World Market Instability in Primary Commodities*

The world economy is still reeling from the remarkable increases in primary commodity prices in 1973-74 at rates and to levels that surpassed the early Korean War period.[1] Even though many commodities have experienced price declines especially with the onset of recession in the industrialized countries in 1974-75, the question naturally arises as to what the future course of prices will be.

Some insights into this question can be obtained by examining the historical trend and cyclical movements of the prices of various commodities in the period since World War II. It is also interesting to consider the causes and consequences of instability and the economic policies that nations have designed to deal with instability and other aspects of primary commodities. In this regard, we shall take note especially of conflicts in commodity policies between commodity exporting and importing nations. In the course of our analysis, we shall offer some suggestions on further research that might enhance our understanding of the causes and consequences of instability and ways in which commodity-policy conflicts can be minimized.

Trend and Cyclical Movements in Primary Commodity Prices Since World War II

In order to determine how primary commodity prices have behaved in the period since World War II, we compiled annual price series for the major internationally traded commodities, based

* The data and technical notes on which this paper is based are available upon request from the author. Christopher F. Baum is to be thanked for his computational assistance.

1 For a comparison of these periods, see MARIAN RADETZKI, "Commodity Prices during Two Booms 1950 and 1973", Skandinaviska Enskilda Banken, *Quarterly Review*, 4/1974.

upon data published by the World Bank and IMF, covering the period, 1948-I to 1975-I or 1975-II. All the data were converted to indexes, with 1970 = 100. Altogether, 33 price series were compiled.

We first plotted the logarithmic values of the annual price indexes against time. Logarithmic plottings have the advantage that they can be interpreted directly in terms of percentage changes. Inspection of these graphs (which are not reproduced here) clearly reveals the remarkable increases in many commodity prices in 1973-74 and signs of weakening in the first half of 1975. We then fitted logarithmic trend functions to the individual series. These are summarized in Table 1. One purpose of fitting these trend functions was to provide an indication of the rate of increase or decline in the individual price series over the period. This information is given by the regression coefficient on time and can be interpreted as the *percentage* rate of increase for each series.

Thus, the largest annual percentage rates of increase for 1948-75 were recorded for petroleum (9.9%), cotton (9.0%), groundnut oil (8.8%), sugar (8.7%), and lumber (8.5%) while there were several commodities, shown without asterisks in the table, for which there was no discernible trend. It should be noted that, in view of the especially large price increases in 1973-74, the estimated trend coefficients may be exaggerated. If one were to engage in price extrapolations beyond 1975, prudence would suggest therefore that the rates of change for the period prior to 1973-74 might be safer to use on the assumption that 1973-74 were rather special years.

The second purpose of fitting the trend functions to the data was to isolate any systematic cyclical movements in the price series. Many such movements are evident in the plottings of the absolute values of the series themselves. These movements can be seen more clearly, however, if we remove the trend influences and focus instead on the patterns of the deviations from trend. Thus, in Figure 1, we have plotted the differences between the actual values and the estimated values based on the fitted trend functions. Patterns of cyclical price movements are evident for several of the commodities depicted, although it will be noted that the periodicities of the movements are not constant and there are substantial differences in the amplitudes over the period as a whole.

The deviations from trend plotted in Figure 1 establish that annual price movements for a wide variety of primary commodities are certainly not random events. If history is any guide, Figure 1 suggests moreover, especially for commodities produced and traded in competitive world markets, that the unusually high prices recorded for 1973-74 were due to special circumstances that may not necessarily repeat themselves in the future.

In order to obtain some idea of the price instability that characterizes the various commodities, an instability index was calculated for each commodity and recorded in Table 1. This index was obtained by dividing the standard error of estimate of the trend equation fitted to the individual price series by the average (mean) value of the series. Since each index is a pure number, comparisons can be made for the different commodities listed. It can be seen that sugar, linseed oil, sisal, zinc, petroleum, and cocoa displayed the greatest instability for 1948-75, and bananas, aluminum, iron ore, butter, lamb, tea, meat, and woodpulp displayed the least instability. Note again that these rankings may not be completely stable because they are influenced by the extreme price observations for 1973-74.

The Causes of Primary Commodity Instability

We have looked thus far only at the instability of primary commodity prices. A more complete analysis would consider the instability of quantities produced, traded, and consumed together with the instability of the total proceeds (price × quantity) realized from exports and required to pay for imports. In addition, since most countries export and import a variety of commodities, we could devise some method of weighting to obtain an overall index of instability for individual nations. Assuming that all of these various measures of instability were available, the question naturally arises as to what the major causes of instability may be.

In seeking to answer this question, an especially useful framework has been provided by Massell.[2] Thus, imagine that we have a primary-producing-exporting country that consumes some part of its production domestically. Export earnings will then depend on the shape and position of the country's supply schedule and on the schedules of foreign demand and home demand. Changes in export earnings from a given good will depend accordingly on the shifts of the

2 See Benton F. Massell, "Export Instability and Economic Structure", *American Economic Review*, September 1970.

various schedules and their elasticities. This suggests therefore that we can analyze the causes of instability in terms of fluctuations in supply and fluctuations in demand.

Thus, for example, there are certain foodstuffs and agricultural raw materials that are apparently subject to considerable short-run supply instability due to such factors as variations in weather, infestations or plant disease, or over- or under-responses of production to price changes. Countries that export goods subject to unstable supply will therefore tend to experience relatively greater instability in their export earnings, depending especially on the elasticity of foreign demand. If the country's export-market share is relatively small, it will face a relatively highly elastic foreign demand schedule. Thus supply instability will result in relatively greater fluctuations in export proceeds when a country supplies a relatively small proportion of the total world market. The opposite tendency would apply, the greater a country's export-market share.

For many other countries, shifts in foreign demand constitute perhaps the major source of instability in prices and export earnings for producing countries. The foreign demand schedule that an individual country faces will depend on the total world demand and supply schedules. Thus, a shift in one of the total world schedules will affect the individual country's foreign demand schedule. Short-run shifts in total supply will result from the forces mentioned in our discussion above. Short-run shifts in demand may result from changes in the prices of related goods and from cyclical changes in income and expenditures. These latter effects will vary depending upon the responsiveness of quantities consumed to variations in income or industrial activity. We might expect therefore that the demand for foodstuffs would be relatively more stable than the demand for industrial raw materials.

Finally, in countries where a substantial proportion of production is consumed domestically, variations in export earnings will result from shifts in the domestic demand schedule due to such factors as changes in domestic monetary and fiscal policies.

As already mentioned, many countries produce and export a variety of commodities so that total export earnings will depend upon the interrelationships among commodities. Thus, a country may have more stable export proceeds, the more diversified are its exports. In addition, there will be greater stability, the more diversification there is in the foreign market destinations of exports.

The causes of export instability thus can be broken down into: (1) the composition of exports; (2) how diversified exports are by commodity and geographic destination; (3) a country's export-market shares; and (4) the relative importance of the exporting country's home market. Besides these factors, instability may be influenced by the stage of a country's development as measured, say, by its per capita income. The argument here is that a more advanced country will tend to specialize on relatively finished products and will have a greater flexibility in its adaptation to change and the reallocation of resources.

Several empirical studies have attempted to assess the importance of these various influences. It is interesting in this regard that, as might be expected, less developed countries (LDC's) had a substantially higher export instability than did the advanced countries. Thus, for example, MacBean found that the average export instability for LDC's was 31 per cent higher than for the advanced countries during the period, 1948-59.[3] Erb and Schiavo-Campo found that average LDC instability was 117 per cent above advanced country instability for 1954-66.[4] Finally, Massell found a 50 per cent greater instability for LDC's for 1950-66.[5] While these results vary depending upon the measure of instability used and the time period, it is nevertheless clear that LDC's are subject to much greater instability in their export earnings than are advanced countries.

Of the various influences noted, it appears, especially from Massell's research, that a substantial proportion of LDC export instability is due to dependence on a relatively small number of commodities for export, but that this is offset the greater the relative importance of the exports of foodstuffs as compared to raw materials. It would be especially interesting if we could draw inferences from these findings about the relative importance of fluctuations in supply and in foreign and domestic demand in explaining export instability. Massell interpreted his results to suggest that foreign demand influences were relatively the most important, but he did not specify exactly the mechanism by which this occurred. Indeed, since he was

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3 See Alasdair I. MacBean, *Export Instability and Economic Development* (Harvard University Press, 1966).

4 See Guy F. Erb and S. Schiavo-Campo, "Export Instability, Level of Development, and Economic Size of Less Developed Countries", *Bulletin*, Oxford University Institute of Economics and Statistics, November 1969.

5 Massell, *op. cit.*

able to explain only around 40 per cent of the observed instability, it is evident that there were other forces at work. If a complete model could in fact be developed, it would have to encompass both the supply and demand sides of the market. Unless we could isolate these influences separately, it would be quite risky to draw conclusions about the relative importance of supply and demand factors in causing instability.

We might nevertheless be able to categorize commodities and countries by the potential sources of instability, based upon the various economic criteria mentioned above. This would be especially important in analyzing commodity-market conditions and attempting to determine how prices, export proceeds, and import payments may behave in the short run.

The Consequences of Primary Commodity Instability

Because export instability has been substantial for primary producing countries and more so for LDC's as compared to advanced countries, one might expect that instability would be detrimental to economic growth, particularly in the LDC's. It was startling therefore when MacBean could not find any evidence to sustain this hypothesis based upon the experience of the 1950's.[6] It is noteworthy that his findings were by no means a statistical artifact or subject to special circumstances since the same results were obtained by Kenen and Voivodas for a more recent period, 1957-66, and for the longer period, 1950-66.[7]

It is of course conceivable that the results may be sensitive to the way in which the underlying model has been formulated. Voivodas has actually attempted to show this to be the case.[8] However, his results are not convincing because he does not offer any explanation of why instability may be harmful to growth. We may conclude, therefore, that the case has certainly not been proven that export instability is a serious deterrent to growth in most LDC's.

In a related vein, it is interesting to take note of research by

6 MacBean, *op. cit.*

7 Peter B. Kenen and C. S. Voivodas, "Export Instability and Economic Growth", *Kyklos*, 4/1972.

8 C. S. Voivodas, "The Effect of Foreign Exchange Instability on Growth", *Review of Economics and Statistics*, August 1974.

Mathieson and McKinnon on the effects of per capita income and "openness" on instability.[9] They constructed measures of instability for real gross domestic product (GDP), real gross investment, real machinery and equipment expenditures, real exports, and real imports for 28 LDC's and advanced countries for the period, 1950-68. The instability measures were substantially greater for the LDC's for all of their series except GDP, which they argued was unreliable because of the way it was estimated.

In seeking to explain the instability of the various component measures, Mathieson and McKinnon found that per capita income was negatively related to instability and that openness, measured as the ratio of exports to GNP, also had a negative influence on instability. This latter finding is quite remarkable because it is the opposite of what one might expect. The fact that openness may be associated with greater stability in LDC's means that relatively greater LDC trade with the advanced countries has not exposed the LDC's to unfavorable transmission effects arising from fluctuations in domestic economic activity in the advanced countries. The policy implication to be drawn is that LDC movements towards autarky may expose them to relatively greater instability, which is again quite contrary to what many observers and policy makers have thought.

As far as advanced country primary exporters are concerned, they may be better able than LDC's to cope with instability because their exports are more diversified and because they can rely on domestic monetary and fiscal policies for stabilization purposes. However, difficulties may arise in cases where domestic consumption of exported goods is relatively important and where there are differences among income groups in the proportions of expenditure devoted to foodstuffs and other categories of consumption. In a free market, an increase in foreign demand will bid up the price for both exports and home consumption. The authorities may thus face a dilemma if the domestic price impact is felt differentially by various income groups. From the standpoint of policy, it would be preferable to deal with this problem by income transfers through the tax system rather than by restricting exports. However, export restriction may

9 Donald Mathieson and Ronald McKinnon, "Instability in Underdeveloped Countries: The Impact of the International Economy", in M. Reder and P. David (eds.), *Essays in Honor of Moses Abramovitz* (Academic Press, 1973).

be politically more expedient, even though it is disruptive to international commercial and diplomatic relations.

Instability may of course also have consequences for importing countries, particularly if there are unanticipated and substantial increases in import payments required for primary commodities, as has recently been the case. Countries will differ substantially in terms of their ability to cope with this kind of situation. Increases in import prices will create incentives for consumers to reduce the consumption of imported goods and to shift towards relatively cheaper substitutes. In the short run, however, the availability of substitutes may be limited and, in view of the demand inelasticities involved, total import payments may rise substantially.

If a payments imbalance is created, the tendency will be for countries to reduce their international reserves or to borrow to finance the imbalance at the existing exchange rate. To the extent that short-term financing is incomplete, there will be downward pressure on the exchange rate. Unless the domestic monetary effects of the reserve loss can be sterilized by offsetting central bank action, there will be a contractionary effect domestically. The resulting reduction in domestic expenditures and possible exchange-rate depreciation should then give rise to movements that will serve to correct the imbalance by encouraging the expansion of exports and discouraging imports.

Countries may also respond to payments imbalances by imposing import restrictions. The imbalances may thus be mitigated temporarily, although the impact will then be shifted to the domestic sector as expenditures are diverted from imports to domestic goods. The forces that created the imbalance to begin with will most likely remain and may reassert themselves unless counterbalancing structural changes take place.

In the short run therefore, importing countries may not be able to counteract effectively rapid and unanticipated changes in the prices of imported commodities. As a consequence, the *level* of domestic prices may rise, and this increase may be reinforced by whatever exchange-rate depreciation occurs that in turn increases the foreign demand for the country's exports and home demand for import substitutes. These increases in the price level are not in themselves necessarily inflationary. However, it is conceivable that the increases can affect wage and price relationships and olter the *rate of change* in the price level, which then would be indicative of greater inflation.

Advanced Country Commodity Policies

Having reviewed the evidence on the trends and instability of primary commodity prices since World War II and the causes and consequences of instability, it is of interest to examine the commodity policies that different countries have adopted. Advanced country policies shall be considered in this section and LDC policies in the following one.

Commodity policies should not be analyzed with reference only to the question of instability, but rather, as both Johnson and Pincus have shown, in a much broader context.[10] For example, temperate zone agricultural products (food and feed grains, sugar, dairy products, and meat) have been subject to quantitative restrictions on imports or equivalent price-raising charges in advanced country import markets. Similarly, until recently, there have been restrictions on agricultural output especially in the U.S. as an adjunct of the domestic price support program. This in turn engendered an elaborate system of export subsidies whereby substantial amounts of food and feed grains in particular were sold on concessional terms to LDC's or given away outright. Changes in U.S. legislation and the upsurge in world market prices have changed this situation remarkably.

Besides temperate-zone agricultural products, the U.S. and other advanced countries have adopted protective measures on a number of other imported products that compete with domestic production. Examples here include state monopolies, quantitative controls, and bilateral agreements involving international trade in tobacco. In the case of the U.S., certain vegetable oil seeds and oils, such as peanuts and flaxseed, are subject to heavy import duties. The U.S. also has imposed tariffs and/or quotas for ostensibly protective purposes on such commodities as cotton, wool, nonferrous metals, and petroleum.

Advanced country commodity policies have been restrictive, furthermore, with respect to certain imported tropical agricultural products even when there have been no closely related domestic substitutes involved. Thus, in Western Europe especially, substantial excise taxes have been imposed on the consumption of coffee, cocoa, and bananas. Also, the Common Market preferential system has

10 See Harry G. Johnson, *Economic Policies Toward Less Developed Countries* (The Brookings Institution, 1967) and John Pincus, *Trade, Aid and Development* (McGraw-Hill, 1967).

favored the Associated Overseas Territories (mainly African countries) with respect to tropical products, with possible trade diverting effects on other supplying countries.

Advanced country commodity policies have also had a marked influence on the composition of trade because of the substantial effective protection that their escalated tariff structures have afforded to the domestic processing of primary commodities. That is, while imports of primary commodities in unprocessed form are subject to zero or relatively low tariffs in advanced country markets, tariffs are escalated depending on the stage of processing of the materials. This effective protection on processing tends especially to bias LDC commodity exports towards unprocessed form.

Finally, we may note that the U.S. in particular has accumulated stockpiles of various commodities, especially nonferrous metals and natural rubber, during the postwar period for strategic reasons. On occasion, when the stockpiles have grown too large relative to potential needs, the U.S. has released supplies to the commercial market, thereby encountering complaints from exporting countries. There have been other instances in which the U.S. authorities have indicated an intention or actually used stockpile releases for stabilization purposes, again to the displeasure of competing suppliers.

As mentioned above, the U.S. accumulated sizable carryovers of food and feed grains as a consequence of its agricultural price-support program. A substantial proportion of these carryovers was disposed of through concessionary sales and outright gifts under P.L. 480 to several LDC's. Recent market changes have virtually depleted U.S. government-held stocks, and pressures are being exerted to restore the level of these stocks, if necessary even at the expense of commercial sales, in order to mitigate inflationary influences domestically within the U.S. and to assist LDC's that are experiencing shortfalls in their total food availability for domestic consumption.

It should be evident from our discussion that advanced country commodity policies have a variety of motives, which involve the protection of domestic producers of similar and related products, sumptuary taxation, the protection of domestic processing industries, and the accumulation and release of U.S. government-owned stockpiles to achieve objectives of national strategy, assistance to poor countries, and domestic price stabilization. The policies involving protection clearly tend to restrict the export volumes and lower the prices received by foreign suppliers. Moreover, to the extent that

protective policies are adopted to avoid or ease the burden of adjustment of domestic producers to changing conditions, the result will be to increase market instability for other primary commodity producers. The effective protection on processing reduces the potential export earnings of primary producers, and it may also aggravate market instability to the extent that processing might provide more flexibility and opportunities for diversification. Stokpile changes and surplus disposal may have adverse effects on competing suppliers even though some countries may benefit from receipt of the commodities. But these latter benefits are not clear if reliance on concessional or outright assistance has created disincentives to the expansion of output and improvement of agricultural efficiency in the recipient countries.

LDC Commodity Policies

Just as in the case of the advanced countries, the commodity policies of the LDC's have been designed for several different objectives. Since foreign trade is so important in many LDC's and can be subjected to closer scrutiny and control than many domestic economic activities, it has been common to concentrate government fiscal measures on the export sector. This has been accomplished by such means as export taxes, multiple exchange rates, and marketing boards that purchased the commodities domestically and sold them in world markets. In cases where a single country or group of countries have supplied a substantial proportion of the world market, the fiscal measures have been designed with a monopolistic intent.

Since it has appeared administratively more convenient to generate government revenues via the foreign sector than by domestic fiscal measures, LDC authorities have often been in a position to use the revenues involved for expenditure purposes elsewhere in the economy. Thus, in many instances, LDC governments have followed policies of import substitution at the expense of the export sector. That is, the encouragement of import substitution worked by creating disincentives to the further expansion of production for export. In some countries like India and Pakistan, import substitution was financed in part by surplus commodity aid and other concessional assistance. Improvements in agricultural efficiency were not accorded primary importance under these circumstances. The point to be made then is that commodity policies in LDC's cannot be considered

independently of other policies. To the extent that LDC policies have constrained the primary producing sectors, these sectors may have become relatively more vulnerable to short-term supply and demand variations.

We have mentioned that individual countries and groups of countries have attempted to exercise monopoly power in instances where they control a substantial proportion of world output and exports. The OPEC countries have provided the most striking example of success in this regard. There have been movements among producers of other commodities, such as bauxite, copper, and bananas, that are designed to emulate the success of OPEC. The question naturally arises as to the conditions that will foster monopolization as an objective of commodity policy.

The conditions that appear most favorable to monopolization are: (a) a relatively inelastic demand over the price range being sought by restriction; (b) prices that can be supported individually rather than requiring joint control over several commodities or grades of commodities; and (c) existence of effective national and international marketing and control systems. Petroleum appears to meet these conditions, perhaps all too well. It is by no means clear, however, that there are many other likely candidates. LDC's that embark upon individual or joint efforts to enhance their monopoly power in particular commodities may thus be disappointed in the outcome. At the same time, it is difficult to fault them for trying to exercise monopoly power in view especially of the restrictive commodity policies that many advanced countries have followed.

International Commodity Agreements

Having looked at national policies, it seems fitting that we consider the policies that have become embodied in international commodity agreements (ICA's). ICA's have a long history, going back to the 1920's, and they have been given much attention especially during periods of falling prices as a possible means of stabilizing prices. Yet, it is noteworthy that, since World War II, ICA's were concluded for only five commodities: wheat, sugar, coffee, tin, and olive oil.

The olive oil agreement has been mainly advisory and was designed to help coordinate national policies rather than to influence

world prices and trade. The sugar agreement was always limited in coverage because of preferential arrangements, and it became inoperative at times when member countries could not establish mutually satisfactory quotas. The wheat agreement lacked an effective mechanism to obligate consuming countries to buy specified quantities at a guaranteed minimum, and, in any event, the agreement was undermined by the price-maintenance policies of the U.S. and Canada in conjunction with the operation of the U.S. surplus disposal programs. The tin agreement, which was operated by means of a buffer stock and export controls, was unable to function smoothly in periods of sharp price declines and increases. The same has been true of the coffee agreement, which was based upon a system of variable export quotas.

Given these experiences, it is difficult to summon up great enthusiasm for ICA's. To begin with, ICA's are difficult to negotiate because countries view them with a multiplicity of objectives, including market stabilization, increased export earnings, mitigation of the impact of secular change or to increase protection in importing countries, and the organization of markets on a comprehensive worldwide scale. Given this multiplicity of objectives, there will be inevitable divergence of interests among and between producing and consuming countries, which will make agreements practically impossible to negotiate unless the consuming countries deliberately act against their own economic interests.

Second, each of the main types of ICA's involves weaknesses that may make them difficult or perhaps impossible to negotiate or implement. Thus, for example, multilateral contracts, as in the wheat agreement, and buffer stocks, as in the tin agreement, require accurate forecasting of price trends. It is quite conceivable, as happened in the tin agreement, that the buffer-stock financing could be exhausted by a protracted price decline that was not fully anticipated. Export-restriction schemes, as in the coffee agreement, assume that countries can control production or operate stockpiles effectively. These schemes also run the risk of being undermined by outside competitors unless the importing countries agree to police the restrictions.

Third, the technical and economic characteristics of primary commodities may make an agreement unworkable. It is apparent that a buffer-stock arrangement could be operated successfully only if commodities are homogeneous and can be stored relatively cheaply.

One might think that commodities like coffee, wheat, or tea would be likely candidates for agreement. But the fact is that even these ostensibly homogeneous commodities come in several different grades and varieties, and their price relationships may be altered significantly in response to changes in taste or technology. A good illustration of this can be found in the shift from Brazilian arabica coffee to African robustas and the shift from ground to instant preparations. Moreover, many ostensibly heterogeneous commodities may in fact be highly substitutable as inputs in production, as in the case of oil seeds and animal fat and fish oil used to produce edible oils and in the case of nonferrous metals. Also, many commodities face close competition with synthetic substitutes.

Finally, we should note the complexity of trade relationships. There are commodities produced and traded primarily among advanced countries, commodities produced and traded primarily among LDC's, and commodities that move mainly between advanced countries and LDC's. This suggests that parties may find it difficult to find a common ground for negotiating purposes, and that national interests might be better served by bilateral negotiations or by dealings in an unencumbered world market.

The upshot of our discussion is that ICA's pose too many problems for negotiations and operation to offer much hope in dealing with problems of instability in a comprehensive way. Nations may find their interests better served if they concentrate their efforts on the expansion and diversification of foodstuffs and raw material output and processing and on the development of more effective domestic policies to improve resource allocation and macroeconomic stability.

Implications for Research and Policy

More work certainly needs to be done on the measurement and analysis of the causes and consequences of commodity instability. Our approach of trend fitting and inspection of deviations from trend can be readily extended to other aspects of commodity behavior, particularly with respect to variations in quantity and the value of production and trade. The analysis of commodities should be incorporated into a country framework as well because we know that instability may be influenced importantly by intercountry variations

in the composition and geographical distribution of exports and the degree of openness in terms of the overall dependence on foreign trade.

With additional research, we could then calculate more comprehensive and up-to-date instability indexes and seek to determine by multivariate analysis how the various factors mentioned in our discussion have influenced instability. In this same connection, it would be interesting to pursue further analytical models of the impact of instability particularly in LDC's and to conduct empirical investigations with reference especially to how these countries have assimilated the impact of the recent upsurge in commodity prices on both the export and import sides.

While the drawing of policy implications from our analysis is to some extent a matter of judgment, the evidence presented on commodity-price trend and cyclical movements suggests that the price levels reached in 1973-74 for many commodities were due to the combination of rather unusual circumstances on both the demand and supply sides. Indeed, there has been a marked reversal for many commodities already in response especially to the weakening of demand conditions in the advanced countries. Under present conditions, short-term policies designed to deal specifically with commodities may therefore be ill advised. It would be preferable in both producing and consuming countries to rely upon a combination of macroeconomic stabilization policies, international borrowing, and exchange-rate adjustment in order to mitigate the effects of inflation and unemployment domestically, and to use domestic fiscal policies to deal with the adverse distributional effects that commodity-price changes may have on different income groups.

The situation is less clearcut, however, for commodities that are subjected to monopoly pricing. We may observe parenthetically that one should not be overly critical of LDC efforts of this kind without being cognizant of the restrictive policies that advanced countries have followed with respect to temperate-zone foodstuffs and raw materials that compete directly or indirectly with products produced and exported by LDC's. By the same token, it is doubtful whether there are in fact very many commodities that lend themselves readily to monopolization because they may be relatively price elastic and because it may be difficult to enforce joint policies with respect to prices and output. The apparent success of OPEC may then be an exception rather than the rule, and, even with petroleum, it may

only be a matter of time before the price structure begins to weaken perceptibly due to conflicting interests among the producing countries and the market adjustments in the consuming countries.

Petroleum aside, the view just expressed is based upon the apparent difficulties that have been encountered in trying to negotiate and to implement international commodity agreements in the past twenty-five years. One can count the number of actual agreements on one hand. And to point to conspicuous examples of success in the operation of any of these agreements would indeed be stretching matters. Under the circumstances, it is difficult to be very enthusiastic for international agreements on commodities unless producing and consuming countries are prepared at times to act contrary to their self interests. Past experience suggests that these occasions are rare.

A more promising approach would be to consider commodity problems in the context of the commercial policy relationships among and between the advanced countries and LDC's. Thus, for example, there are evident conflicts in policies among the advanced countries with regard to temperate-zone foodstuffs that could be addressed if the European Community were willing. Furthermore, advanced country policies have frequently been adverse to the interests of LDC's, especially on matters of restricting market access and the effective protection of processing. It would appear that the Multilateral Trade Negotiations still underway under GATT auspices in Geneva provide a unique opportunity for effecting changes in tariffs and other aspects of commercial policy because these negotiations could furnish the *quid pro quo* that has been so elusive when pursued especially in more limited discussions of international commodity arrangements.

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RESULTS OF LOGARITHMIC TREND FUNCTIONS FITTED TO ANNUAL COMMODITY-PRICE SERIES, 1948-75 — TABLE 1

	Trend Coefficient [a]	Instability Index [b]
Tropical products		
Coffee	−.001	.060
Cocoa	.033	.085
Tea	−.006	.044
Sugar	.087 *	.137
Bananas	−.001	.016
Food grains and feedstuffs		
Rice	.050 **	.069
Wheat	.072 ***	.065
Corn	.008	.075
Fishmeal	.076 ***	.075
Meat and dairy products		
Meat	.036 **	.046
Lamb	.042 ***	.041
Butter	.023 **	.040
Tobacco [c]	.037	.078
Oilseeds and oils		
Soybeans	.039 **	.054
Copra	.012	.064
Palmnut oil	.023	.060
Groundnut oil	.088 ***	.079
Linseed oil	.071 **	.101
Fibres		
Cotton [d]	.090 ***	.078
Wool	.001	.058
Jute	.021 ***	.039
Sisal	.065	.099
Rubber	−.014	.060
Forest products		
Woodpulp	.028 **	.046
Lumber	.085 ***	.049
Metals		
Zinc	.055 *	.090
Tin	.053 ***	.050
Copper	.042 ***	.056
Lead	.033	.072
Aluminum	.037 ***	.030
Iron Ore [e]	.000	.031
Phosphates [f]	.039	.066
Petroleum [g]	.099 **	.089

* Significant at .10 level; ** at .05 level; *** .01 level.

[a] To obtain these values, we first fitted a trend function of the form, $\log P_t = a + bt + e$, where P_t is the price index (1970 = 100) for year t, t is time, and e is the residual. Since, in this formulation, there was evidence of high positive correlation in the residuals, we applied a single-stage, semidifference formulation to remove the autocorrelation. This took the form: $\log P_t - \hat{p} \log P_{t-1} = a_1(1-\hat{p}) + b_1[t-\hat{p}(t-1)] + e_1$, where $\hat{p}$ is the coefficient of autocorrelation, calculated as $1 - DW/2$, and DW refers to the Durbin-Watson statistic. The corrected trend values reported in the table are the coefficients, b_1.

[b] The instability index has been calculated as the standard error of estimate of the fitted (uncorrected) trend function divided by the mean value of the dependent variable.

[c] Series covers 1948-74. [d] Series covers 1951-75. [e] Series covers 1954-74. [f] Series covers 1950-75. [g] Series covers 1950-75.

SOURCE: Based upon data published in World Bank, *Commodity Trade and Price Trends* (1974 Edition), Report No. EC-166 174 (August 1974) and IMF, *International Financial Statistics*, 1972 Supplement and July 1975 issue.

FIGURE 1

PRIMARY COMMODITY PRICES
ABSOLUTE DEVIATIONS FROM LOGARITHMIC TREND, 1948-1975

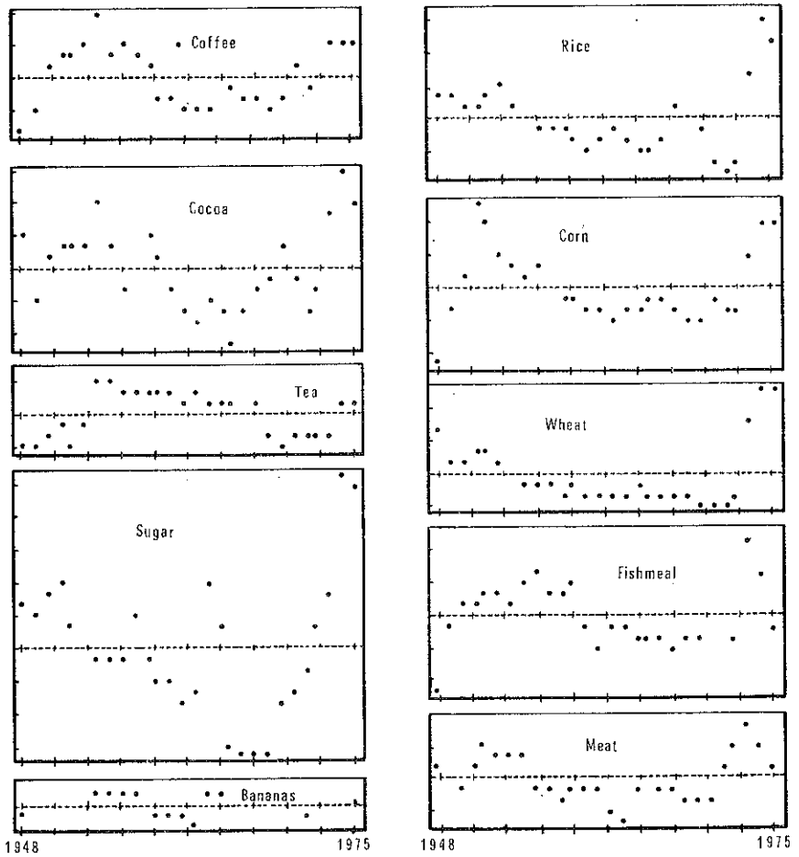


FIGURE 1 (Continued)

PRIMARY COMMODITY PRICES
ABSOLUTE DEVIATIONS FROM LOGARITHMIC TREND, 1948-1975

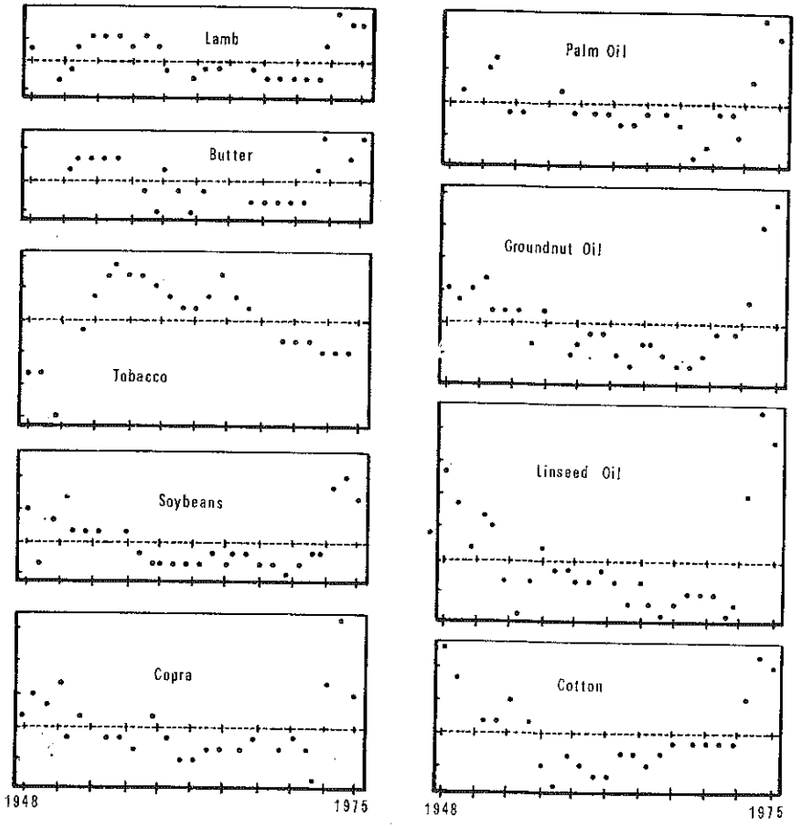


FIGURE 1 (Continued)

PRIMARY COMMODITY PRICES
ABSOLUTE DEVIATIONS FROM LOGARITHMIC TREND, 1948-1975

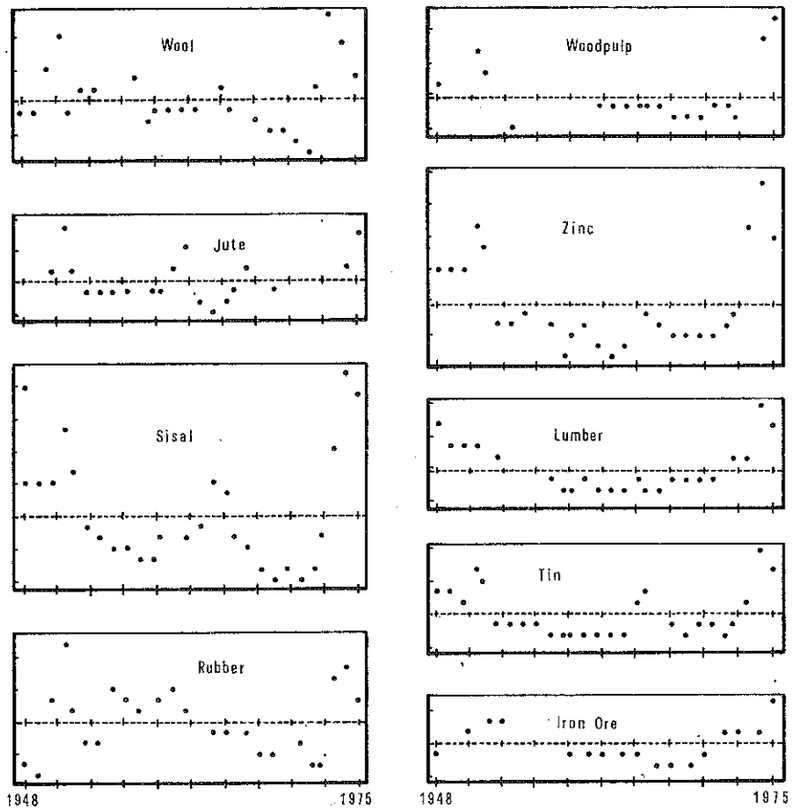
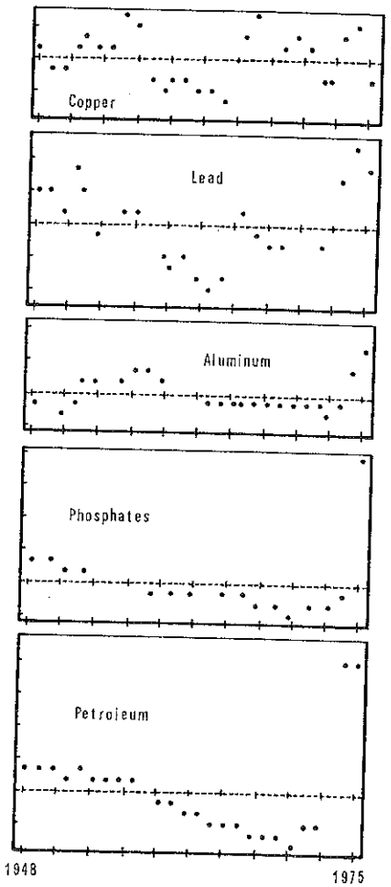


FIGURE 1 (Continued)

PRIMARY COMMODITY PRICES
ABSOLUTE DEVIATIONS FROM LOGARITHMIC TREND, 1948-1975



NOTE: The vertical axes refer to the deviations between the actual values and the trend values estimated on the basis of the equation: $\log P_t = a + bt + e$, where P_t is the price index (1970 = 100) for year t, t is time, and e is the residual. The equation was estimated using natural logarithms. The horizontal axis is measured in units of 2.7 years, beginning in 1948 and ending in 1975. Each asterisk refers to a year, except when the actual and estimated values coincided and were not plotted therefore on the zero line. For data sources, see Table 1.