# GROWTH AND TERMS OF TRADE

A Dissertation
Submitted To The
UNIVERSITY OF POONA

For The Degree Of
M. PHIL., IN ECONOMICS

*By*

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**Gokhale Institute of Politics and Economics**
PUNE - 411 004.

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# PREFACE

This dissertation is a brief survey of the literature concerning 'Growth and Terms of Trade'. Trade plays a prominent role in the growth of LDCs of Latin America, Africa and Asia, which are characterized by dominant export sector and are facing serious balance of payment difficulties.

The school headed by Raul Prebisch has analysed the situation prevailing in these countries under the framework of economic dependence. The factors responsible for this situation are foreign trade and investment. Prebisch brings out the importance of trade in the process of transfer of productivity gains from the developing to developed countries and has coined the term 'centre-periphery'. In his analysis, the deterioration of terms of trade (a low income elasticity of demand being one of the reasons) is the indicator of this process of transfer. This part of Prebisch's analysis finds its justification in the neo-classical framework of 'growth and terms of trade' advanced by J.R. Hicks and H.G. Johnson. The concentration of productivity gains in the existing prominent export sector coupled with low income elasticity of demand for the products results in the ultra-pro-trade biased growth in the economy. The net effect is the deterioration of terms of trade.

Most of the critiques of Prebisch's analysis have concentrated their attention only on the secular movement of terms of trade between the primary and manufactured goods and have tried to falsify this argument. The main concern of Prebisch's analysis is not to prove the deterioration of terms of trade but to show what type of growth a country is experiencing and the mode of appropriation of surplus in the centre-periphery system.

Both UNCTAD and World Bank data show the downward movements in the terms of trade of developing countries in the period 1951-1973. Under such a situation the only solution for the developing countries besides import substitution, trade liberalization policies and cartel organization, is to find the 'real comparative advantage' both in production as well as in consumption since the comparative advantage itself is shifting.

I have summarized this argument in the four chapters. Chapter 1 deals with Prebisch's thesis on secular deterioration of terms of trade. Chapter 2 analyses the various types of growth effects on the terms of trade. In Chapter 3 the analysis regarding the movement of terms of trade between primary and manufactured product is presented. Chapter 4 shows the slow growth of exports, recently experienced by LDCs.

For this work I am highly grateful to my guide, Dr. B.G. Bapat, who gave me a clear insight into the problem.

I am thankful to Prof. N. Rath and Prof. B.S.R. Rao for their advice. My sincere thanks are extended to Mr. Inamdar, who has typed this dissertation neatly and carefully. Above all I am thankful to all my friends and the staff of Gokhale Institute for the help and inspiration they provided.

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Santosh Thirani

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# CHAPTER 1

## TRADE LEAD GROWTH—A SECULAR DETERIORATION OF TERMS OF TRADE

In the post-war period many economists have questioned whether the classical trade theory with its assumption of "ideal conditions" is able to provide an adequate explanation of the distribution of the gains from trade between rich and poor countries. Classical theory maintained that, by following the principle of comparative advantage, all trading countries would profit; the poor countries would be better off in the post-trade situation and real world income would be maximized. The experience of the real world shows that the principle of comparative advantage has augmented the inequalities between the nations. The economic system which has come into operation, is the industrially advanced centre and the primary producing periphery i.e. 'Centre-Periphery System'. The basis of the system is the cyclical phenomena experienced by the capitalist world, i.e. the active centre and passive periphery. This hypothesis of widening inequalities between the nations or the centre-periphery relationship is mainly advanced by Raul Prebisch, Hans, Singer and Gunnar Myrdal. Raul Prebisch explains this dependency by means of "Secular deterioration of the terms of trade of periphery country". [41, 42, 43]. Myrdal explains it by means of

'Circular cumulative causations' of 'spread effects' and 'Backsetting Effect' [36]. Both the writers have stressed the point, that, it is the low income elasticity of demand (low import propensity of the centre) which has a detrimental effect on the growth of the periphery and thus the inequality will be further widened. The 'Export-Lead' growth which has resumed the main feature of the underdeveloped countries has been recognized by Prof. Ragner Nurkse [35], who has appreciated the role of trade as 'Engine of Growth' in the 19th Century, but in the 20th Century it has failed to serve this role due to the sluggish demand in the centre for the peripherial products.

1.1 Secular Deterioration of Terms of Trade

The secular deterioration hypothesis is as old as the classical period. To explain the terms of trade of Great Britain, Torrens, Marshall and in the 20th Century, even Keynes had advanced this hypothesis. But Raul Prebisch gave it a twist by applying it at a different juncture to explain the growing dependency of the underdeveloped countries. Before going into Prebisch's explanation, we should have a cursory glance of the different situations and the cause on which the theory was originally based.

1.1.1 British School and the Secular Deterioration

The underlying cause was the existence of 'law of diminishing return' in the agricultural sector, which is the cornerstone of the classical analysis, and the basis to the whole distribution theory of Ricardo. The first writer who

analysed the effect of diminishing returns on terms of trade was Robert Torrens. He writes:

"As the several nations of the world advance in wealth and population, the commercial intercourse between them must gradually become less important and beneficial. ... The species of foreign trade which has the most powerful influence in raising profits and increasing wealth, is that which is carried on between an old country in which raw produce bears a high value in relation to wrought goods and a new country where wrought goods possess a high exchangeable power with respect to raw produce. Now as new countries advance in population, the cultivation of inferior soil must increase the cost of raising raw produce, and the division of labour reduce the expense of working it up. Hence, in all new settlements, the increasing value of raw produce must gradually check its exportation and the falling value of wrought goods progressively prevent their importation, until at length the commercial intercourse between nations shall be confined to those peculiar articles, in the production of which the imitable circumstances of soil and climate give one country a permanent advantage over other." [53, p.185]

From this quotation, it can be seen that Torrens believed in the falling terms of trade for the industrialized country, of which England was the most important at that time. His view was further advanced by Keynes and Robertson in order to explain the deterioration of Great Britain's situation by £ 37 between 1900 and 1911.

Keynes-Beveridge-Robertson Controversy: In 1912, in a comment on the Board of Trade Returns for 1911, Keynes noted that Britain was £ 37 million a year worse off than it would have been if all prices had moved equally between 1900 and 1911. He concluded:

"The deterioration - from the point of view of this country - shown above is due, of course, to the operation of the law of diminishing returns for raw products which, after a temporary lull, has been setting in sharply in quite recent years, there is now again a steady tendency for a given unit of manufactured product to purchase year by year a diminishing quantity of raw product. The comparative advantage is moving sharply against industrial countries." [22, p.630]

This pessimistic viewpoint forms the basis of his writing, viz. The Economic Consequence of Peace (1924). He writes:

"Upto about 1900 a unit of labour, applied to industry yielded a purchasing power over an increase quantity of food. It is possible that about the year 1900 this process began to be reversed and a diminishing yield of nature to man's effort was beginning to reassert itself." [25, p.8]

The main factor responsible for this deterioration of the terms of trade is the rapid growth of population. "The pressure of population on food, which had already been balanced by the accessibility of supplies from America, for the first time in recorded history has definitely reversed."

Beveridge, in his Presidential Address to the British

Association in 1923, lost to Keynes, despite a massive barrage of statistics designed to show that the rise in acreage and the yield in agriculture were keeping pace with the growth in population and the increase in industrial productivity. [76]

Beveridge was concerned with long-period movements of productivity and demand in the various sectors of the world economy. Discussing the course of the terms of trade index, he concluded: "The course of such an index is the resultant of several independent forces, namely, efficiency of production in industry or in agriculture and demand for industrial or agricultural product." [50, p.188]

Since Keynes was the major spokesman of those days his analysis received greater importance. Later Keynes recognizes the improvement of Britain's terms of trade in the post-war period, but it was accompanied by the fall in the volume of exports. Keynes concludes that: "We are no longer able to sell a growing volume of manufactured goods at a better real price in terms of food." Prof. D.H. Robertson [45] advances the argument about falling terms of trade for manufacturing country on the basis of Bowley's figures on U.K.'s terms of trade. (35, p.68]

Clark's Estimate of Terms of Trade in 1960: The most substantial successors of Keynes and Robertson is Colin Clark [98] and A. Lewis [28]. Clark in his 'Economies of 1960', written in 1940-41, predicted that the terms of trade would move in favour of agriculture by a factor of as much

as 1.9 by 1960, in comparison with the base period of 1925-34. Clark's analysis is based on following basic factors:

1) The relation between estimated future population and the size of the working force.
2) The relation between real income per head and the demand for tertiary products (transport and other services).
3) Relation between real income per head and food consumption.
4) The relation between productivity in agriculture and the density of population on the land.
5) The trend of productivity per head in secondary and tertiary industries.
6) The trend in productivity per head in agriculture.

The question which Clark asked, is: Given the productivity in the secondary and tertiary industries with its consequences on real income, what level of the terms of trade will yield the food supplies appropriate to that real income? He says:

"The level of world prices for agricultural product must be high enough to hold in agriculture enough workers to produce the agricultural supplied required at the real incomes implied by the projected productivity trends in secondary and tertiary industries." [9, p.49]

The main factors of Clark's estimates are:

1) enormous transfer of capital from developed to underdeveloped regions,
2) rapid growth of population in the underdeveloped country,
3) the relatively slow increase in productivity in agricultural country,
4) somewhat high estimate of income elasticity of demand,
5) a price elasticity of demand in the neighbourhood of 0.5 per cent.

This pessimism regarding supply and optimism regarding demand will lead to an improvement in the terms of trade of an agricultural country.

Till now we are dealing with the writers who wrote before R. Prebisch and their main aim was to show how Great Britain's terms of trade is declining. Now with Prebisch we will move to the different world, where growth is mainly 'export lead', and deterioration of the terms of trade has its effect on the economic growth of the economy.

1.1.2 Secular Deterioration—Prebisch-Singer Version

Prebisch-Singer thesis is based on the statistical findings of Economic Commission of Latin America (ECLA) - Relative Prices of Exports and Imports of underdeveloped countries 1949. [Appendix C]

He begins by questioning the very basis of international trade i.e. the scheme of 'international division of

labour', According to this 'scheme', the benefits of technical progress tend to be distributed alike over the whole community, either by lowering of prices or by the corresponding raising of incomes [42, p.2]. The real world has not experienced such an ideal situation; instead the fruit of technical progress has been unevenly distributed, favouring the rich countries.

"Historically, the spread of technical progress has been uneven and this has contributed to the division of the world economy into industrial centres and peripheral countries engaged in primary production with consequent difference in income growth." [41, p.220] This uneven technological growth has led to the transfer of productivity gains from the periphery to the centre which is explained via 'wage price mechanism' operating in both centre and periphery.

Prebisch argues that if the fruits of technical progress had been evenly distributed, then the rise in productivity in the industrial centre would have brought a steady improvement in the price relationship of periphery. This has not happened because of several reasons.

Price has not fallen concomitantly with technological progress. On the one side the cost has reduced as a result of high productivity, on the other side the income of the entrepreneurs has increased. If the increased income is more than productivity increase, the price increases, rather than falls. He explains this by means of mathematical example.

Table 1.1 : How the Effects of Increased Productivity Are Transmitted from Centre to Periphery

| | Primary production 1 | Industrial production 2 | Total production 3 | Ratios $\frac{1}{3}$x100 | Ratios $\frac{2}{3}$x100 |
|---|---|---|---|---|---|
| Change in Productivity | 100 | 100 | 100 | | |
| | 120 | 160 | 140 | | |
| Case I | | | | | |
| Productivity rise leads to fall in cost and hence the fall in prices | 100 | 100 | 100 | 100 | 100 |
| | 83.3 | 62.5 | 71.4 | 116.7 | 87.5 |
| Case II | | | | | |
| Cost decreases but income increases | 100 | 100 | 100 | 100 | 100 |
| | 120 | 180 | 150 | 80 | 20 |
| Change in prices with change in income | 100 | 100 | 100 | 100 | 100 |
| | 99.9 | 112.5 | 107.1 | 93.3 | 100 |

In the first case the increase in productivity from 100 to 120 in agriculture and from 100 to 160 in industry, with the income remaining constant costs fall from 100 to 83.3 in case of agriculture and 100 to 62.5 for manufacture. Now with the increase of productivity of 20 in primary produce, it will be able to buy 116.7 out of total produce of '140' and in case of manufacture the purchasing power of previous 100 manufactured goods will be only 87.5. This is a situation where the productivity gain is equally distributed between the trading countries.

But there is a marked difference in the result, when the income increases with the increase in productivity. In the manufactured section, income has increased more than productivity, the prices have gone up from 100 to 112.5, the price ratio of the primary producing is the same, thus we see the purchasing power of the primary produce has reduced from 100 to 93.3 i.e. a fall of 7.7 per cent per unit. Under such a situation productivity gains has been transferred from periphery to centre.

The explanation for this phenomenon is found in the trade cycle. "The existence of this phenomenon cannot be understood except in relation to trade cycle and the way in which they occur in the centre and at the periphery. Since the cycle is the characteristic form of growth of capitalist economy." [40, p.5] In course of the cycle the gap between prices of the two (i.e. primary products and industrial product) is progressively widened, because, although in the upswing, the prices of primary products rise more rapidly than the industrial prices, they also fall more in the downswing. Here he brings the importance of prevailing wage system in both 'centre and periphery'.

During the upswing, part of the cycle profits are absorbed by an increase in wages, occasioned by competition between entrepreneurs and by the pressure of trade union. When the profits have to reduce at the downswing, the part

that is absorbed by wages loses its fluidity by reason of the well known resistance to lowering of wages. This flexibility of the wage in the periphery is due to the 'characteristic lack of organization among the periphery' countries to keep wages high as productivity increases. This has happened, according to Prebisch, in Latin American countries and other underdeveloped countries.

Prebisch [42] leaves the cyclical theory and prescribes different explanation for the falling terms of trade. He brings in the low 'income elasticity of demand for primary product'. "Deterioration in the terms of trade in the peripheral process of growth subject to the unrestricted play of market forces is the result of disparities in the income elasticity of demand and uneven form in which the technological progress has spread into the world." [41, p.330]

In order to explain the process of transfer of productivity gains from periphery to centre he uses the 'productivity ratio' (which expresses the relationship of physical productivity per man between the periphery and the centre) and wage ratio. There is only one wage ratio and as many productivity ratios as there are commodities. The wages are perpetually kept low because of the pressure of surplus population.

In order to show the effect of low income elasticity of demand on terms of trade he begins with an ideal situation. In a two-country and two-commodity model, where A is primary

producing country and B is manufacturing country. There exists in both, same wage rate and productivity rate at the margin is same. There exists no technological disparities i.e. the productivity in A is three times that of B and productivity in B is three times that of A in their respective range of activities. Now if we take the assumption of high income elasticity of demand for industrial good and low income elasticity of demand for the primary goods, the following change will take place in the economy.

In the country A, there will be a transfer of manpower from the export sector, (where due to productivity rise, output has increased, but demand for the output has fallen,) to the sector of lower productivity. The pressure of the redundant population and lower opportunities for its absorption cause the fall in wages and hence in prices. Thus the productivity gains will be transferred to the centre via low price of the consumer good. On the other hand, in the centre, the high income elasticity of demand for industrial good will attract the population from the agricultural sector; the price of labour increases i.e. wages, and hence the price of the product will be higher. Thus the lower income elasticity of demand of primary product without any change in the technological disparities causes the fall in the terms of trade. This theory forms the core of Prebisch's analysis and finds its justification in the neo-classical theory of growth and terms of trade. Both production and consumption effect of growth is 'ultra-pro-trade biased'. [Chap. 2]

Prebisch [43] recognizes the importance of demand and states that it is the lack of adjustment within the periphery that causes the fall in terms of trade.

"The origin of this phenomenon is to be found in the relatively slow rate at which world demand for primary commodities grows in comparison with that for industrial products. The disparity need not necessarily bring about any decline in primary prices so long as production adjusts itself continually and easily to the tempo of demand. For this to be possible, three conditions which are absent in practice would have to be satisfied.

a) The redundant proportion of the increment in the economically active population in primary activities would have to be displaced, so that the production could expand at a rate not exceeding the rate of growth of demand.

b) The manpower thus displaced would have to be employed in industry and other labour-absorbing activities.

c) The manpower in question would have to be absorbed quickly and completely enough for the real wages of workers in primary activities to rise and advantage to be taken of the increment in the productivity of the latter."

If the level of wages in primary activities fail to rise to the extent permitted by the increase in productivity, the latter will be transmitted into profit gain and will go to stimulate the growth of production beyond the tempo imposed by the growth of demand, thereby, forcing down the relative prices of primary commodities as compared with those of the industrial goods.

Prebisch recognizes, deterioration is not the phenomenon caused by outside forces, but due to the lack of 'dynamism in development'. It is due to (1) slow growth of demand for primary product, (2) productivity rise in export sector, (3) slow absorption of the redundant manpower in the other activities which leads to fall in wages.

Prebisch says that the tendency for the terms of trade to deteriorate rests on the structural difference between the centre and the peripheral country. In 'Towards a New Trade Policy for Development', he writes: "it is not an imitable law. It is a trend which can be slowed down or halted when the demand for primary commodities in the major centres expands very rapidly either because of the speed with which income rises or because of extraordinary requirements". [43, p.10]

From the above analysis it is clear that the higher 'import coefficient' of the centre has a favourable effect on the improvement of the terms of trade of the periphery. In order to slow down this trend, Prebisch advocates the policy of import substitution industrialization in the developing country.

Prebisch further suggests that "countries experiencing a deterioration in the terms of trade have a prima facie claim upon additional international resources - resources over and above those which would have received in the normal course of events".[42, p.19] This resources transformation should take place in the form of higher prices for their produce. He says for the developing country as a whole, the deterioration of the terms of trade in the period 1950 to 1961, is that of $ 13.1 million. The deterioration is particularly severe in Latin America i.e. $ 10.1 billion in the same period.

Thus it is the responsibility of the centre to provide enough 'marketable opportunities' for the primary produce. Prebisch's view received widespread recognition in the underdeveloped country. For the first time 77 underdeveloped countries met in Geneva in 1964, to pursue their case and asked for a fair price by means of the well organized body i.e. United Nations Conference on Trade and Development (UNCTAD).

H.W. Singer [52] has supported and supplemented Prebisch's view on uneven distribution of technological progress by means of low price of primary goods and higher income to the producer of manufactured goods. Technical progress in manufacturing industries is expressed via rise in incomes, while technological progress in the production of food and raw material in underdeveloped countries is expressed by a fall in prices. Thus the developed countries are in the

favourable position both as a consumer and producer. Further he adds, is that the technical progress in the manufacturing sector reduces the input requirement of the 'raw material' used; thus the demand for raw material falls.

"Technical progress while it operates unequivocally in favour of manufactures - since the rise in real incomes generates a more than proportionate increase in the demand for manufactures - has not the same effect on the demand for food and raw materials. In the case of food, demand is not very sensitive to rises in real income, and in the case of raw materials, technical progress in manufacturing actually largely consists of a reduction in the amount of raw materials used per unit of output. This lack of automatic multiplication in demand, coupled with the low price elasticity of demand for both raw materials and food, results in large price falls, not only cyclical but also structural." [52, p.242]

## 1.2 Gunnar Myrdal: on Widening International Inequalities

Myrdal begins by saying that the classical theory of international trade does not provide the explanation for the economic inequalities and their tendency to grow, as it is based on the assumption of stable equilibrium. Myrdal applies his hypothesis of 'Circular Cumulative Causation' in order to explain the growing inequalities i.e. any process has a tendency to move upward or downward in the cumulative fashion [36, p.27]. In order to explain the growing inequality he takes into consideration the 'terms of trade'. "A cumulative

process of going upward and downward, will be generated by a change in the terms of trade of a community or a region." The operation of the circular cumulative process results in 'Backsetting Effect' or 'Spread Effects' in the community.

The Backsetting Effect deals with adverse effects faced by a locality due to the expansion in the other locality. The factors responsible for this are capital, labour movement, and especially the trade. He says: "The trade operates with the fundamental bias in favour of the richer and progressive regions and disfavour of other regions. The freeing and widening of the market will often confer such competitive advantages to the industries in the already established centres of expansion, which usually work under the condition of increasing return, that even earlier existent handicraft and industrial activities in the other regions are thwarted." This phenomenon took place in Italy. [36, p.29]

In case of the newly opened trading centres, trade resulted in spread effect, which explains the effect of expansionary momentum from the centres of economic expansion to other regions. The growth of the centre leads to growth in the peripheral countries.[36, p.31] One of the many factors which is responsible for the spread effect is demand in the centre of expansion. "The Spread Effects of momentum from a centre of industrial expansion to other localities and regions, operating through increased demands for their products and in many other ways." [36, p.32]

The level of development of the growing country depends on the Spread Effect. When the spread effect is low, the country will be poorer and this poverty will be further aggravated by means of a circular process. The spread effect in the underdeveloped country is low because of the sluggish demand condition.

## 1.3 Nurkse's Thesis on Trade as 'Engine of Growth'

The role of the 'demand' as the growth transmission process has been recognized further by Ragner Nurkse[37], who considers trade to be the main 'engine of growth' in the 19th Century, but in the 20th Century it has failed to serve this function because of the 'sluggish demand' for the primary products.

The pattern of "growth through trade", affected particularly the new countries or as late Falke Hilgerdt used to call them, the "regions of recent settlement" i.e. in World's temperate latitudes: Canada, Argentina, Uruguay, South Africa, Australia and New Zealand. The growth in these regions was because of the splendid market which the old world has offered to them. These countries have experienced the cumulative process of development, which was brought about by export demand and foreign investment. In the period 1880-1913, the foreign investment was supported by a long-run prospect of expanding demand in the industrial centres for the raw materials.

In the 20th Century there exists the current lag for the exports of poor countries. Nurkse says, "the centre is not transmitting its own rate of growth to the rest of the world through a proportional increase in its demand for primary products."[37, p.95] He establishes the five causes for the Slow Growth of Demand: (1) The composition of industrial production in the advanced economies is shifting away from "light" industries in favour of "heavy" industries (such as engineering and chemicals). (2) As a special case, the rising share of services in the total output of advanced industrial countries tends to cause their raw material demand to lag behind the rise in their national product. (3) Agricultural protectionism which has adversely affected the imports of primary products. (4) The income elasticity of the consumer demand for many agricultural commodities tends to be low. (5) Substantial economies have been achieved in industrial uses of natural materials. (6) Development of the synthetic substitutes for raw materials. Furthermore, he adds that the primary product has low price elasticity.

Nurkse is of the view that the trade does not serve as 'engine of growth' in 20th Century because of the self-sufficient centre i.e. U.S.A. and the slow growth of the demand for underdeveloped countries' product. Hence it will lead to the deterioration of the terms of trade of developing country.

The supporters of the deterioration theory, further

take into account the operation of the Engel's law of consumption. According to the law, the increase in income brings a less than proportionate increase in demand for consumption goods.

"Inexorably, too, the terms of trade move against agricultural and raw material countries as the world's standard of living increases (except in the times of war) and as Engel's law of consumption operates." [26, p.349]

The foregoing analysis shows that the deterioration of the terms of trade shows the increasing dependency of the growing country, as the growth in the country is ultra-pro-trade biased whereas in the centre the growth is 'anti-trade-biased' and the income elasticity of the demand for import is less than one. [Chap. 2]

# CHAPTER 2

## ECONOMIC GROWTH AND TERMS OF TRADE

The literature on Economic Growth and Terms of Trade has received widespread importance after the publication of Prof. J.R. Hicks' [17] famous paper - 'An Inaugural Lecture' - on "dollar problem" in 1953. He advances a thesis explaining that the "dollar problem" which Great Britain was facing in 1949, it not a monetary phenomenon which can be solved by the mere devaluation but it is deep-rooted in the nature of Economic Growth of the country. Classical writers were mainly concerned with the effect of trade on Economic Growth but not vice-versa. Taking Hicksian thesis as guideline the literature has been further advanced in order to explain the position of two growing countries at the international level.

### 2.1 Hicks on Growth and Trade

Hicks advances his reasoning in terms of the standard two-country trade model. There are two countries, A and B, of which only A grows, while B is stagnant. What will happen?

If productivity grows uniformly in A - i.e. if all its industries expand at the same rate - the likelihood is that this will benefit B. Here the assumption is that the money income rises to the full extent of the productivity increase in A, while the income remains unchanged in B, because nothing

has happened there. The cheapening of A's products would have been erased by the rise in incomes, and prices would remain unchanged in A. Prices would also remain unchanged in B, as nothing has happened there. Money income has not changed in B, so there is no reason why B should buy a larger or smaller quantity of A's products than before. But since A's income has risen, that will lead to an increase in demand for imports. This implies that the balance of trade will turn in B's favour. To restore balance,the relative price of B's export would increase. Its terms of trade will improve.

Hicks finds that the assumption of 'uniform increase in productivity' is unable to explain the current situation prevailing between U.K. and America. Thus he makes the assumption of Export biased and Import biased growth, depending upon the concentration of productivity increase in the particular sector.

Export Biased Growth: If the improvement in productivity is concentrated in A's export sector with no improvement elsewhere, this case is extremely favourable for country B. Suppose the income remain constant in both countries. The prices of B's export will remain constant, because nothing has happened in this country, whereas the prices of A's export will fall. The terms of trade will turn in favour of B.

Import Biased Growth: Here the question that arises is what will happen, if the productivity gain in A is concentrated in its import competing sector? The case is most

favourable to A. With the previous line of reasoning we can say if incomes in both countries remain the same, the prices of import competing goods in A would have to fall. This would mean that a larger share of the market would be taken over by goods produced in A, because imports would be substituted with import competing goods. The demand for export from B would therefore fall. This would create a deficit in B's balance of trade. To restore it, B would have to lower her export prices. Thus B's terms of trade ($P_n/P_m$) will fall. A will keep her productivity gains and also will have improved terms of trade. From this analysis, Hicks tries to explain the situation prevailing in Great Britain. In Great Britain in the 19th Century the productivity gains in the export sector is slower than the gains in U.S. import competing sector but at the same time there was higher productivity gains in U.S. export sector. In the 20th Century, U.S. has higher productivity gains in its import competing sector but in the export sector it has slowed down. This explains the main cause of U.K.'s deteriorating terms of trade. The problem cannot be solved with mere devaluation scheme, it requires the improvement in export sector.

The framework given by Hicks has been further supplemented and advanced by E.J. Mishan [33], W.M. Cordwen [10], J.H. Johnson [21], and Jagdish Bhagwati [18].

## 2.2 Income Effect and Terms of Trade

E.J. Mishan [33] has incorporated 'income effect' in the foregoing analysis in order to determine the growing countries terms of trade.

He takes two countries, U.K. and U.S.A., two-commodities, Grain and Textiles. U.K. imports grain and exports textiles and the reverse situation prevails in U.S. There exists only partial specialization. Both the countries produce both goods. If there is overall increase in productivity in U.S., i.e. in both the sectors, in order to maintain the prevailing terms of trade U.S. has to export the same volume of commodity as before. This indicates that the U.S. consumes an additional quantity of textiles, since it is producing more of textiles at home even.

Hence for the terms of trade to move in favour of U.K., it is not only the positive income effect on textiles that is necessary, but it should be above a determinate magnitude. If the income effect on textiles in the U.S. is smaller than this magnitude the terms of trade will move against the U.K.

The argument has been elaborated with the aid of two conventional diagrams, in Figure 1(a) and 1(b). [33, p.218] In Fig. 1(a) offer curves for the U.S. and the U.K. are depicted, BQ representing the equilibrium quantity exchanged between them at terms of trade given by BT. If at these terms of trade, U.S., after its technological innovation,

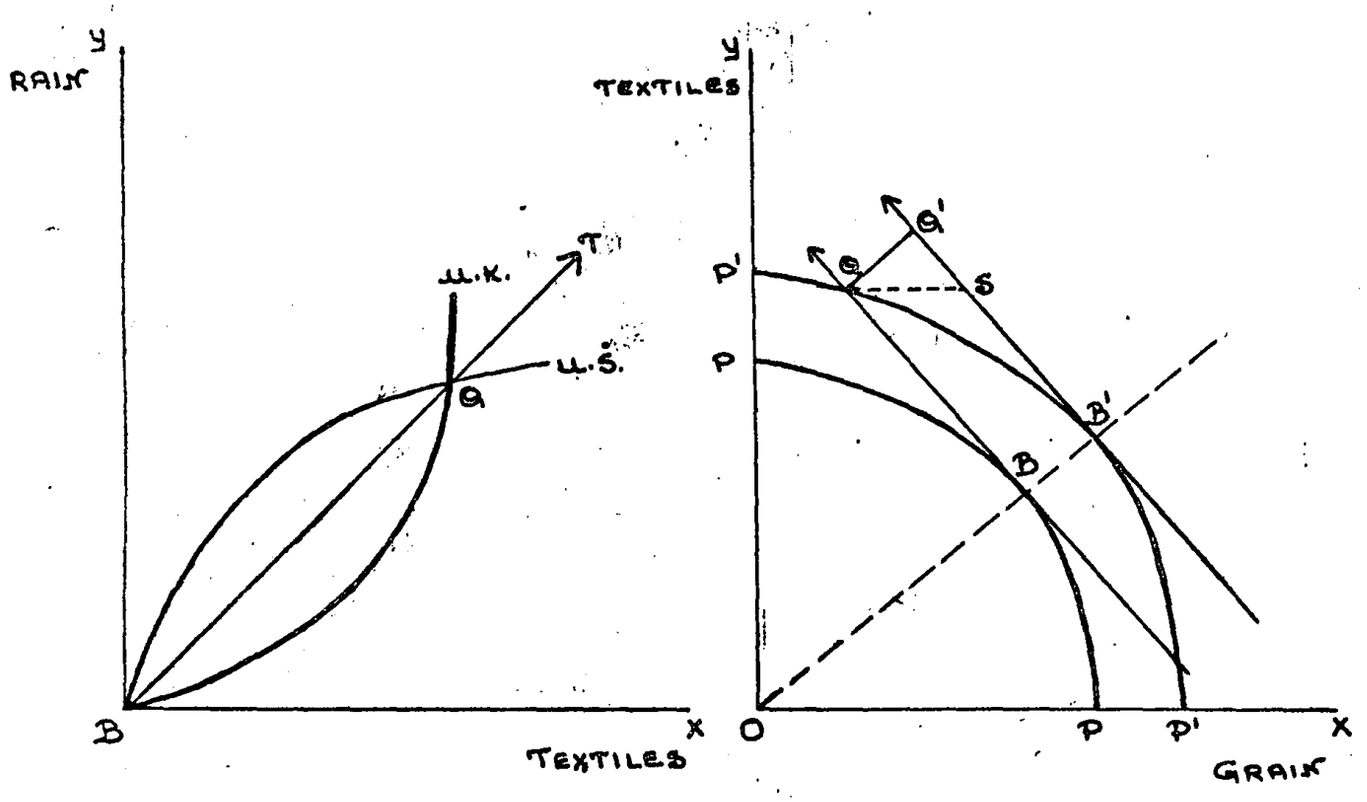


Fig: 1 (a) (b)

wished to exchange more grain for U.K.'s textiles, then the terms of trade will turn against her. On the other hand, if after these improvements she wished to exchange less grain for U.K. textiles, the terms of trade would move against the U.K. and in her favour.

Fig. 1(b) depicts the U.S. production possibility curve, PP, before technological innovation takes place. The terms of trade are given by BT. Total production in the U.S. is represented by point B, total consumption by the point Q and with BQ equivalent to BQ in Fig. 1 - representing quantity exchange with U.K.

An overall advance in U.S. productivity is represented by the curve P'P', drawn so that the tangent to production possibility curves are parallel i.e. B and B'. Now in order for the same term of trade to prevail as before the quantity consumed must be at the point Q and that produced at the point B' where QQ' is drawn parallel to BB'. The actual income effect is the vertical distance between QS and Q' i.e. Q'S.

If the U.S. income effect on textiles is smaller than that indicated by SQ', then the quantities she offers for sale at going terms of trade will decrease and the resultant terms of trade will move in her favour. Conversely, if the U.S. income effect on textiles is larger than that indicated by Q'S the amount offered for exchange by the U.S. are in excess of those represented by B'Q and the terms of trade turn in favour of the U.K. and against the U.S.

This analysis proves that Hicksian generalization of improving terms of trade for B, if there is uniform productivity increase in A's industry, is wrong. Thus in order to take effect of growth on terms of trade, both production effect and consumption effect of output expansion should be taken into consideration.

## 2.3 Production and Consumption Effects of Economic Growth

Prof. Johnson has elaborated this issue of "growth and terms of trade" in all its dimensions. He begins by asking the most fundamental question; What is the effect of growth on the growing country's demand for imports at the initial terms of trade? He takes into consideration both production and consumption effect of output expansion. On both consumption and production sides, he advances five biases.

(1) Pro-trade biased growth - which increases the supply of export and demand for imports more than proportionally than increase in output.

(2) Neutral - or unbiased - which increases the supply of export and demand for imports in proportion to output.

(3) Anti-Trade biased - which increases the country's demand for import and supply of export less than proportion to the output. These biases are similar to export biased, neutral and import biased growth advanced by Prof. Hicks.

He adds two more biases which are the extreme cases -

(4) Ultra-Pro-trade biased - In which more than the

increase in national income is devoted to the purchase of imports so that the demand for home goods will fall. The country will be less self-sufficient.

(5) Ultra-Anti-Trade biased - In which the whole increase in national income is devoted to the purchase of 'home goods'. Thus the dependence on trade will be reduced and the country becomes absolute 'self-sufficient'.

Growth Bias in Hicksian and Johnson Terminology

| Hicks | Johnson |
|---|---|
| Export biased | Pro-trade biased |
| Import biased | Anti-trade biased |
| Neutral | Neutral |
| Ultra Export biased | Ultra-Pro-trade biased |
| Ultra Import biased | Ultra-Anti-trade biased |

Consumption Effect: The above given five types of consumption effect of output expansion can be explained with the help of "output elasticity of demand for importable" i.e. the proportional change in quantity of importables demanded divided by the proportional change in the national output, which causes the changes in import demanded. $E_y$ denotes the output elasticity of demand for importable. The growth will be pro-trade biased if $E_y > 1$ and anti-trade biased if $E_y < 1$. The growth will be neutral if $E_y = 1$. The extreme cases of ultra-pro-trade and ultra-anti-trade depends on value of elasticity $E_y < 0$ and $E_y > 1$ respectively. The various

possibilities of growth with respect to output elasticity of demand for importables have been summarized in the Table 2.1.

Table 2.1 : Growth and Biases in Consumption

| Biases | Demand Propensities for Importables | Output Elasticities of Demand for Importable |
|---|---|---|
| Ultra-pro-trade | MPI > 1 | $E_y > 1$ |
| Pro-trade | MPI > API | $E_y > 1$ |
| Neutral | MPI = API | $E_y = 1$ |
| Anti-trade | MPI < API | $E_y < 1$ |
| Ultra-anti-trade | MPI < 0 | $E_y < 0$ |

Diagramatically, these consumption biases can be expressed by means of Figure 2.

In this Figure, C is the pre-growth consumption point, MP is the production possibility frontier. With the growth the MP curve will shift outward to M'P'. The growth will be Pro-trade, Anti-trade or neutral depending upon the change in demand for importables with respect to change in total national output.

Production Effects: Like the consumption, the production shifts can be explained with the help of 'output elasticity of supply of importables', which is indicated by $\sigma_y$. When $\sigma_y > 1$, domestic production of importables increases

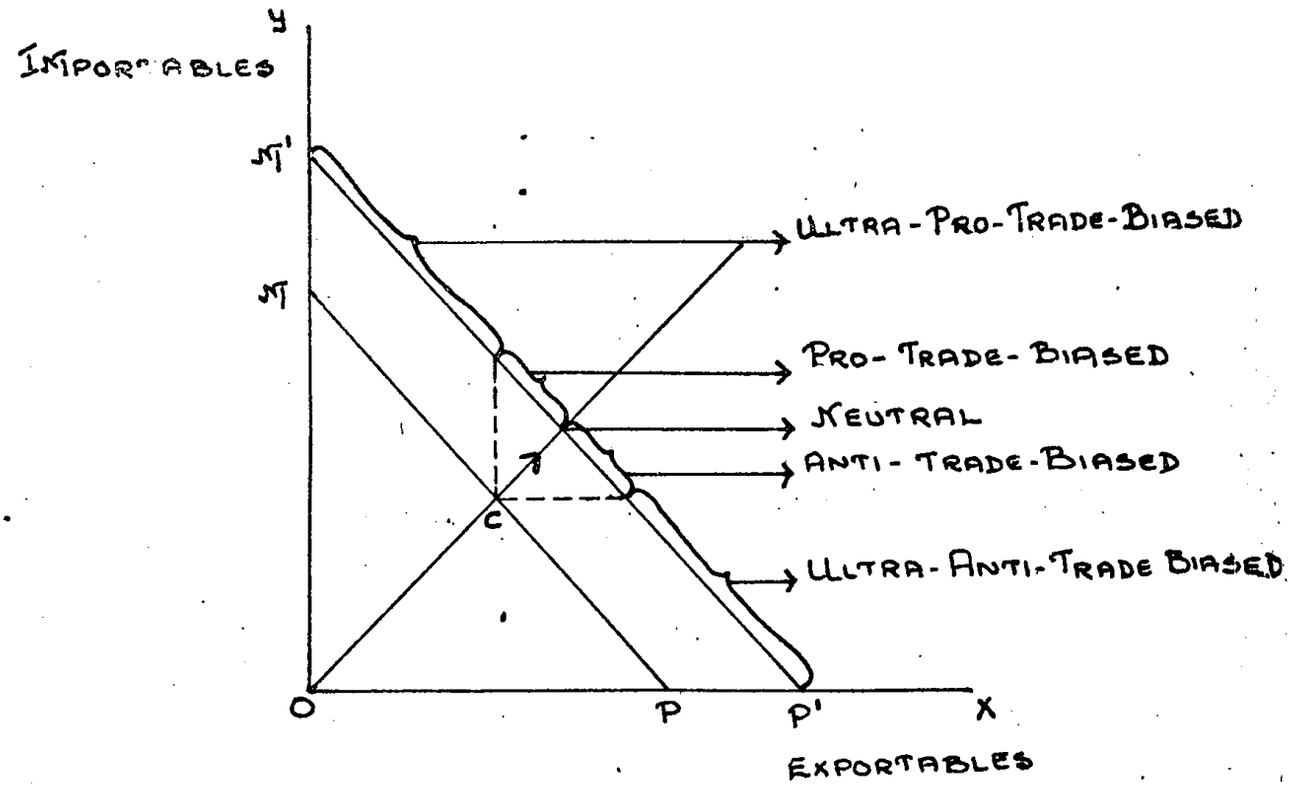
Y
IMPORTABLES
π'
π
ULTRA-PRO-TRADE-BIASED
PRO-TRADE-BIASED
NEUTRAL
ANTI-TRADE-BIASED
ULTRA-ANTI-TRADE BIASED
C
O
P
P'
X
EXPORTABLES

Fig: 2.

more than proportionally to national income, country's production pattern will be self-sufficient growth is anti-trade biased. $\sigma_y < 1$ the growth will be pro-trade biased i.e. the increase in domestic supply of importables is less than proportionate to increase in national income. $\sigma_y = 1$, denotes neutral growth. $\sigma_y < 0$ indicates that there is absolutely no production of domestic importables and the terms of trade will be highly against the growing country. $\sigma_y > 1$ indicates that country's self-sufficiency has increased, since the increase in domestic production of importables is more than the increase in national income. The Table 2.2 summarizes these various possibilities.

Table 2.2 : Growth and Biases in Production

| Bias | Supply propensities in importables | Output elasticities of supply of importables |
|---|---|---|
| Ultra-pro-trade | MSI < 0 | $\sigma_y < 0$ |
| Pro-trade | MSI < ASI | $\sigma_y < 1$ |
| Neutral | MSI = ASI | $\sigma_y = 1$ |
| Anti-trade | MSI > ASI | $\sigma_y > 1$ |
| Ultra-Anti-trade | MSI > 1 | $\sigma_y > 1$ |

Here ASI denotes the average supply of importables as a fraction of total production and MSI denotes the marginal supply response to production changes. The diagramatic representation of these biases is given in Figure 3.

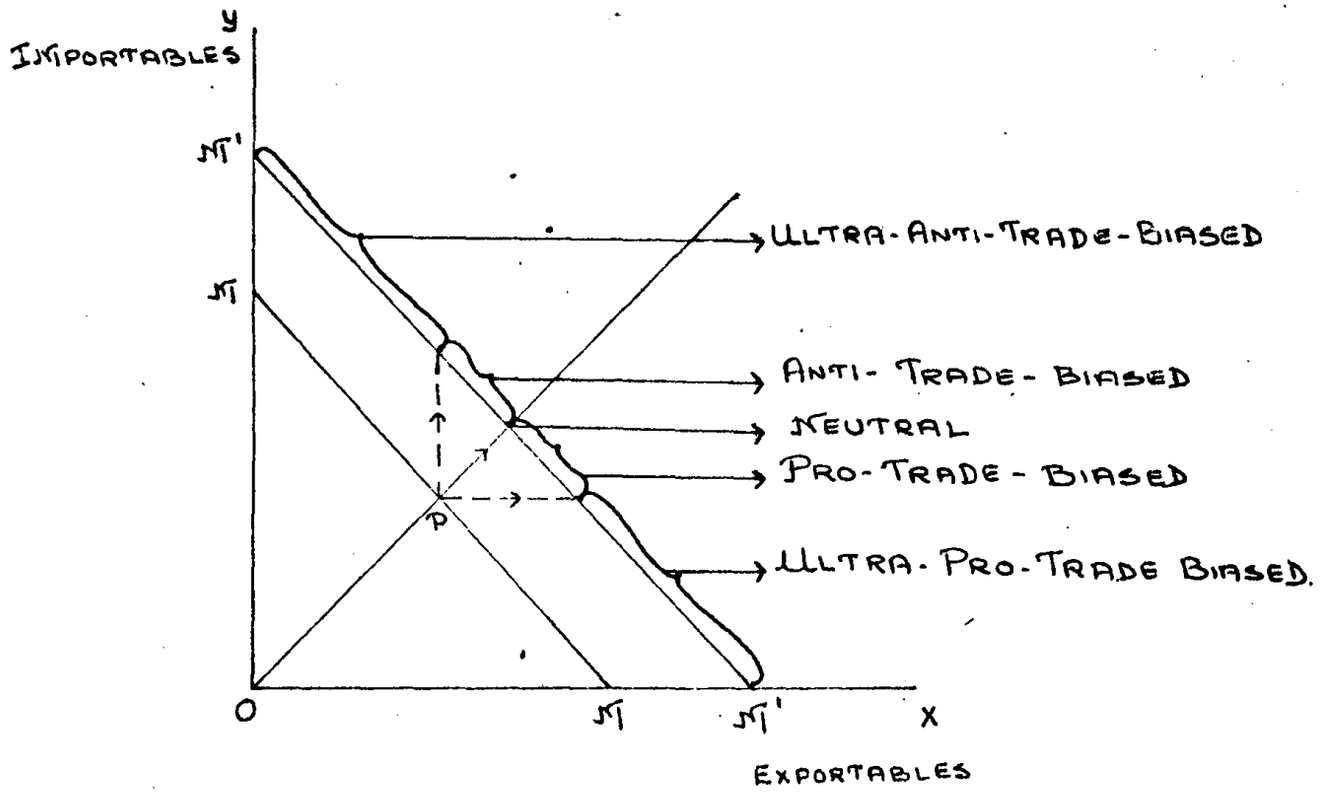
Y
IMPORTABLES
ULTRA-ANTI-TRADE-BIASED
ANTI-TRADE-BIASED
NEUTRAL
PRO-TRADE-BIASED
ULTRA-PRO-TRADE BIASED.
P
O
X
EXPORTABLES

Fig. 3.

In the Figure 3, if the output expansion follows the path of OP, the growth will be neutral. With divergence to the right, the country will move into the zone of Anti-Trade Biased Growth and divergence to the left will bring it into the zone of Pro-Trade Biased growth.

The total effect of growth on the terms of trade can be determined only by combining both production and consumption effects. The Table 2.3 gives the addition of the consumption and production effects.

Table 2.3 : The Net Effect of Production and Consumption

| Production Effects | | Consumption Effect | | | | |
|---|---|---|---|---|---|---|
| | | A | B | C | D | E |
| Production effects | | N | P | UP | A | UA |
| | | Combined Effect (Production + Consumption) | | | | |
| A | N | N | P | P or UP | A | UA |
| B | P | P | P | P or UP | A | UA |
| C | UP | P or UP | P or UP | UP | Not UP | All type |
| D | A | A | Not UP | Not UA | A or UA | UA |
| E | UA | A or UA | UA | All type possible | UA | UA |

Note: N - Neutral; UP - Ultra-Pro-trade biased; P - Pro-trade biased; UA - Ultra-anti-trade biased; A - Anti-trade biased.

About the combined effect of production and consumption Prof. Johnson writes[21,p.296] that if both shifts are biased in

the same direction or one is neutral, the combined effect is clearly pro-trade biased or anti-trade biased. If the shifts are biased in the opposite direction, the net effect cannot be assessed, because consumption of imports initially exceeds domestic production of it. "The bias of the same degree but in opposite direction will not cancel out, here the bias on the consumption side will dominate unless the production shift is sufficiently more biased than the consumption shift." [21, p. 296]

2.3.1 Effects of Factor Accumulation on Terms of Trade

After analysing the question of production and consumption effect Prof. Johnson goes further to analyse the effect of factor accumulation on terms of trade.

Here he proceeds with the classic two-country and two-commodity analysis. (1) A, manufacturing country which exports manufactures and imports food stuff and B, agricultural country with the reverse situation. (2) There is only partial specialization in both the countries. (3) Food is a labour intensive good and manufacture is a capital intensive good. (4) At the constant terms of trade all increase in output goes as income to the factor which is accumulating. (5) The income paid to manufacturer will be spent on manufactured good and income of the agriculture will be spent on agricultural good.

He makes Rybczynski's theorem as the basis for the analysis of factor accumulation and its effect. "At constant

relative prices of the two commodities, an increase in the supply of one factor, with the other factor constant, will result in an absolute expansion in production of the commodity using relatively little of this factor. In order to absorb the augmented factor at an unchanged price it is necessary to secure more of the other factor as well; this can be achieved only by freeing the other factor from the industry in which it is used intensively, resulting in a contraction of output of that industry." [51, p.336]

On the basis of this theorem the production effect of factor accumulation can be generalized. The capital accumulation in the manufacturing country (A) will lead to the contraction of the total output in the agricultural sector and the output in manufacturing sector will increase. Thus the production effect is ultra-pro-trade biased. But the capital accumulation in the agricultural country i.e. in B, has ultra-anti-trade-biased effect, since it will lead to the contraction of output of agricultural good and increase in production of import competing goods. Conversely, the population growth will reduce manufacturing output and increase agricultural output, thus making the production effect of population growth ultra-anti-trade biased in country A and ultra-pro-trade-biased in country B.

In order to derive the consumption effect the underlying assumption is that at constant terms of trade all the increase in output goes as income to the factor which is

accumulating. The capital accumulation in country A, will lead to the increase in income of capitalist class, who will spend on manufactured goods; the price of manufacture will rise i.e. price of exportable rises, the consumption effect of capital accumulation is anti-trade-biased. With a similar reasoning consumption effect of capital accumulation in the agricultural country is pro-trade biased. But the consumption effect of population growth is the reverse.

### 2.3.2 Effects of Technological Progress and Growth Biases

The question of technological progress is the most difficult of all the questions, it has been widely dealt by Ronald Findlay and Henry Grubert [49] in the year 1959. Technological progress is (1) neutral and (2) biased (in terms of capital and labour).

Neutral Technological Progress: Prof. Johnson has used the Hicksian neutral technological progress. A neutral innovation is one which increases the marginal productivity of both factors of production in the same proportion or in other words which reduces the quantities of the two factors required to produce a given quantity of output in the same proportion. It has the initial effect of increasing the output in which it occurs and lowering its cost of production at initial factor prices.

With the neutral technological progress the output of the sector where the technological progress has taken place

will increase. This is because after technological progress more labour and capital is used in this sector and the output of the other sector will contract. From this it can be concluded, that neutral technological progress in the manufacturing sector of country A has ultra-pro-trade biased effect and in the agricultural sector it has ultra-anti-trade biased effect. But growth will be ultra-anti-trade biased if it occurs in the manufacturing sector of country B and ultra-pro-trade biased effect if it occurs in the agricultural sector of the same country.

2.3.3 Biased Technological Progress

(a) Labour Saving Technological Progress: The innovation is labour saving, when the marginal productivity of capital is higher relative to the marginal productivity of labour. Thus it has the combined effect of reducing cost and releasing the factor used less intensively.

The labour saving technological progress, when it occurs in the manufacturing sector of the country A, the production effect is indeterminate, since it has no definite effect on the output of the two sectors. But the labour saving technological progress in agricultural sector of country A will have ultra-anti-trade bias, since that will lead to the production of output of that sector and considerable reduction in the output of other sector. In the agricultural sector of country B, will have ultra-pro-trade biased effect and it is indeterminate if it occurs in the manufacture

sector of country B.

(b) Capital Saving Technological Progress: The capital saving innovation is one, where, in the new situation the marginal productivity of the labour increases at constant factor prices. At the same factor price ratio, after the innovation, we get a more labour intensive method of production.

If it occurs in the manufacturing sector country A, it will have an ultra-pro-trade biased effect, since it increases the output of that sector in more than proportionate increase in total output. It will have ultra-anti-trade biased effect if it occurs in manufacturing sector of country B. But its effect in the agricultural sector is indeterminate.

2.3.4 Consumption Effect of Technological Progress (S-H)

In order to assess the consumption effect of technological progress the basis for our analysis is that at constant terms of trade the increase in national income will go to a factor which is used intensively. The consumption effect of neutral technological progress occurring in manufacturing sector of country A is anti-trade biased. As the technological progress will lead to an increase in the income of capitalist, who buys more of manufactured good, which is the export good of that country, the price of the good will rise due to increase in demand and the terms of trade will turn against B or it can be expressed as the output elasticity of supply of the exportable is less than one. The consumption effect will be untra-pro-trade

biased if neutral technological progress occurs in the export sector of country B (i.e. agricultural). It will be ultra-pro-trade biased if it occurs in the agricultural sector of country A and ultra-anti-trade biased if it occurs in the manufacturing sector of country B.

Table 2.4 : Effects of Economic Growth [21, p. 296]

| Type of growth | Manufacturing country | | | Agricultural country | | |
|---|---|---|---|---|---|---|
| | P.E. | C.E. | T.E. | P.E. | C.E. | T.E. |
| Capital accumulation | UP | A | UP to A | UA | P | UA |
| Population growth | UA | P | UA | UP | A | UP to A |
| Neutral Progress | | | | | | |
| a) Manufacturing | UP | A | UP to A | UA | P | UA |
| b) Agriculture | UA | P | UA | UP | A | UP to A |
| Capital Saving | | | | | | |
| a) Manufacturing | UP | A | UP to A | UA | P | UA |
| b) Agriculture | UA to UP | P | UA to UP | UP to UA | A | UP to A |
| Labour Saving | | | | | | |
| a) Manufacture | UP to UA | A | UP to UA | UA to UP | P | UA to UP |
| b) Agriculture | UA | P | UA | UP | A | UP to A |

Note: A - Anti-trade biased. UA - Ultra-anti-trade biased.
P - Pro-trade biased. UP - Ultra-pro-trade biased.

## 2.4 The Effect of Growth on Terms of Trade via Reciprocal Demand Curves

An alternative treatment to ascertain the effect of growth on the terms of trade is provided by Pryor.[15, p.45]

Pryor proves that with a unitary elasticity of demand for both commodities ($Ey_1=Ey_2=1$) and neutral growth on the production side(which is interpreted as uniform expansion in production possibility boundary) the effect is the radical expansion of the reciprocal demand curve with respect to initial terms of trade.

The Figure 4(a) exhibits the neutral growth where there is uniform expansion of production possibility curve. The initial terms of trade the output has expanded from IC to J. The point D on curve A of figure 4(b) corresponds to K of Figure 4(a). After the neutral expansion the reciprocal demand curve shifts to A'. $\frac{DE}{OD} = \frac{KJ}{OK}$. After the neutral expansion, the reciprocal demand curve of country A cuts the reciprocal demand curve of country B at point F and new terms of trade line is Y' which lie below Y thus indicates that terms of trade is unfavourable to country A.

If the income elasticity of imported good is greater than 1, the reciprocal demand curve will lie further than the radical expansion of reciprocal demand curve after neutral expansion, and the growth will be pro-trade biased. If the income elasticity of demand is less than one, the new reciprocal demand curve will be inside the neutral reciprocal demand curve. This is shown in Figure 5.

It is clear from above analysis that if both countries grow at the same neutral rate, the terms of trade remain unchanged, since each offer curve moves radically to the same

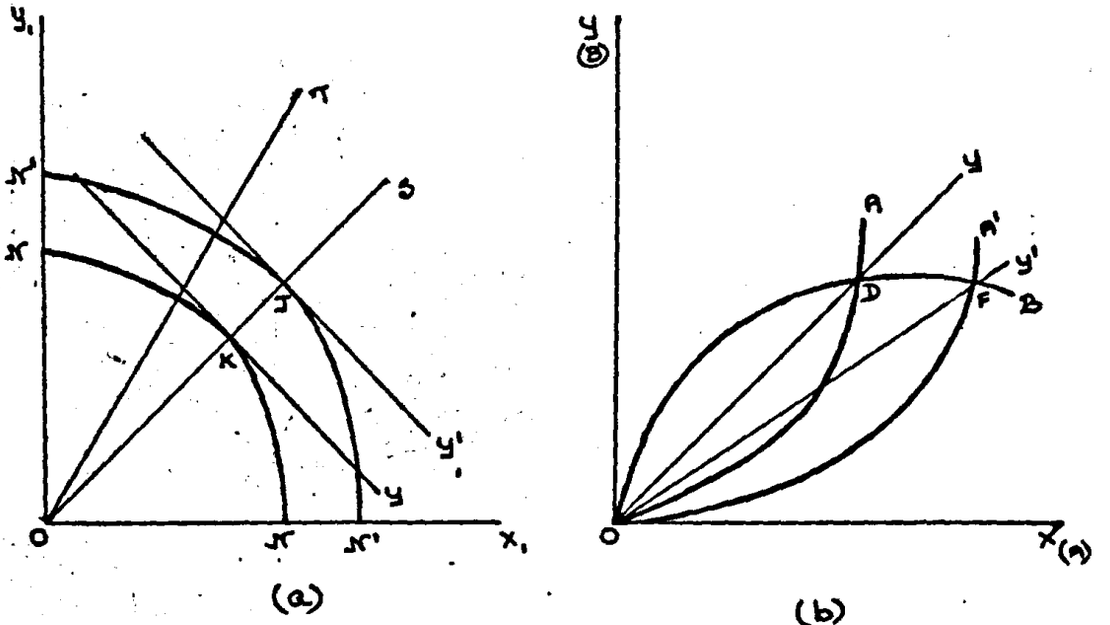


Fig: 4

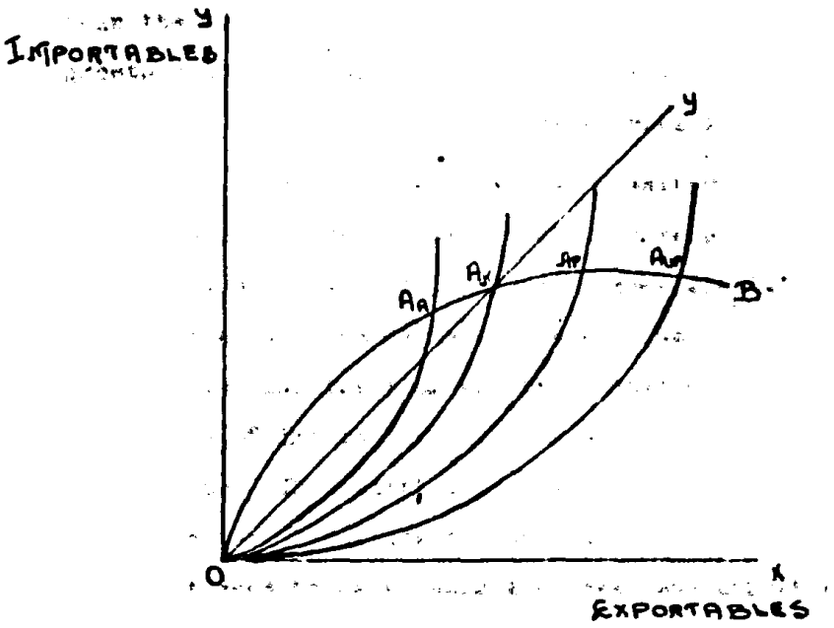


Fig: 5

extent. The terms of trade must move against the country with the greatest growth.

Growth is export biased when the PP curve expands a greater percentage along the export good sector. Import biased growth shows the greater percentage expansion of PP' curve along the import good axis. The Figure 6(a) and 6(b) shows export biased and import biased growth. The income elasticity of two commodities being the same, export biased growth will shift the reciprocal demand curve much further than the radical expansion, while in case of import biased growth with the same income elasticity the new reciprocal demand curve lies inside the original reciprocal demand curve.

The export-biased growth with unitary income elasticity will lead to the deterioration of the terms of trade and import-biased growth with unitary income elasticity will lead to an improvement in terms of trade. The export biased growth, with income elasticity of export greater than one, and income elasticity of import less than one, resultant growth is indeterminate. The export biased growth will lead to a deterioration in terms of trade but at the same time income elasticity of import good being greater than one, the growth is anti-trade-biased the total effect of growth is indeterminate.

The import biased growth with unitary income elasticity will improve the terms of trade. With import good elasticity greater than one and export good elasticity less than one the growth is indeterminate. But with import elasticity less than

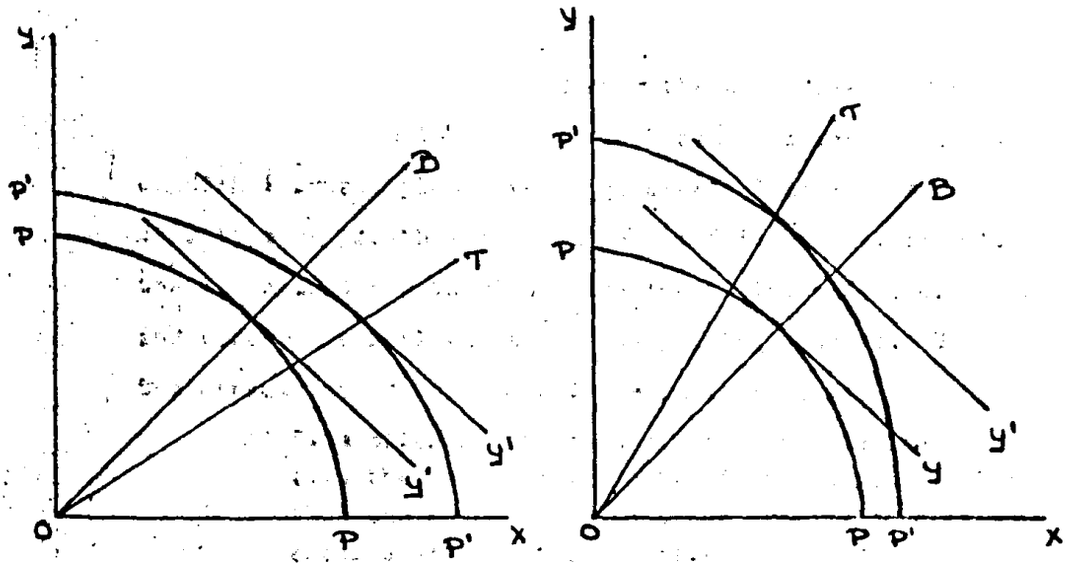


Fig 6 (a) (b)

one, the growth will have a positive effect on terms of trade.

Table 2.5 : Economic Growth and Terms of Trade

| Type of growth | Income Elasticities | | |
|---|---|---|---|
| | Export good=1 Import good=1 | Export good<1 Import good>1 | Export good>1 Import good<1 |
| Neutral | N | - | + |
| Export good biased | - | - | i |
| Import good biased | + | i | + |

N = Neutral. - = Deterioration.
i = Indeterminate. + = Improvement.

## 2.5 Immiserizing Growth

Recently while considering the underdeveloped countries, the concept of Immiserizing growth has been advanced. Prof. Jagdish Bhagwati [18] gives a geometrical note of such growth. This type of growth will lead to a sufficient deterioration in the terms of trade to offset the beneficial effect of expansion and reduce the real income of the growing country. Under the two circumstances, growth will be immiserizing:

1) "The offer of the rest of the world is inelastic i.e. the income elasticity of export good is less than one which shows that the growing country's exports are inferior goods."

2) "Growth actually reduces the domestic production of importables at constant relative commodity prices."

From our above analysis we can say if the growth is ultra-pro-trade biased and income elasticity of exportables is less than

one the growth will be immiserizing growth - both consumption and production effect of growth is ultra-pro-trade biased. This will lead to the deterioration of the terms of trade of the growing country plus the total real income.

## 2.6 Effect of Growth on Terms of Trade When Both Countries Are Growing

Till now we have dealt with the question of what will happen to the terms of trade of the growing country. In a situation where both the countries are growing, the effect of growth on the terms of trade of growing country can be explained with the help of following equation.

$$\frac{dP}{dt} = \frac{(R_{1m}S_{1m} - R_1E_{1m}C_{1m}) - (R_2E_{2n}C_{2n} - R_{2n}S_{2n})}{\frac{C_{1m}}{P}e_1 + \frac{C_{2n}}{P}e_2 + \frac{S_{1m}}{P}s_1 + \frac{S_{2n}}{P}s_2} \quad *$$

Here n denotes export and m import magnitude, C denotes consumption and S supply. Thus $S_{1m}$ denotes supply of import competing good in Country I.

$C_{1m}$ - Consumption of imported good in Country I.

$C_{2n}$ - Consumption of Country II's export good.

$S_{1m}$ - denotes supply of the import competing good in Country I.

$S_{2n}$ - denotes supply of the import competing good in Country II.

t - Economic growth with reference to time.

$P_n$ - Price of Country I's export good.

$P_m$ - Price of its import good.

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* The Proof of the formula is given in Appendix B.

Country I's terms of trade is given by $P = \frac{P_n}{P_m}$ which will be 1/P in case of Country II.

$R_{1m}$ - denotes the growth rate of import-competing sector in Country I,

$R_{2n}$ - growth rate of import competing sector in Country II.

$R_1$ - growth rate of National Income in Country I.

$R_2$ - growth rate of National Income in Country II.

$e_1$ - Country I's elasticity of demand for import good with respect to terms of trade.

$e_2$ - Country II's elasticity of demand for its export good with respect to the terms of trade.

$s_1$ - elasticity of supply of exportables with respect to P.

$s_2$ - Country II's elasticity of supply of exportables with respect to the terms of trade.

$E_{1m}$ - Income elasticity of importables in Country I.

$E_{2n}$ - stands for the income elasticity of exportables in Country II.

The above equation shows that the outcome of the terms of trade depends on the large number of factors like, rate of growth of national income, which sector is experiencing growth, i.e. supply of output. The development of demand is increased by income elasticities.

The denominator is made up of magnitude of elasticities which are positive if we take the assumption of gross substitutability in consumption and competitive condition in production. The magnitude of the elasticities which makes up the denominator are very important for the adaptability of the two trading

economies. The direction of change in the terms of trade will depend on the numerator.

The outcome of the terms of trade will depend on $R_{1m}S_{1m} - R_1E_{1m}C_{1m} = R_2E_{2n}C_{2n} - R_{2n}S_{2n}$ if the left side of equation is greater than the right side the terms of trade will improve for Country I. If the right side is larger the larger the terms of trade will improve for Country II. If the two sides are equal, the terms of trade will not change during the growth process.

If the Country II is stagnant and Country I is growing, the result for the terms of trade depends on whether the weighted growth rate of import production ($R_{1m}S_{1m}$) is larger or smaller than the weighted income elasticity of demand for importables ($R_1E_{1m}C_{1m}$). The terms of trade will improve if $R_{1m}S_{1m} > R_1E_{1m}C_{1m}$, with the reverse sign, it will deteriorate. But if both are balanced, it is neutral.

From the above analysis it is clear that in order to analyse the effect of growth on terms of trade the basic questions which should be asked are:

1) What type of growth is taking place?
2) What are the causes of growth?
3) Which sector of the economy is growing?
4) What is the income elasticity of demand for importables?
5) What is the output elasticity of supply for importables?

# CHAPTER 3

## CRITIQUE OF PREBISCH-SINGER THESIS AND EMPIRICAL VERIFICATION

The Prebisch-Singer thesis about the 'international trade and economic inequality' has been subjected to serious criticism by several writers both on analytical and empirical grounds. The main points of criticism are confined to the (1) nature of the data on which the thesis is based and (2) secular movement of the terms of trade.

### 3.1 Nature of Data

Regarding the inadequacy of the data, three basic objections have been put forward. Firstly, data has failed to take into consideration the changes in the quality and new products. The introduction of new products and qualitative improvement have been greater in manufactured than in primary products. This point has been taken into consideration by G. Haberler[16]. Haberler says, "This introduces a bias because, as has been repeatedly pointed out, industrial product has tremendously improved in quality and literally every year a host of new products are introduced, while the quality and range of the most primary products have remained very much unchanged." [16, p.329]

Secondly, it has failed to take into consideration the change in transport cost. During the 1880s and 1890s, when

Britain's terms of trade improved the most, there was a large decline in transport costs. The British data for explaining the terms of trade for primary producing country can be valid only when we take into account the shipping charges, since the United Kingdom quotes the value of its commodity trade, f.o.b.* for exports, and c.i.f.* for imports. Prof. Ellsworth has concluded that:

"A large proportion and perhaps all, of the decline in the British prices of primary products in the period between 1876 and 1905 can be attributed to the great decline in inward freight rates ... since the price of British manufactured exports fell in this period by 15 per cent, the terms of trade of primary countries, were f.o.b. prices used for their exports as well as for their imports may well have moved in their favour." [13, p.55]

The third objection is that the British terms of trade, without any verification, has been taken as representative of the terms of trade, of other industrial countries. Prof. Kindleberger in Terms of Trade—European Case Study has computed indices for Other European Countries and has concluded that they do not support the generalization which is based on the United Kingdom terms of trade. He believes that in intra-European trade, the terms of trade on the whole has been unfavourable for France and Italy, whom he has regarded the less developed countries. "Moreover, if the terms of trade of

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* f.o.b. = Free on board.
c.i.f. = Cost, insurance, freight.

industrial Europe with other areas are computed, and inverted, to get an impression of the terms of trade of the rest of the world with Industrial Europe, it ... will be found that the underdeveloped world has fared" less well than, for example, the United States.

Besides all these objections, Prof. G.M.Meier [31,p.260] points out that the commodity terms of trade between primary products and manufactured products is not the same as the terms of trade between poor and rich countries. Even if the commodity terms of trade did deteriorate, the question still remains whether it has been the serious obstacle for development. Prof. Meier points out that in order to explain the "production effect" and 'income effect' of the deterioration of the terms of trade, the relevant index is the 'single factoral' and 'income terms of trade'* respectively rather than the 'commodity terms of trade'. But this objection has been rejected by W. Baer who says that "The productivity in the peripheral countries has not increased to such an extent as to overcome the price decline. Further he points that in case of countries like Brazil and Argentina the decline in the export prices was accompanied by a much smaller proportionate increase in export quantities, while the small decline in the import price was accompanied by a proportionately much greater increase in quantum imports." [4, p. 176]

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* See Appendix A, for the Concepts of Single Factoral and Income Terms of Trade.

## 3.2 Various Analyses Dealing with Long run Movement in Terms of Trade

While explaining the long run movement of the terms of trade between the primary products and manufactured goods the most important studies have been done by T. Morgan [34, 35], Lewis[28] and M.K. Atallah[2].

### 3.2.1 T. Morgan's Analysis About Terms of Trade

Prof. T. Morgan, in his paper "The Long-run Terms of Trade between Agriculture and Manufacture" takes five countries U.K., U.S.A., India, Japan and New Zealand and shows that there exists no secular tendency for the terms of trade to deteriorate.

Table 3.1 : Data Covering Approximately 90 Years 1960s to 1952

| Country | Estimate of reliability of data | Exact years covered | General movement of the prices of primary product divided by prices of manufacture |
|---|---|---|---|
| U.K. | Good earlier to excellent in the later year | 1860-1953 | Major fall (but a rise in the last 20 years) |
| U.S. | " | 1860-1953 | Major rise (wider fluctuations in the last 40 years) |
| India | Excellent in total | 1861-1953 | Rise-Fall-Rise |
| Japan | Good | 1873-1952 | Mild rise and major fall to 1930s |
| New Zealand | Excellent | 1861-1952 | Major rise (violent fluctuations) |

He says that Prebisch's view on falling terms of trade due to "characteristic lack of organization among the workers employed in primary production" is inconclusive on two accounts.

The most relevant question, he says, is: Are money wages and prices that rise freely and fall sluggishly, either necessary or sufficient conditions, to cause relatively high prices in the world market?

The answer for the question, he says, is 'No'. It is the world's demand and supply which are the determinant of the price level. Any country whose union has been especially successful in hoping money wage rates would find itself in a comparative squeeze. Its export would slip, its balance of payment will be adverse and domestic prices in the long run will not fall but the exchange value of the currency would fall instead.

Secondly, he says that the higher money wages to not necessarily cause higher domestic prices. They do so only if they rise faster than productivity. But even if they do so the question still remains as to whether union secure higher wage rates for labour of given quantity, than the wages of non-union labor.

Morgan, on the basis of the extensive data, comes to the conclusion that there exists no secular deterioration but different countries go through difference experiences. "... The emphasis is ought to be centred on the heterogeneity of price experience. Particular supply influence and particular demand changes for different commodities, countries and time have dominated the historical experience." [34, p.20]

In his second paper i.e. Trends in Terms of Trade and Their Repercussion on the Primary Producer, he analyses the terms of trade of 18 developed and 29 underdeveloped countries in two periods i.e. 1937-1959 and 1953-1959.

Table 3.2 : Median Value of Terms of Trade

(1953=100)

| Year | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 |
|---|---|---|---|---|---|---|---|
| Developed countries | 100 | 99 | 99 | 96 | 100 | 100 | 101 |
| Underdeveloped countries | 108 | 106 | 110 | 98 | 90 | 88 | 89 |

(1937=100)

| Year | 1948 | 1950 | 1951 | 1952 | 1953 | 1954 |
|---|---|---|---|---|---|---|
| Developed countries | 102 | 96 | 98 | 100 | 102 | 102 |
| Underdeveloped countries | 108 | 130 | 160 | 126 | 125 | 128 |

| Year | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 |
|---|---|---|---|---|---|---|
| Developed countries | 100 | 97 | 97 | 99 | 101 | 102 |
| Underdeveloped countries | 135 | 131 | 127 | 117 | 123 | 119 |

The data shows the greater stability of the developed countries but the underdeveloped countries are subjected to the severe fluctuation. With 1953 as the base, it is found that, the terms of trade of primary country is declining severely after the Korean War. It is mainly because the developed countries

are diversifying their export, but in case of the underdeveloped countries high deependence on one or few export products has been recognized.

Morgan, further goes on constructing the 'real purchasing power index', i.e. the index value of the export divided by the price index for imports.

$$\frac{Pn_i \; Qn_i}{Pn_0 \; Qn_0} \cdot \frac{1}{Pm_i / Pm_0}$$

where P is price, n is exports, m is import and i is the given year and 0 is the base year. This shows what would be bought in exchange for the primary product export.

Table 3.3 : The Real Purchasing Power in Terms of Primary Products Exports

| Year | Group | | |
|---|---|---|---|
| | Developed I | Undeveloped | Developed II |
| 1937 | 100 | 100 | 100 |
| 1948 | 138 | 104 | 105 |
| 1950 | 128 | 143 | 133 |
| 1951 | 129 | 140 | 118 |
| 1952 | 138 | 140 | 118 |
| 1953 | 149 | 161 | 194 |
| 1954 | 149 | 190 | 136 |
| 1955 | 162 | 179 | 143 |
| 1956 | 117 | 169 | 154 |
| 1957 | 189 | 159 | 140 |
| 1958 | 206 | 172 | 140 |
| 1959 | 206 | 172 | 163 |
| 1960 | 236 | 179 | 165 |

Developed I - U.S.A., Canada, Belgium, Italy, Norway, U.K. and Japan;

Undeveloped - Turkey, Uruguay, India, Burma, Ceylon, Philippines;

Developed II - Australia, New Zealand, Denmark;

whose total value of agricultural export to total export exceed 60.

This index gives a different picture of developed vis-a-vis underdeveloped countries. The increased volume of exports of the Developed Countries I dominate the scene and their capacity to buy import, has increased. In case of Second group of Developed Countries, the purchasing power since 1937 has increased the least. In case of Underdeveloped Countries widespread fluctuations have been found.

The result shows that there exists no alleged historical tendency for the terms of trade to move against the developing countries but countries experienced differently with respect to time and place.

3.2.2 Estimates of Terms of Trade in 1960 by A. Lewis

Like Colin Clark, an attempt has been made by Arthur Lewis to predict the future trend in terms of trade between primary and manufactured goods. The period taken into account is 1870-1960. He proceeded in two steps: First, he explained the prices of raw materials and then, he explained the prices of food.

Explanation of the Price of Raw Materials: Because he was interested in the secular, rather than the cyclical movement, he correlated five year moving averages of demand and price with a series, which assumes a constant annual increase of potential output. Potential output was taken as output at full capacity. The price varies as actual supply rises or falls, relative to potential supply. He correlated two sets of series, one for the period 1881-1913, and another for the

period 1921-1938. The result he obtained were the following:

(i) 1881-1913:

$$\text{Log } P_{RM} = 0.6806 + 0.8622 \text{ Log } M_R - 0.0131 R$$

(ii) 1921-1938:

$$\text{Log } P_{RM} = 0.0396 + 0.8561 \text{ Log } M_R - 0.0142 M$$

where: $P_{RM}$ - index numbers of price of raw materials,

$M_R$ - index numbers of manufacturing production,

R - year since 1881,

M - year since 1921.

The two periods yielded close results. The coefficient of $M_R$ is the reciprocal of the elasticity of supply, which comes out at 1.16 and 1.17 in the two periods respectively. The antilogs of the coefficients of R and M show by how much the price would fall each year, if manufacturing output were unchanged. The percentages for the first and second periods are 3.1 per cent and 3.3 per cent, respectively.

Explanation of the Price of Food: Five year moving averages of a series of food production were correlated with an index of the production of manufactures for the years 1921-1938. The tested function was thus a demand function and the formula obtained was the following:

$$\text{Log } P_F = 1.9000 + 0.5821 \text{ Log } M_R - 1.4908 \text{ Log } F,$$

where: $P_F$ - index of price of food,

$M_R$ - index of manufacturing production,

F - index of food production.

The elasticity of demand is the reciprocal of the coefficient of F and equal to -0.67 and the coefficient of $M_R$ shows that an increase of 1 per cent in manufacturing production will be associated with an increase of 0.582190 in the price of food.

Having explained the prices of raw materials and food by manufacturing and agricultural production, Lewis tried to guess the level of these productions in 1960. For manufacturing production he assumes two alternative rates of increase, based on the observed rate of increase of this production in the world between 1890 and 1913. The two rates are 3.3 per cent and 4.2 per cent per annum.

For food production he works with two assumptions: an annual rate of 2 per cent increase, and an annual rate of 1.3 per cent increase.

From statistical comparison he found that a 1 per cent increase in world manufacturing is usually associated with an 0.87 per cent increase in the world trade in primary products. Applying this coefficient on the percentage increase in world manufacturing production between 1950 and 1960, obtained from his assumed annual rates of increase, he finds that trade in primary products will increase by 35 per cent on the lower assumption and by 43 per cent on the higher assumption.

He calculates the price of raw materials in 1960. He uses for this purpose the formula obtained for 1921-1938.

The result is that raw material prices will be the same in 1960 as in 1950 on the lower assumption, and will be 10 per cent higher on the higher assumption.

Using the formula for the price of food obtained for the period 1921-1938, he finds that by 1960, the price of food will fall by 8 per cent if manufacturing production grows only at 3.9 per cent per annum and food production grows only at 2 per cent per annum, and that it will rise by 10 per cent, if the manufacturing production grows by 5 per cent per annum and food production only 1.3 per cent.

The combination of the food and raw material prices in 1960 makes the terms of trade for primary products as a whole move between a lower limit of a fall of 3 per cent and an upper limit of a rise of 10 per cent.

A more straightforward method was used by H.G.Aubrey[3] in order to predict the movement of the terms of trade between the U.S. export of manufactured goods and their imports of primary production. He projected the import value of about 30 commodities which account approximately for two-thirds of the U.S. imports. The estimation of import volumes was made by taking imports as the difference of projected demand over prospective domestic supply, with the implication that imports are drawn upon, even in the long run, only to the extent necessary to supplement domestic supply. The price is estimated by matching the prospective domestic supply with estimated total demand, with due consideration to long-run technological trends.

Aubrey conducted numerous discussions with commodity specialists in the American Industry and Government and was able to establish a fairly broad range of prices for each commodity, in accordance with a fair consensus of exports, based on a partly intuitive appraisal of long-term cost trend in their industries. The lower limit of the range was determined by real domestic production costs, since the projected domestic output would not be as forthcoming as a figure satisfactory to a requisite numbers of producers. In case of commodities, not manufactured in the U.S.A., similar factors shaping world supply and demand had to be considered for the projection. For food, the consumption of individually projected import item was based on long-term trend of per capita consumption and on a population projection. And finally, in order to project the remaining one-third of U.S.A. imports not covered by individual commodity estimates, a modified system of trend projections was adopted, partly based on unpublished post-war coefficient computed in the Federal Reserve Bank of New York.

According to the estimates reached by Aubrey through this method, the value of the U.S.A. imports in constant dollars, in 1975, is put at 2.5 to nearly 3 times the value of imports in 1948. This corresponds to an annual rate of increase of imports of 3.5 to 4 per cent from 1948 to 1975.

From these estimates Aubrey then derives an index of import unit values based on the years 1937-1940, and he

relates this index to an index of the unit values of U.S. exports of finished manufactures. The resulting index shows that the ratio of the prices of U.S. imports to the U.S. export, will move in favour of imports by a factor from 1.53 to 1.63 between 1948 and 1975.

### 3.2.3 Explanation of Terms of Trade by Means of Mathematical Model

Three mathematical models have been built up by M. K. Atallah [2, Chp. 3] in order to explain the long term movement in the relation between the prices of the agricultural products and industrial products, as they enter international trade.

He divides the world into two sectors i.e. the under-developed countries exporting food stuff and raw material and the developed countries exporting finished goods. It is a two-sector, two-commodity model. The land in the model is considered constant and the improvement is related to the 'capital investment' and 'technical progress'. The demand for agricultural products is supposed to depend on real income of both sectors and on the relative price of these products. No distinction is made between the income and price elasticities of demand in each sector - both sectors have the same demand function. Capital goods are industrial goods and no distinction about the capital goods is made.

The solution of the whole system depends on the relationship between the price of the agricultural product and the

price of the industrial products. If we call the price of agricultural product, $P_1$, and the price of the industrial product $P_2$, P will denote the relationship between $P_1$ and $P_2$.

$P = \frac{P_1}{1}$. (The price of the industrial product being 1.)

The Three Alternative Models

Model I

(a) Variables (Endogenous)

$P_1$ = volume of agricultural production

$P_2$ = volume of industrial production

$S_1$ = savings in agricultural sector

$S_2$ = savings in industrial sector

$C_2$ = capital stock in the industrial sector

$\dot{C}_2$ = the change in the capital stock or investment

P = the ratio of the prices of agricultural products to the prices of the industrial product.

(Exogenous)

$L_0$ = labour force in the industrial sector at the initial period.

t = time.

(b) Data for Structural Coefficient

$\alpha_1$ = annual rate of technical progress in the agricultural sector

$\beta_1$ = annual rate of technical progress in the industrial sector

$\beta_2$ = labour exponent in the industrial sector

$\sigma_1$ = rate of saving in the agricultural sector

$\sigma_2$ = rate of saving in the industrial sector

$\lambda$ = annual rate of growth of the labour force in the industrial sector.

$\partial_1$ = marginal propensity to consume agricultural products in both the agricultural and industrial sector

$\alpha_0$, $\beta_0$, $\partial_0$ are the constant determined by initial value.

The equations of the model are:

$$P_1 = \alpha_0 e^{\alpha_1 t} \qquad 1$$

$$P_2 = \beta_0 L_0^{\beta_2} e^{(\beta_1 + \lambda\beta_2)t} C_2^{1-\beta_2} \qquad 2$$

$$S_1 + S_2 = C_2 \qquad 3$$

$$S_1 = \sigma_1 {}_p\hat{P}_1 \qquad 4$$

$$S_2 = \sigma_2 P_2 \qquad 5$$

$${}_p\hat{P}_1 = \partial_1 ({}_p\hat{P}_1 + P_2) + \partial_0 \qquad 6$$

Equation 1 is the production function in the agricultural sector, which simply states that the agricultural output grows at a constant annual rate.

Equation 2 is a combination of two functions -

(i) industrial production function proper -

i.e. $P_2 = \beta_0 e^{\beta_1 t} L_t^{\beta_2} C_2^{1-\beta_2}$

(ii) the growth equation of the labour force in the industrial sector i.e. $L_t = L_0 e^{\lambda t}$, where $\lambda$ is the annual rate of increase.

Equation 3 shows the investment in the industrial sector, because agricultural production does not include capital as a factor of production.

Equation 4 shows the saving in the agricultural sector $S_1 = \sigma_1 P_1$ . The saving depends on the money income of the industrial sector. Similarly, Equation 5 gives the saving in the industrial sector, which is a fixed proportion of money income in that sector.

Equation 6 shows the demand for agricultural product, which is related to the total value of the money income of both the sectors and the marginal propensity to consume of agricultural products. is constant in both the sectors.

Model II

All the equations of the Model II are same as that of the first one, except for the 6th one.

$$P_1/P_2 = \psi_0 (P P_1 + P_a)^{\psi_1} P^{\psi_a} \qquad 6$$

$\psi_0$ = constant determined by the initial value

$\psi_1$ = income elasticity of demand for agricultural product

$\psi_a$ = price elasticity of demand for agricultural product.

This equation provides a more elaborate description of the demand for agricultural products in relation to the demand for industrial products by bringing into consideration the income and price elasticities.

Model III:

He makes certain changes in the agricultural production. Capital stock is included in agricultural sector and is the capital exponent in the agricultural sector.

$$P_1 = \alpha_0 e^{\alpha_1 t} C_a^{\alpha_a} \qquad 1$$

The production function in agricultural sector does not show the substitutability between the capital and labour but instead the complementarity

$$S_1 = \dot{C}_1 \qquad 3$$

$$S_2 = \dot{C}_2 \qquad 4$$

Saving in both the sectors depends on the change in the capital stock.

The next step is to put empirical content into these equations. Using the most satisfactory data which can be found, as an approximation to agricultural and industrial output, that is, Derksen's figures of national income in agricultural and industrial countries, capital coefficients are derived from figures presented by Tinbergen, Colin Clark and Kuznets. The industrial labour force is obtained from the U.N. Statistical Yearbook.

On the basis of figures presented by Tinbergen and Clark, Atallah chooses an annual rate of increase in efficiency of production of 1 per cent, for both the industrial and agricultural sectors. He takes $a$ labour exponent of 0.70 and $1-a$ capital coefficient of 0.30 implying that 70 per cent of

total output can be attributed to labour and 30 per cent to capital. Thus he arrives at the result of the model.

He considers Model III as the most relevant one "because in this model we were able to describe in a more explicit way the interplay of the factors which influences the terms of trade." [2, p.74]

Table 3.4 [2, p.66] shows the declining terms of trade for primary product over the years. He concludes that the terms of trade between agricultural products and the industrial product will move against the former by a factor approximately 0.3 in the decade after 1952-54.

Till now we have analysed, the various attempts made by different writers to explain the long run movement of the terms of trade between industrial and agricultural countries. It has been widely accepted that the terms of trade for primary producers have deteriorated after 1952 i.e. after the Korean War. Prof. M.L. Dantwala [32] says in order to explain the future course of terms of trade, four factors should be taken into consideration:

1) Factors affecting demand for primary products for industrial countries.
2) Supply from non-industrial countries.
3) Import demand of non-industrial countries.
4) Supply from industrial countries.

From the above analysis, it is clear that various writers have reached different conclusions about the movements in the terms of trade. The alleged historical tendency

Table 3.4 : The Terms of Trade Calculated by Model III with Different Capital Coefficients

| | | III a | | | III b | | | III c | | | III d | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $C_1/P_1 = 3$ | | | $C_1/P_1 = 1.5$ | | | $C_1/P_1 = 2$ | | | $C_1/P_1 = 3$ | | |
| | | $C_2/P_2 = 5$ | | | $C_2/P_2 = 4.3$ | | | $C_2/P_2 = 4$ | | | $C_2/P_2 = 3$ | | |
| | t | $P_1$ | $P_2$ | P | $P_1$ | $P_2$ | P | $P_1$ | $P_2$ | P | $P_1$ | $P_2$ | P |
| $_2 = 0.70$ | 0 | 125 | 477 | 1 | 125 | 477 | 1 | 125 | 477 | 1 | 125 | 477 | 1 |
| $_2 = 0.11$ | 10 | 161 | 600 | 0.71 | 182 | 604 | 0.53 | 173 | 595 | 0.59 | 161 | 621 | 0.73 |
| | 20 | 201 | 757 | 0.52 | 240 | 767 | 0.33 | 222 | 774 | 0.42 | 202 | 806 | 0.55 |
| $_2 = 0.30$ | 0 | 125 | 477 | 1 | 125 | 477 | 1 | 125 | 477 | 1 | 125 | 477 | 1 |
| $_2 = 0.11$ | 10 | 161 | 623 | 0.73 | 182 | 637 | 0.56 | 173 | 644 | 0.64 | 161 | 676 | 0.79 |
| | 20 | 202 | 825 | 0.5 | 243 | 870 | 0.38 | 225 | 877 | 0.46 | 204 | 965 | 0.64 |
| $_2 = 0.70$ | 0 | 125 | 477 | 1 | 125 | 477 | 1 | 125 | 477 | 1 | 125 | 477 | 1 |
| $_2 = 0.20$ | 10 | 161 | 625 | 0.73 | 182 | 633 | 0.55 | 173 | 638 | 0.63 | 161 | 658 | 0.77 |
| | 20 | 202 | 815 | 0.56 | 243 | 833 | 0.36 | 224 | 844 | 0.45 | 203 | 891 | 0.62 |

about the 'secular deterioration' seems to be invalid. Prof. G. Haberler is the vehement critique of the Prebisch-Singer thesis on secular deterioration.

Prof. Haberler denies the validity of the Prebisch-Singer theory, that the prices of finished goods are kept high by 'monopolistic competition'. He says: "It is true that for most periods and countries, monetary policy and wage policies have been such that economic progress has taken the form of rising money wages and stable or rising prices rather than the form of stable money income and falling prices. ... there is no evidence that it has hurt the producers of primary products." [16, p. 337]

Further he criticizes the operation of Engel's law of consumption for the primary products. He says: "Engel's law applies to food but not to raw materials. Moreover relative price depends not only on demand but also on supply conditions which are likely to change over a long period." This point has been supported by M.J. Flanders[14], another severe critic of Prebisch thesis.

Haberler has refuted the secular deterioration thesis on terms of trade but has recognized the cyclical instability of the terms of trade experienced by the underdeveloped countries. He states: "It is a well known feature of the business cycle that prices of agricultural products and primary commodities in general fluctuate more widely than prices of manufactured products and finished goods in general." From this

it follows that the terms of trade of a country whose export consists of primary product tends to deteriorate during the downswing and improve at the upswing of the cycle[16, p.337]. He further says that the task of eliminating the world-wide fluctuation falls upon U.S.A. and other developed countries. This will automatically eliminate the radical shifts in the terms of trade and at the same time stabilize the export volumes. Thus as far as Haberler is concerned it is the developed countries who are bearing the burden for eliminating the cyclical instability in the underdeveloped countries.

Prebisch's thesis is not just concerned with the movement in the terms of trade but extends beyond to the problems of Balance of Payment and Real Income. This has been stated explicitly by M.J. Flanders [14, p. 319]:

1) A "balance-of-payment" problem, with demand for imports in periphery tending to grow faster than import demand in centre, so that equilibrium can be achieved only if P grows more slowly than C. This problem arises from centre's inelastic demand (for imports from periphery) with respect to income.

2) A "real income problem". The export goods of periphery fetches a low price at the international level due to C'c price-inelastic demand for imports from P.

On the other hand, Prof. W. Baer [4] brings out that Prebisch's main concern was not only the movement in the terms of trade but the economic growth of the developing countries.

In this model trade is the most important means by which the growth is brought about in the economy and thus the basic contention is that the classical theory of trade is responsible for bringing inequality in the world. He uses terms of trade to show how the surplus has been expropriated by the developed countries from the underdeveloped. Thus criticism of Prebisch on the basis of the movement in terms of trade is not enough.

Prof. W. Baer points out that, "the principal problems to which Prebisch and his followers call attention is the harm which changes in international demand and productivity conditions over time can do to the relative benefits from trade which goes to primary producing countries. At any one period of time all partners benefit from trade. But the relative benefits accruing to the peripheral partner in time t+1 might be smaller than at time t. To preserve and expand their capacity to import and to protect their income and employment, some degree of protection and subsidization is necessary."[4, p.169]

W. Baer points out the serious complication arising from an increase in productivity. "The complication arising from an increase in productivity in the domestic sector does not change and hence the general wage level in both sectors remains the same, the fruit of this productivity increase will be transferred to the centre, since prices of export will drop in about the same proportion as the productivity

increases. But the productivity increase and the inelastic international demand will cause employment to shrink in the export sector. The resulting manpower surplus can only be employed in domestic industries if wages will shrink so that industries with a lower ratio can exist. This lowering of wages in order to increase employment will cause more international transfer of income." [4, p.169]

Thus when we take the technological progress in the export sector (which results in lowering the cost at constant output or under competitive condition, it leads to an expansion of the output,) accompanied by a lower demand elasticity for the product is a sufficient condition for the immiserizing growth.

The previous chapter brings out that in Prebisch's Model it is the 'low income elasticity of demand' for export goods with constant pressure of population has a detrimental effect on the terms of trade of growing country. The technological progress in that sector further worsens the situation. Thus Prebisch's analysis is not about the fall in the terms of trade of developing country, but to show the effect of trade on growth of the country, which most of his critiques have failed to take into consideration.

# CHAPTER 4

## RECENT EXPERIENCE ON TRADE AND DEVELOPMENT

In the previous chapters I have summarized the literature about the effect of trade on growth as well as the effect of different types of growth on trade, as trade plays the most important role in the development of the developing countries. From the analysis we have found that it is the low income elasticity of demand and the productivity rise in the export sector that causes the fall in the terms of trade of a developing country.

Under such a situation it is the responsibility of the developed world to provide the market for the products of developing countries and to liberalize the import restriction policy, followed by the developed world. On the part of developing countries, for balanced development, the strategy adopted is that of 'import-substitution'.

The trade liberalization and import substitution policies became the major issues of debate in the post-war period. The demand, however, was for liberalization of trade restrictions by the developed world. One of the 'General Principles' embodied in the final Act of the UNCTAD I, 1964 was:

"The expansion and diversification of international trade depends upon increasing access to markets, and upon

remunerative prices for the exports of primary products. Developed countries shall progressively reduce and eliminate barriers and other restrictions that hinder trade and consumption of products from developing countries and take positive measures such that it will create and increase markets for the exports of developing countries." Thus the commodity agreements and manufacturing preferences were the two most important demands put forward by the developing world.

Recently, the argument put forward by H. Johnson[20], Dr. Bapat[6] and others is that, it is not the trade liberalization or import substitution that will foster the economic development in the developing country, as the whole basis of comparative advantage on which trade is based has been shifting. Thus for developing country the question is not only to solve the 'Export Pessimism' but research has to be on 'shifting comparative advantage'.

In this chapter, I will summarize the (1) recent trend in terms of trade, (2) growth of exports, (3) working of centre-periphery system, (4) the effect of inward looking strategy of development, and (5) the shifting comparative advantage.

## 4.1 Movement in the Terms of Trade (1953-1972)

Both the UNCTAD and the World Bank data show that the terms of trade for the developing countries of primary commodities over a period 1953-1972 have been deteriorating.

Table 4.1 : Comparison of World Bank and UNCTAD Indices of the Terms of Trade for Developing Countries of Primary Commodities

(Base: 1963=100)

| Year | Index of commodity export unit value (a) (1) | Index of unit value of exported manufactured goods (b) (2) | UNCTAD Terms of Trade 1 ÷ 2 (3) | World Bank Terms of Trade (c) (4) |
|---|---|---|---|---|
| 1953 | 118 | 94 | 126 | 122 |
| 1954 | 127 | 92 | 138 | 137 |
| 1955 | 122 | 92 | 133 | 130 |
| 1956 | 117 | 95 | 123 | 128 |
| 1957 | 114 | 98 | 116 | 118 |
| 1958 | 108 | 97 | 111 | 111 |
| 1959 | 103 | 96 | 107 | 110 |
| 1960 | 104 | 98 | 106 | 106 |
| 1961 | 100 | 99 | 101 | 98 |
| 1962 | 95 | 99 | 96 | 97 |
| 1963 | 100 | 100 | 100 | 100 |
| 1964 | 106 | 101 | 105 | 109 |
| 1965 | 103 | 103 | 100 | 109 |
| 1966 | 105 | 106 | 99 | 109 |
| 1967 | 102 | 107 | 95 | 100 |
| 1968 | 106 | 107 | 99 | 102 |
| 1969 | 110 | 110 | 100 | 104 |
| 1970 | 115 | 117 | 98 | 102 |
| 1971 | 107 | 124 | 86 | 89 |
| 1972 | 113 | 134 | 84 | 87 |

Notes:

a - Based on unit value of developing countries export of coffee, cocoa, tea, maize, rice, sugar, bananas, copra,

(contd.)

coconut, palm oil, groundnut oil, cotton, jute, sisal, natural rubber, wool, copper, tin, lead, zinc, bauxite, alumina, aluminium, iron ore, phosphate rock, manganese ore on unit value of world exports of oranges and tobacco. The index has been weighted by 1963 values of exports from developing countries. In 1963 the total export value of these selected commodities from developing countries represented 67.5 per cent of the total value of all primary commodities (excluding petroleum) exported by developing countries.

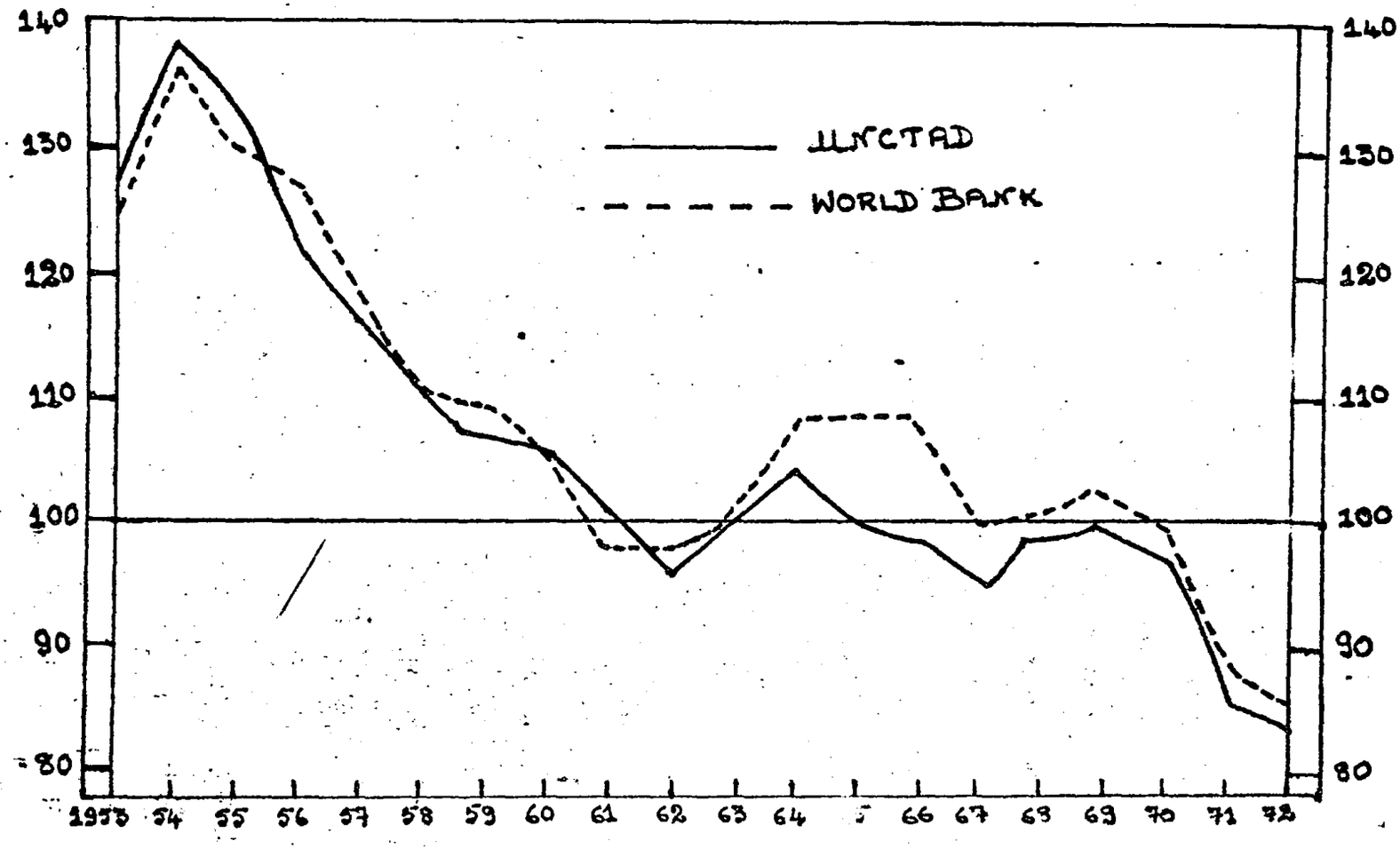
b - United Nations index of unit value of manufactured goods exported by developed market countries.

c - The series covers 34 commodities excluding petroleum.

Source: United Nations, Monthly Bulletin of Statistics; F.A.O., Trade Yearbook; and National Statistics, Commodities Exports Projections Division of the World Bank.

TERMS OF TRADE FOR DEVELOPING COUNTRIES OF PRIMARY COMMODITIES (1953 - 1972)

1963 = 100



The UNCTAD [54] series shows a downward trend of 2 per cent per annum while the World Bank data exhibits 1.7 per cent per annum. The period covered by these calculations excludes the commodity price boom occasioned by the Korean War, as well as the more recent price boom of 1972-74, since inclusion of these two periods would have biased the calculation of the trend. The declining trend can be seen both from the Table 4.1 and the Graph.

## 4.2 Slow Growth of Exports

The economic health of the industrialized countries is a key determinant of the growth prospects of developing nations. "Slow and erratic growth in industrialized countries in recent years, combined with other discriptive influences, including increased protection, international inflation and exchange rate instability, reduced the volume of growth of world trade from about 9 per cent a year between 1973 and 1977. In the same year the growth of developing country export decline 6.4 per cent to 3.6 per cent a year. Recent export price trends have been erratic and on balance unfavourable to the developing countries." [57, p.5]

The Table 4.2 shows that the primary commodity export of the developing countries have grown little in volume. It is because of the unfavourable international market conditions and also because of adverse weather conditions and other supply difficulties.

Table 4.2 : Growth of Merchandise Exports, by Product Category and Country Group, 1960-76 and 1976-90 (Average Annual Percentage Growth Rates, at 1975 Prices)

| | 1960-76 | | | 1976-90 | | |
|---|---|---|---|---|---|---|
| | World | Industrialized countries | Developing countries | World | Industrialized countries | Developing countries |
| Fuel & Energy | 6.7 | 4.5 | 6.3 | 3.1 | 3.3 | 3.2 |
| Other Primary Products | 4.4 | 5.1 | 3.7 | 3.3 | 3.3 | 3.3 |
| Food & Beverages | 4.4 | 5.4 | 3.5 | 3.7 | 3.9 | 3.1 |
| Non-food Agricultural Products | 5.1 | 6.3 | 3.4 | 1.8 | 1.1 | 2.8 |
| Minerals & Non-ferrous Metals | 3.9 | 3.4 | 4.7 | 3.5 | 3.0 | 4.5 |
| Manufactures | 9.1 | 9.1 | 12.7 | 7.0 | 6.5 | 10.9 |
| Machinery & Transport Equipment | 9.9 | 10.1 | 17.5 | 7.6 | 7.1 | 15.3 |
| Other Manufactures | 8.5 | 8.3 | 11.8 | 6.5 | 6.0 | 9.0 |
| Total Merchandise | 7.4 | 7.8 | 6.3 | 5.7 | 5.9 | 6.1 |

Source: World Bank; United Nations Yearbook of International Trade Statistics, various issues; Handbook of International Trade and Development Statistics.

Developing countries' manufactured exports have continued to show much greater dynamism, but their growth has declined from an average of about 15 per cent a year in the period 1965-73 to about 11 per cent a year in the period 1974-77. This slowdown was the result of slower economic growth and heightened

protection in industrialized countries. Cloth, textiles and footwears are subjected to this protectionism.

Another main feature of their trade is that the developing countries will continue their rapid expansion of trade with one another. In 1976 more than one-fourth of developing country merchandise export went to other developing nations.

## 4.3 Working of the Centre-Periphery System

The new feature of foreign trade is the emergence of the dynamic centres like EEC, EFTA, Japan, etc. and their peripheries. The old centre and periphery system where USA was the dominating centre is changing[1,p.100]. Side by side a new socialist centre has come into existence (CMEA group).

In the last two decades the 'centre-periphery' system has undergone substantial degree of change. It is found that two parallel and contradicting forces are in operation i.e. "relative marginalization" and "dependent integration". The periphery, according to the reasons advanced by Prebisch, i.e. low income elasticity of demand for primary product, technological substitution, etc., has gradually become less "necessary" to the centre as a supplier and as a market, both for goods and services and for capital. The marginalization shows the deterioration of the terms of trade, which still operates.

The new emerging feature of the periphery country now is 'dependent integration'. The dependent integration takes both the political and economic inequality between centre and

periphery. The main features are:

1) The structural specialization in primary products reduces the relative bargaining power of the periphery in world trade and in its relationship with the centre.

2) The new mode and orientation in foreign private investment represents an obvious dimunition in the national decision-making power vital for development.

3) The system of financing, insofar as it derives from or increases external indebtedness in the periphery, has negative effects on the autonomy of national policy.

4) Enlargement and diversification in the field of foreign ownership and management sharpens the problem of technological subordination, which is no longer confined to the export sector, as in the past.

5) The above realities are translated into other means of subjection at the political and military etc. levels. [1, p.118]

A change in this structure requires besides import substitution and trade liberalization policies, a healthier 'centre-periphery' cooperation in the field of economics and politics along with appropriate technical innovation.

### 4.4 "Import Substitution"—Inward Looking Strategy for Development

The development of periphery via means of 'import substitution' has been advanced by Raul Prebisch to enable the periphery to recoup for its deteriorating terms of trade. He says:

"It is not a question of doctrinal preferences, but a necessity imposed by the international circumstance." He further says, "For obvious reasons of economic viability, import substitution should not continue in those watertight compartments which CEPAL has been impinging since its earliest days. Now more than ever is its essential to conduct the process rationally at the Latin American level and on a basis of formulas for trade with other developing countries."[41,p.204]

The policy of 'import substitution' although it is a "necessity imposed by the international circumstances", has further aggravated the inequalities of the developing countries.

Paul Streeten[40] says that both the inward looking and outward looking strategies have increased the inequalities.

The former because they strengthen domestic market imperfections and monopolies and reduce demand for labour-intensive process, the latter because the market rewards most to those factors that are relatively scarce (capital, management, professional skills) and penalises those in abundant supply and because the market strengthens ability to accumulate of those who have against who have not.

Under such a situation, it is difficult to predict what strategy will be helpful for the egalitarian development. At different places and at different times, the strategy required for development is different.

The main defect of the 'import substitution' is that it is not based on the existing comparative advantage. Protec-

tion, investment allocations and other forms of encouragement are provided not to a limited number of most promising "infant" industries but to any branch whatsoever. The most important defect about import substitution is the "negative value added" i.e. the value of inputs exceeds that of outputs at world prices. The industrialization of the developing country should take into account the difference in productivity gap in the manufacturing sector of both developed and less developed countries. Several studies have been done by Diaz for Argentina, and by Nelson and others for Columbia.

Bela Balassa in 'growth strategies in semi-industrial countries' points out "We cannot accept as a criterion of success the fact that the structure of manufacturing industry in countries following an inward-looking strategy approaches that of industrial nations. ... The industries in question generally use backward technical methods, manufacture products of low quality and have not achieved the degree of intra-industry specialization that is desirable under modern condition. ... One may say that countries pursuing inward-looking policies have built that it is based on small-scale production with inadequate specialization and outdated machinery."[7, p.45]

The operation of the exchange-control system further adds to the inefficiency in the working of import substitution. Emphasis on plant expansion can lead to a situation in which foreign exchange availabilities do not permit the import of

enough inputs to operate these plants at capacity. Furthermore Lloyd G. Reynalds (Image and Reality in Economic Development) says, even if import substitution is rational, it has inherent limitations. The benefit occurring to the industrial producer is at the expense of exporters. It discourages the production of export good, which lead to the fall in supply of exports. Thus we find that "inward-looking policies have often been applied too strongly and too indiscriminately, to a degree that has hampered economic progress instead of promoting it and that countries pursuing less restrictive trade policies have in general fared better.

With these limitations of import substitution, the academicians have recently started advocating the 'Export Promotion Growth Strategy', as accepted by Taiwan and Korea. G.M. Meier argues that as in case of import substitution, 'negative value added' can also occur in exports. Export promotion, supported by multinational enterprises with a good many concessions, privileges and incentives can have this result.

Paul Streeten says that the over-expansion of export may turn the income terms of trade against the developing countries; the import capacity and import willingness are not likely to keep in step with accelerated export expansion; that the protectionism in developed countries may increase; and even when exports are successful, the gain to the developing countries may be small or in extreme case negative.

Under such circumstances it is the institutional and political constraints that have to be overcome and some co-ordination between developing countries is essential in order to get a fair benefit. This will lead to the 'groupism' at the international level and improves the monopoly power of developing countries. But I.G. Patel[39] has warned against the use of monopoly and bargaining power by the developing countries because he fears:

"Once you get into a mood of warfare in trade, it is going to be difficult to keep the firing within any prescribed limits."[39, p.45] Thus it is the moral responsibility of the rich country to assist the poor countries in their own way of development, the support they can provide is via means of liberal trade policies.

4.5 Shifting Comparative Advantage

Prof. ~~Henry~~ Harry Johnson[22] argues that the recent conflict between the developed and underdeveloped countries can be solved if both specialize according to the principle of comparative advantage. He says "There is nothing wrong with the classical principle of the beneficiality of freedom of trade, other than the fact that the rich and poor countries are equally not prepared to live with and adopt themselves to that principle: the rich countries by using protectionist policies instead of assisted factor mobility, the poor countries by seeking to promote economic activities on the basis of emulation of rich countries rather than comparative advantage. The less

developed countries would be better advised to insist, so far as they can, that the developed countries should accept and live by the principle of comparative advantage, than to tolerate rich-country's violations of the principle and attempt to counteract those violations by violation of their own, coupled with demands for compensation in the form of foreign aid and trade preferences."[22, p.34]

Johnson further argues that the principle of comparative advantage changes over the time. At the static level, the difference in the "national resource endowment, national policies with respect to support of scientific research and extension of education at public expense and national economic size" builds up comparative advantage for a country; but it changes over the time with the "upward trend in the value of human time".[20, p.32] This stimulates the labour saving innovation. In addition to the increase in value of human time, the consumption level rises and new products will be innovated to meet rising income level. The new products, both capital goods and consumer goods, initially will be produced in the innovating country but as development proceeds the increasing unit value of labour time creates the incentives to shift the location of production of new goods towards location of lower labour time value.

There are four ways of product transfer:

1) Imitation of innovation by domestic producer in the former export market,

2) by establishing a subsidiary unit by the innovating firm in the foreign market,

3) the transfer may occur through the sale or lease in return for royalties or a share of profits, of productive knowledge by the innovating firm to a domestic firm in the foreign market.

4) The fourth mechanism of transfer involves the disappearance, through competition, of the commercial value of the knowledge, to the point where it becomes a free good to the world as a whole i.e. the technology is transferred from innovating country to other countries.

All four mechanisms of the production transfer provide the economic machinery for a dynamic theory of comparative cost, in which technical improvements generated in response to rising living standards and changing relative costs of capital and labour yield initial comparative advantage which is lost by diffusion through the world economy in response to economic incentive provided by differences, ultimately, in relative costs of human labour time.

Till now we have seen the change in comparative advantage is due to a change in the 'value of labour time'. The comparative advantage changes with the change in demand. This has been dealt with by S.D. Linder, who says, pre-condition for a non-primary commodity to emerge as an export good is the presence of "home demand" - foreign trade is only an 'extension of the domestic trade'. The internal demand pattern determines the range of commodity that constitutes potential exports.

This thesis implies that the underdeveloped countries will be poor exporters of manufactured good since the demand pattern in these countries is different. The new innovations in the production field and the changing pattern of demand with the change in the income, reduces the export potential of the underdeveloped countries. Dr. Bapat argues that even with trade liberalization, developing countries will be at a disadvantageous position, since the very basis of trade i.e. comparative advantage, has been shifting from developing to developed countries.

"The developing countries need to know that they cannot take their traditional comparative advantage exports for granted. The comparative advantage has a shifting base. It shifts with technological growth, distribution of income and capital accumulation."[18, p.37] From this analysis it follows that any policy formulation either import substitution or export promotion, should take into consideration the fact that the comparative advantage of a country changes over time.

Thus the question of 'fair price' is not the question of mutual help and relative bargaining power only, but it is the question of growth and ability to cope up with the changing world situation. In the present world setting it is the most serious and difficult question.

Yet we look forward. There exist hopes.

# APPENDIX A

## CONCEPTS OF TERMS OF TRADE

Terms of trade, despite the various ambiguities regarding its use, have been widely accepted as an index of the trend of gains from trade, since the days of Ricardo. Recently the concept has received considerable attention in discussion of economic development. This is not only because the terms of trade have sizable quantitative significance for the most poor countries but also because they are a convenient indication of the net result of diverse forces and have important welfare indication.

Several concepts of terms of trade have been used i.e. commodity terms, single factoral, double factoral, income terms, real cost and utility terms. [56, pp. 558-564] These concepts fall under three groups:

1) Those that relate to the ratio of exchange between commodities - net barter and income terms of trade.
2) Those that relate to the interchange between productive resources - the single factoral and double factoral terms of trade.
3) Those that interpret the gains from trade in terms of utility analysis - the real cost and utility terms of trade.

Commodity Terms of Trade

The most widely used criterion for the trend from gain is the commodity terms of trade. This measures the relation between the prices a country gets from its export and the prices it pays for its export.

The index of the commodity terms of trade can be represented symbolically as:

$$T_c = \frac{eP_1/eP_0}{iP_1/iP_0} = \frac{P_n}{P_m}$$

e = export commodity. i = import commodity.
P = price index number. 0 = initial year.
1 = for the given year.
$P_n$ and $P_m$ are price index numbers for export and imports respectively.

A rise in $T_c$ indicates that the larger volume of import will be received, on the basis of price relation, in exchange for the given volume of exports. It does not take into account the changes in the composition of food entering into international trade and the quality of goods.

Gross Barter Terms of Trade

This concept has been introduced by Taussig, the main purpose in introducing this concept is to correct the commodity or net barter terms of trade for unilateral transactions of import or exports which are surrendered without compensation or received without counterpart, such as tributes and immigrants remittances. It is the ratio of the physical

quantity of imports to the physical quantity of exports.

$$T_G = \frac{iQ_1/iQ_0}{cQ_1/cQ_0} = \frac{Q_m}{Q_n}$$

$Q_m$ and $Q_n$ are volume index numbers for imports and exports. Rise in $T_G$ represents a favourable change in the sense that more imports are received for a given volume of exports than in the base year.

Since $T_G = T_c$ only if the value of imports and value of exports are equal otherwise $T_G$ and $T_c$ diverge when there are unilateral transactions. Thus as Haberler has suggested allowance should be made separately for unilateral transactions, instead of incorporating them in the terms of trade index.

Income Terms of Trade

The commodity terms of trade is not the perfect indicator of the gain from trade since it does not take into account the physical volume of export. The terms of trade for a country will improve even with the fall in the price of export if the volume of export has substantially risen. This concept was first introduced by G.S. Dorrance [11].

$$T_Y = T_c \cdot \frac{Q_{n1}}{Q_{n0}} = T_c \cdot Q_n$$

Here $Q_n$ is the export volume index.

A rise in $T_Y$ indicates that the country can obtain a larger volume of imports from the sale of its exports. Its capacity to import based on export has increased. The export

based capacity to import should be distinguished from the total capacity to import which depends not only on exports but also on capital flow and other invisible exchange receipts. Income terms of trade cannot be interpreted as a measure of the gain from trade or an indicator of welfare. It should be simply used as a measure of the quantity of imports bought by exports.

Single Factoral Terms of Trade [56]

This concept takes into consideration the changes in the productivity which is of prime significance in considering development. Symbolically it is represented as:

$$T_{c,f} = T_c \cdot \frac{eF_0}{eF_1}$$

where $eF_0/eF_1$ represents the reciprocal of the index of cost in terms of quantity of factors of production used per unit of export, and $T_{c,f}$ represents the index of the physical amounts of foreign goods obtained per unit of cost in terms of quantities of factors of production. A rise in $T_{c,f}$ is a favourable movement in the sense [~~that a movement in the sense~~] that a greater quantity of imports can be obtained per unit of factor-input used in the production of exportables.

Double Factoral Terms of Trade

It takes into consideration the changes in productivity in producing imports as well as exports i.e. the number of units of the productive services of the foreign country whose product exchanged for the product of one unit of the

productive services of home country.

$$T_{c,ff} = T_c \cdot \frac{eF_0/eF_1}{iF_0/iF_1}$$

Here, $eF_0/eF_1$, $iF_0/iF_1$ represents the exports and import productivity index. The older writers usually accepted the double factoral terms of trade as identical in their trend with the commodity terms of trade. But with changes in costs either with respect to output or to time, the trends of the two indices could be substantially divergent.

The divergence of $T_{c,ff}$ from $T_{c,f}$ when $T_{c,f}$ for country A is constant only indicates the changes in the productivity in the country B, the index does not have any welfare significance. What matters to the importing country is whether it receives more goods per unit of its "exported factor inputs" i.e. an improvement in the single factoral terms of trade; but not whether the import contains more or less foreign inputs than before.

Real Cost Terms of Trade Index

A closer approach to an index of real gain from trade would be achieved if $T_f$ were multiplied by the reciprocal of an index of the "disutility coefficient" of the technical coefficient of the export commodities.

$$T_{c,f,r} = \frac{P_n}{P_m} \cdot \frac{eF_1}{eF_0} \cdot \frac{eR_0}{eR_1} = T_{c.f} \cdot \frac{eR_0}{eR_1}$$

$eR_0/eR_1$ represents the index of amount of disutility per unit of technical coefficient. This index represents the total

physical amount of foreign goods obtained per unit of real cost.

Utility Terms of Trade

Here we move from the amount of foreign goods obtained per unit with the real cost involved in producing the exports to the 'relative desirability' of the import commodity. The relative desirability are due to changes in tastes and this would be necessary to incorporate in the "real cost of trade index". If we write U for average desirability and utility and 'a' to designate its commodities whose production for domestic consumption is forgone as the result of resort to production of export. Then

$$U = \frac{iU_1/aU_1}{iU_0/aU_0}$$

represents the index of relative desirability of import for forgone commodity.

$$\text{Utility term of index} = T_{c,f,r,u} = T_{c,f,r} \cdot \frac{iU_1/aU_1}{iU_0/aU_0}$$

These are the several concepts regarding terms of trade. Because of the precision in calculation the most widely used concept still is 'commodity terms of trade'. Serious interpretation of the data of commodity terms of trade requires careful handling.

## APPENDIX B

### A FORMAL MODEL OF ECONOMIC GROWTH AND INTERNATIONAL TRADE [54, p.143]

The proof of the formula -

$$\frac{dP}{dt} = \frac{(R_{1m}\, S_{1m} - R_1\, E_{1m}\, C_{1m}) - (R_2\, E_{2n}\, C_{2n} - R_{2n}\, S_{2n})}{\frac{C_{1m}}{P} e_1 + \frac{C_{2n}}{P} e_2 + \frac{S_{1m}}{P} s_1 + \frac{S_{2n}}{P} s_2}$$

is given below.

$Y_1$ denotes national income in Country I.

$Y_2$ denotes national income in Country II.

$S_{1m}$ denotes output of import competing good in Country I.

$S_{2n}$ denotes supply of the export good in Country II.

$C_{1m}$ denotes consumption of the imported good in Country I.

$C_{2n}$ denotes consumption of Country II's export good.

$t$ denotes economic growth.

$P_n$ denotes the price of Country I's export good.

$P_m$ denotes the price of Country I's import good.

$P$ denotes the terms of trade for Country I.

Since the import good of Country I is used as numeraire and $P_m=1$.

Thus we get following system of equations:

$$S_{1m} = S_{1m}[t, P(t)] \qquad (1)$$

Supply of Country I's import competing good is a function of economic growth and of relative prices.

$$C_{1m} = C_{1m}[Y_1(t), P(t)] \qquad (2)$$

Consumption of importables in Country I is a function of

its national income and of relative prices.

$$S_{2n} = S_{2n}[t, P(t)] \qquad (3)$$

Output of exportables in Country II is function of economic growth and relative prices.

$$C_{2n} = C_{2n}[Y_2(t), P(t)] \qquad (4)$$

Consumption of exportables in Country II is a function of its national income and relative prices.

Finally under equilibrium situation -

$S_{1m} + S_{2n} = C_{1m} + C_{2n}$.

Now if we differentiate with respect to t,

$$\frac{d(S_{1m} + S_{2n})}{dt} = \frac{d(C_{1m} + C_{2n})}{dt}$$

which gives

$$\frac{\partial S_{1m}}{\partial t} + \frac{\partial S_{1m}}{\partial P}\frac{dP}{dt} + \frac{\partial S_{2n}}{\partial t} + \frac{\partial S_{2n}}{\partial P}\frac{dP}{dt}$$

$$= \frac{\partial C_{1m}}{\partial Y_1}\frac{dY_1}{dt} + \frac{\partial C_{1m}}{\partial P}\frac{dP}{dt} + \frac{\partial C_{2n}}{\partial Y_2}\frac{dY_2}{dt} + \frac{\partial C_{2n}}{\partial P}\frac{dP}{dt}$$

Solving for dP/dt gives

$$\frac{dP}{dt} = \frac{\left(\frac{\partial S_{1m}}{\partial t} - \frac{\partial C_{1m}}{\partial Y_1}\frac{dY_1}{dt} - \frac{\partial C_{2n}}{\partial Y_2}\frac{dY_2}{dt} - \frac{\partial S_{2n}}{\partial t}\right)}{\frac{\partial C_{1m}}{\partial P} + \frac{\partial C_{2n}}{\partial P} + \frac{\partial S_{1m}}{\partial P} - \frac{\partial S_{2n}}{\partial P}}$$

This equation shows the effect of economic growth on terms of trade. Rephrased in terms of growth rates and elasticities where,

$R_{1m} = \frac{\partial S_{1m}}{\partial t} \cdot \frac{1}{S_{1m}}$ : The growth rate of import competing sector at given terms of trade.

$R_1 = \frac{\partial y_1}{dt} \cdot \frac{1}{y_1}$ : The growth rate of the national income in Country I.

$E_{1m} = \frac{\partial C_{1m}}{\partial y_1} \frac{y_1}{C_{1m}}$ : The income elasticity of importables in Country I.

$R_2 = \frac{dy_a}{dt} \cdot \frac{1}{y_a}$ : The rate of growth of national income in Country II.

$E_{2n} = \frac{\partial C_{an}}{\partial y_a} \frac{y_a}{C_{an}}$ : The income elasticity of exportables in Country II.

$R_{2n} = \frac{\partial S_{an}}{\partial t} \cdot \frac{1}{S_{an}}$ : The growth rate of the export sector in Country II at constant terms of trade.

$e_1 = \frac{\partial C_{1m}}{\partial P} \frac{P}{C_{1m}}$ : Country I's elasticity of demand for its import good with respect to the terms of trade.

$e_2 = \frac{\partial C_{an}}{\partial P} \frac{P}{C_{an}}$ : Country II's elasticity of demand for its export good with respect to the terms of trade.

$s_1 = -\frac{\partial S_{1m}}{\partial P} \frac{P}{S_{1m}}$ : Country I's elasticity of supply of importables with respect to the terms of trade.

$s_2 = -\frac{\partial S_{an}}{\partial P} \frac{P}{S_{an}}$ : Country II's elasticity of supply of exportables with respect to the terms of trade.

Using these definitions the equation can be rewritten as:

$$\frac{dP}{dt} = \frac{(R_{1m} S_{1m} - R_1 E_{1m} \cdot C_{1m}) - (R_2 E_{2n} C_{2n} - R_{2n} S_{2n})}{\frac{C_{1m}}{P} e_1 + \frac{C_{2n}}{P} e_2 + \frac{S_{1m}}{P} s_1 + \frac{S_{2n}}{P} s_2}$$

## APPENDIX C

## SELECTED UNIT VALUE RATIOS, 1876-1948

(1938 = 100)

| Period | Primary to manufacture commodities in world trade * | United Kingdom imports to exports based upon | |
|---|---|---|---|
| | | Current year weight @ | Board of Trade Index |
| 1 | 2 | 3 | 4 |
| 1876-1880 | 147 | 163 | |
| 1881-1885 | 145 | 167 | |
| 1886-1890 | 137 | 157 | |
| 1891-1895 | 133 | 147 | |
| 1896-1900 | 135 | 142 | |
| 1901-1905 | 132 | 138 | |
| 1906-1910 | 133 | 140 | |
| 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 |

(continued)

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| 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 |

* Based on League of Nations, Industrialization and Foreign Trade (Geneva, 1945). Represents major trading countries and other

@ Based on W. Schlote, "Entwicklung and Strukturwandlurgen des englischen Aussenhandels von 1700 bis Zur Gerenwart,"

Source: United Nations, Department of Economic Affairs, "Relative Prices of Exports and Imports of Underdeveloped Countries," 1949, p. 22.

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