(U.S.A.)

BURLAP
(INDIA)

Source: Theodore Morgan, "Trends in Terms of Trade and Their Repercus-
sions on Primary Producers," in International Trade Theory in
a Developing World, ed. by Roy Harrod and Douglas Hague (New
York: St. Martin's Press Inc., 1963), p. 86.

As a further confirmation of the fact that the terms of trade
are not turning against primary-product-producing underdeveloped
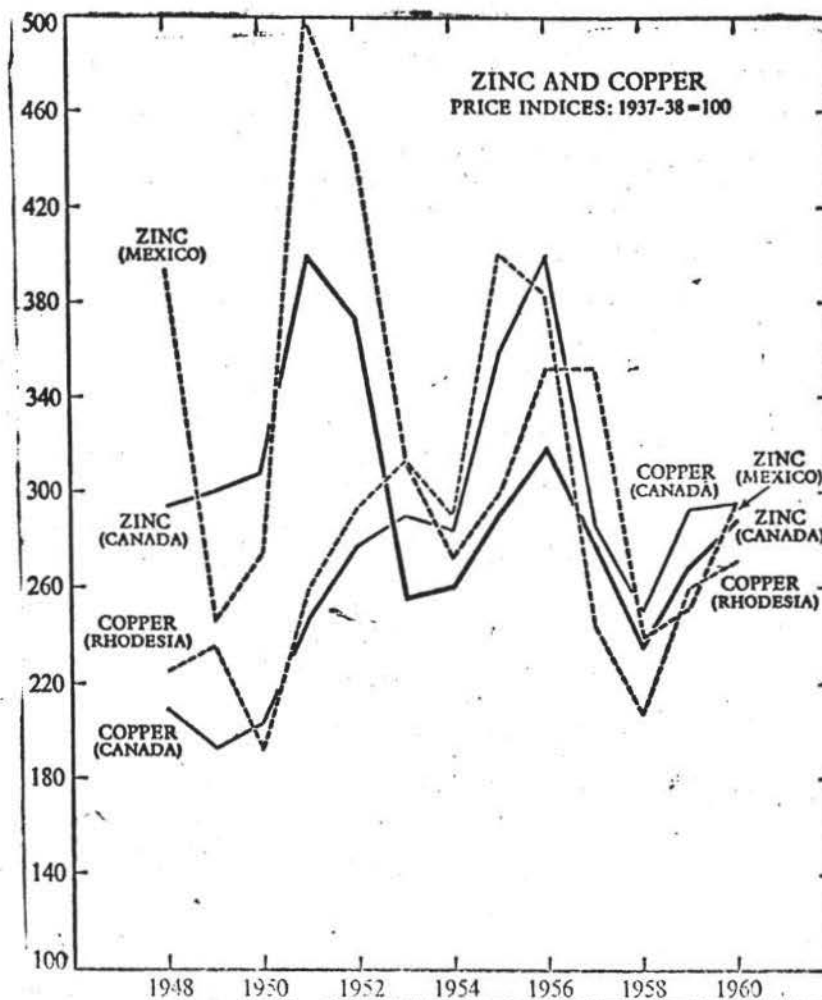
CHART 14
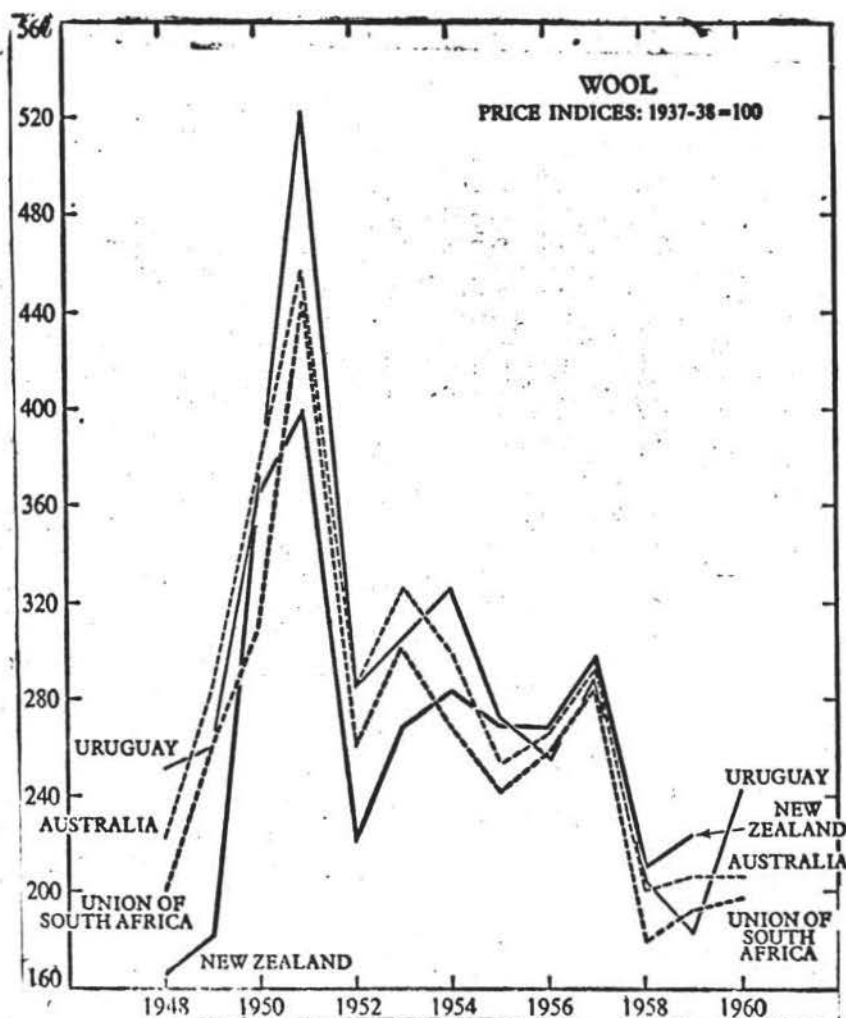
WOOL
PRICE INDICES: 1937-38=100

Source: Theodore Morgan, "Trends in Terms of Trade and Their Repercussions on Primary Producers," in International Trade Theory in a Developing World, ed. by Roy Harrod and Douglas Hague (New York: St. Martin's Press Inc.,.1963), p. 87.

nations, I have constructed both net barter and income terms of trade indexes for five South American countries: Brazil, Colombia, Chile, Peru, and Argentina. Only underdeveloped nations in Latin America were chosen because Prebisch was primarily concerned with the idea that the terms of trade were turning against underdeveloped nations in Latin America. The net barter and income terms of trade for these

nations are presented in Tables 7 and 8.

TABLE 7

NET BARTER TERMS OF TRADE

Year	Brazil	Argentina	Colombia	Peru	Chile
1946	...	...	...	...	66
1947	...	...	...	...	69
1948	48	...	...	...	75
1949	59	...	...	...	74
1950	104	...	125	134	82
1951	104	123	128	156	89
1952	100	98	132	125	98
1953	111	111	144	114	107
1954	149	103	171	119	97
1955	131	106	148	118	109
1956	125	94	164	117	123
1957	130	87	147	113	96
1958	131	92	125	97	85
1959	121	99	106	94	96
1960	113	105	108	97	101
1961	107	102	105	96	98
1962	93	89	98	97	104
1963	100	100	100	100	100
1964	114	109	118	113	101
1965	121	105	113	118	115
1966	104	...	112	138	157
1967	102	...	105	137	...
1968	114	...	...	...	...

*Calculated from: United Nations, Department of Economic and Social Affairs, Yearbook of International Trade Statistics 1969 (E.71. XVII.5), 1970, pp. 99, 54, 182, 168, 665.

Examining the net barter terms of trade it is seen that the Brazilian and Chilean terms of trade seem to be improving, the Argentinean and Colombian net barter terms of trade exhibit a slight tendency to fall, and the Peruvian net barter terms of trade seem to exhibit no tendency whatever.

TABLE 8

INCOME TERMS OF TRADE

(Base = 1963)

Year	Brazil	Argentina	Colombia	Peru	Chile
1946	...	...	...	...	53
1947	...	...	...	...	56
1948	48	...	...	...	64
1949	53	...	...	...	57
1950	81	...	94	47	61
1951	87	66	106	55	72
1952	69	35	110	49	82
1953	85	68	145	49	60
1954	98	67	161	56	90
1955	101	60	138	59	96
1956	104	59	138	64	104
1957	100	58	118	63	84
1958	97	67	105	56	73
1959	109	73	108	61	100
1960	103	78	104	81	91
1961	105	69	96	94	95
1962	85	85	100	100	103
1963	100	100	100	100	100
1964	101	102	123	124	121
1965	114	107	111	125	135
1966	121	...	107	146	196
1967	115	...	105	151	...
1968	142	...	...	...	...

*Calculated from: United Nations,Department of Economic and
Social Affairs, Yearbook of International Trade Statistics 1969 (E.71.
XVII.5), 1970, pp. 99, 54, 182, 168, 665.

The income terms of trade of Brazil, Argentina, Peru, and Chile
are improving while the income terms of trade of Colombia do not seem
to exhibit any clear-cut tendency. As a result, it would seem that
the ability to import is improving for four out of the five of the
Latin America nations studied.

In summary, the empirical evidence which we have examined in this
section provides no support whatever for Prebisch and Singer's

hypothesis that the terms of trade are turning against the underdeveloped nations. What has been shown is the tremendous variety of experience, regarding the movements in the terms of trade, which the underdeveloped nations have undergone.

Even though we have shown that there is no general tendency for the terms of trade to deteriorate against underdeveloped nations it is possible that the terms of trade may, for a time, turn against certain individual underdeveloped nations. If so, will this phenomenon have a significant effect upon the rate of growth of the underdeveloped nations? Prebisch would certainly answer this question affirmatively. According to Prebisch the economic development of Latin American countries depends heavily on foreign investment and the importation of the capital and technology necessary for development. The servicing of foreign investments must be paid for by means of exports in the same currency and the imports of foreign capital and technology can only be paid for with the foreign exchange received from exports. Thus if the returns from exports decline, it will be extremely difficult to increase the rate of economic growth in Latin America.[40]

Hans Singer would also agree with Prebisch that a deterioration in the terms of trade of underdeveloped nations would reduce their rate of growth. He states, "Conversely, when the prices and sales of primary commodities fall off, the desire for industralization is suddenly sharpened. Yet, at the same time, the means for carrying it out are sharply reduced."[41]

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[40]Prebisch, "The Economic Development of Latin American," _Economic Development of Latin American_, pp. 1-5.

[41]H. W. Singer, _International Development_, pp. 166-167.

I sought to empirically test the idea that movements in the terms of trade of an underdeveloped nation will have a significant effect upon its rate of growth. I used simple linear regression techniques and the specific functional form used was

$$Y = f(A),$$

where Y stands for the rate of growth and A stands for a change in the terms of trade. A positive relationship between the two variables is hypothesized by Prebisch. In other words, as the net barter terms of trade increase (decrease) for a nation, its rate of economic growth should increase (decrease). The nations and time periods covered by this study were: Brazil (1950 - 1967), Argentina (1951 - 1965), Colombia (1950 - 1967), Peru (1950 - 1961), and Chile (1950 - 1966). The results of the study are presented in Table 9 with each nation's regression equation listed under its name and the t-test value for each nation's regression coefficient listed under each of the regression equations.

The regression coefficients for Brazil and Chile are so insignificant that they are not even listed on the t-table. The regression coefficient for Colombia is significant only at the eighty-five per cent level, usually lower than is acceptable. The regression coefficient for Argentina is significant at the ninety-five per cent level, but the sign on the regression coefficient is negative which is quite contrary to what Prebisch postulated. Peru is the only nation for which the regression coefficient is both positive and significant at a high level, ninety-nine per cent.

TABLE 9

Nation	R^2
Argentina $Y = .00798 - .00262 A$ (2.2586)	.2987
Brazil $Y = .01826 + .00035 A$ (.5072)	.0166
Colombia $Y = .03703 + .00189 A$ (1.2600)	.0958
Chile $Y = .02301 - .00009 A$ (.1000)	.0007
Peru $Y = .02883 + .00123 A$ (2.5625)	.3032

*Calculated from: United Nations, Department of Economic and Social Affairs, Yearbook of National Accounts Statistics 1969, (E.71. XVII.3) 1970, pp. 170-74.

In summary, it seems that a significant relationship between movements in the terms of trade and the rate of economic growth exists for only one out of the five nations studied. Hence, it seems doubtful that a significant relationship does exist between movements in the terms of trade and the rate of economic development. At any rate, the burden of proof rests on those who claim that such a relationship exists.

The empirical evidence presented in this section seems to provide no support for Prebisch and Singer's hypothesis that the terms of trade are turning against the underdeveloped primary producing nations. In addition, the idea that movements in the terms of trade significantly affect a nation's rate of economic growth does not seem to be supported by the results of the regression analysis presented in Table 9.

V.

SUMMARY AND CONCLUSION

The hypothesis that the terms of trade are turning against under-developed nations has gained wide acceptance among the economists and government officials of many underdeveloped nations, especially Latin American nations. They believe that the supposed deterioration in their terms of trade is slowing down or limiting their rate of economic growth.

In this paper we have examined the theories of Raul Prebisch and Hans Singer, the main proponents of the idea that the terms of trade are deteriorating against underdeveloped nations. We found that the assumptions upon which Prebisch and Singer's theories are based were of a dubious nature and the statistical evidence, used in support of their theories, invalid. Other evidence was introduced in this paper to show the heterogeneity of the experience of underdeveloped nations regarding movements in their terms of trade. In addition, it was shown, through further investigation, that movements in the terms of trade seem to have little effect on the rate of growth of underdeveloped nations.

In summary, I would like to say that it is very possible that the terms of trade for some underdeveloped nations are falling and also that if this fall is of a drastic nature and persists over time it may have a detrimental effect on the rate of growth of these nations. What

I object to is Prebisch and Singer's idea that underdeveloped nations will as a whole be subject to this phenomenon with negative effects upon their rate of growth. For some underdeveloped nations movements in their terms of trade may pose problems, but for others this phenomenon will not occur. Thus I would suggest that each nation will have to examine its own situation with regard to this phenomenon and determine the policies relevant to its own specific problems.

There are several areas concerning movements in the terms which could serve as topics for further research. One could develop some scheme for classifying primary products and use this in determining which of these groups of primary products have experienced improving, declining, or fluctuating terms of trade. In addition, one could also trace primary goods in different underdeveloped nations to see if the movement in these prices differs significantly between nations. These are just a few ideas for further research.

TABLE 10

PRICE INDICES OF BEVERAGE, MEAT, BUTTER AND SUGAR
(1937–38 = 100)

Commodity and country	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Tea													
1. India	252	247	193	181	167	177	251	264	233	239	231	229	242
2. Ceylon	208	230	191	187	161	178	242	229	215	190	183	189	182
Meat													
1. New Zealand (Base: 1938)	147	165	124	106	122	140	161	179	183	193	174	153	161
2. Argentina (Base: 1938)	159	158	205	202	205	255	258	242	192	183	213	240	253
3. Denmark	199	190	134	148	160	153	144	151	163	150	154	147	148
Butter													
1. Australia	176	194	153	159	171	180	180	183	160	140	108	171	150
2. N.Z.	162	202	154	165	178	189	193	219	197	178	150	218	191
3. Denmark	247	247	148	156	162	181	183	188	192	155	128	184	159
Sugar													
1. Philippines	174	176	184	175	184	196	192	178	180	190	197	192	—
2. Cuba	219	230	241	240	253	256	246	236	241	251	256	253	—
3. Dominican Republic	437	349	500	381	310	287	284	298	459	332	291	321	—

Source: Theodore Morgan, "Trends in Terms of Trade and Their Repercussions on Primary Producers," in International Trade Theory in a Developing World, ed. by Roy Harrod and Douglas Hague (New York: St. Martin's Press Inc., 1963), p. 80.

TABLE 11

PRICE INDICES OF CEREALS AND OILS
(1937–38 = 100)

Commodity and country	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Rice													
1. U.S.A.	346	257	249	284	304	311	254	287	241	264	281	255	235
2. Burma	537	537	392	406	515	607	456	362	333	323	332	314	297
Wheat													
1. Canada	222	185	163	183	197	179	155	151	150	147	143	149	146
2. U.S.A.	242	212	222	242	241	226	233	228	224	226	205	200	201
Oil													
1. U.S.A. (linseed)	299	269	186	210	—	152	147	130	142	137	139	131	132
2. Philippines (coconut)	500	327	342	357	237	351	290	245	234	290	331	408	357
3. Ceylon (coconut)	307	406	350	409	235	315	281	282	239	249	243	349	285

Source: Theodore Morgan, "Trends in Terms of Trade and Their Repercussions on Primary Producers," in *International Trade Theory in a Developing World*, ed. by Roy Harrod and Douglas Hague (New York: St. Martin's Press Inc., 1963), p. 83.

TABLE 12

PRICE INDICES OF RUBBER, PULP AND TOBACCO
(1937–38 = 100)

Commodity and country	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Rubber													
1. Ceylon	119	97	211	335	208	200	177	199	249	205	154	197	211
2. Malaya	123	102	219	342	194	136	136	231	196	180	162	205	219
3. Indonesia	138	116	259	378	233	155	149	243	225	204	175	220	—
Pulp													
1. Canada	238	247	230	336	357	328	325	320	321	334	328	330	325
Tobacco													
1. U.S.A.	195	195	195	214	207	206	211	209	217	220	231	241	237
2. Turkey	160	136	152	154	137	149	168	188	196	200	193	175	144

Source: Theodore Morgan, "Trends in Terms of Trade and Their Repercussions on Primary Producers," in *International Trade Theory in a Developing World*, ed. by Roy Harrod and Douglas Hague (New York: St. Martin's Press Inc. 1963), p. 88.

TABLE 13

PRICE INDICES OF ZINC, COPPER, LEAD, TIN, NITRATE AND COAL
(1937–38 = 100)

Commodity and country	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Zinc													
1. Canada	295	299	305	400	374	257	262	293	319	281	237	270	291
2. Mexico	395	250	275	499	446	312	273	299	353	353	238	255	298
Copper													
1. Canada (1938 base)	210	194	204	251	278	291	286	360	401	288	250	295	298
2. Rhodesia (1938 base)	225	236	193	259	295	313	288	403	385	246	209	261	272
Lead													
1. Canada	328	324	263	350	331	263	276	293	317	292	235	223	221
Tin													
1. Malaya	199	207	188	271	246	186	181	188	198	190	188	202	201
Nitrate													
1. Chile	197	233	219	225	247	240	222	216	199	177	182	181	200
Coal													
1. U.S.A.	208	203	197	213	214	204	197	208	234	243	236	228	220

Source: Theodore Morgan, "Trends in Terms of Trade and Their Repercussions on Primary Producers," in International Trade Theory in a Developing World, ed. by Roy Harrod and Douglas Hague (New York: St. Martin's Press Inc., 1963), p. 90.

TABLE 14

PRICE INDICES OF WOOL, COTTON, HEMP AND JUTE
(1937–38 = 100)

Commodity and country	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Wool													
1. Australia	223	283	—	453	288	326	300	254	266	294	201	206	206
2. New Zealand	165	183	363	399	224	269	283	271	269	297	209	224	—
3. Union of South Africa	199	264	311	449	262	302	269	242	257	286	179	194	198
4. Uruguay	251	263	364	522	286	305	326	273	256	290	206	183	244
Cotton													
1. U.S.A.	325	319	348	400	372	316	327	323	326	325	334	319	302
2. Egypt (Ashmouni)	446	338	453	542	389	291	346	317	348	388	349	338	349
3. Mexico (Base: 1938)	—	—	—	491	321	299	323	296	284	274	257	228	242
Hemp													
1. Philippines	484	499	491	568	355	352	251	275	334	413	360	533	550
Burlap													
1. India	444	391	403	708	372	289	277	256	236	240	234	233	276

Source: Theodore Morgan, "Trends in Terms of Trade and Their Repercussions on Primary Producers," in International Trade Theory in a Developing World, ed. by Roy Harrod and Douglas Hague (New York: St. Martin's Press Inc., 1963), p. 85.

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