

Commodity Price Stabilization and Economic Growth

Jaleel Ahmad*

This paper analyzes the probable consequences of commodity price stabilization proposals for long-run growth and change in primary producing countries. In particular, the focus is on the link between commodity producing sectors on the one hand, and other traded and non-traded sectors on the other. A simple two-sector framework investigates the medium and long-run effects of the asymmetric growth of primary exports on the viability and future development of pre-export processing of raw materials. The model analyzes the inter-sectoral movement of resources following price stabilization and traces the associated income and consumption effects. The discussion of medium-term resource movement effect is followed by a discussion of long-run effects on economic growth and welfare.

I. Introduction

Recent proposals for primary commodity price stabilization and price enhancement (indexation) through buffer stocks have been the subject of a number of theoretical and empirical studies. However, the probable consequences of these proposals for long-run growth and structural change in primary producing countries have received little or no attention. The pre-occupation with partial equilibrium price and income effects of stabilization and indexing of commodity prices have tended to preclude attention to their macroeconomic and sectoral implications. The only notable attempt at incorporating the inter-sectoral linkages is in the context of a comparison between buffer stocks and export quotas by Dick, *et al* (1982). However, sectoral implications in their paper are analyzed in a single-period, comparative static framework, which yields quantitative estimates of the once-and-for-all effects on the GDP. While this

* Professor, Department of Economics, Concordia University.

framework provides useful insights into efficiency effects of commodity price indexation relative to those of an export quota, the long-run cumulative consequences on the structure of production and the prospects of economic growth are not pursued.

An implicit assumption underlying the approaches utilized in the study of price stabilization and indexing of commodity prices is that such measures are unaccompanied by a change in the structure of production and its relative composition, and hence the latter is assumed to remain constant over time. If this were indeed true, any concern with problems of structural composition and economic development would be unjustified. But such a conclusion is unwarranted in view of the experience learnt from previous attempts to regulate the prices of primary commodities in international trade.¹ It is evident that the effects of commodity price stabilization transcend its direct and immediate outcomes for commodity producing sectors, and need to be analyzed in a broader framework. It is, therefore, necessary to explicitly incorporate the linkage between commodity producing sectors and other traded and non-traded goods sectors. In particular, it is necessary to formulate clear hypotheses with respect to ensuing resource movements, the distribution of national income across sectors, and the complexion of future economic growth.

The purpose of the present paper is to shed light on some of the longer-run perspectives that are eclipsed by the aggregative, short-run effects of price stabilization on the GDP. In particular, the major concern of the paper is with the medium- and long-run effects of the asymmetric growth of primary export sectors on the viability and development of pre-export processing of raw materials. The simple framework developed in this study enables one to separate short-run and long-run effects, and to bring into focus a number of issues that directly or indirectly impinge on growth implications of the primary commodity price stabilization and indexation proposals.²

¹ For an analysis of historical experience with attempts to stabilize, raise, or otherwise regulate primary commodity prices, see Lewis (1977).

² Price stabilization and indexation scenario assumed in this paper is the one proposed in the UNCTAD Integrated Program for the Core Commodities. The program rests on the establishment of an internationally-owned common buffer stock covering ten "core" commodities, a common financing fund for the acquisition of stocks, a commitment to purchase and sell at administered prices, and presumably a direct indexing of these prices to some composite average price index of manufactures, with the express purpose of changing the world relative prices. The core commodities are cocoa, sugar, coffee, hard fibers, jute, cotton, rubber, copper, and tin. The financing of the buffer stock was originally estimated to cost \$6 billion. This figure has been repeatedly revised downward, due to difficulties in mobilizing resources of this order. For details, see UNCTAD (1974, 1976).

The plan of the paper is as follows. Section II analyzes the intersectoral movement of resources following price stabilization, and the associated income and consumption effects. Section III considers the effects of changes in the terms of trade on economic growth and welfare. A final section brings together the main conclusions.

II. Resource Movement Effects

In analyzing the production and consumption effects of primary commodity price stabilization and indexation, we assume a small, open, developing economy producing two tradable goods — primary commodities and “processing” of raw materials, both of which are traded at given world prices. The economy also produces another consumption good — termed for simplicity as the non-tradable or services — which is the only consumption good in this simplified economy. The imports from the rest-of-the-world consist exclusively of intermediate goods that do not directly enter the consumer utility function. We assume further that, while the production of primary commodities and of processing requires both capital and labor in some specified though variable proportions, the non-tradables are produced only with inputs of labor. Both labor and capital are assumed to be “non-specific,” and freely mobile between sectors. Our chief concern is with the effect of price stabilization and indexation in commodity sectors on the relative profitability and size of the two tradable sectors, and subsidiary effects on real income, consumption, factor prices, and the future shape of economic growth.

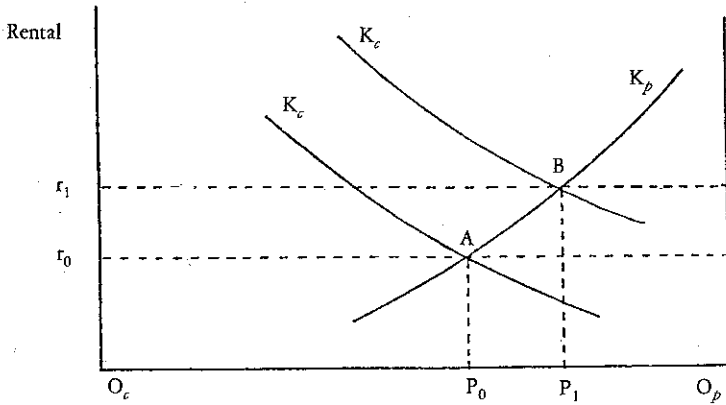
We begin by considering the short-run production and consumption effects of changing relative prices and terms of trade on the three sectors included in the analysis. The *production effect* is reflected in the intersectoral movements of labor and capital due to a change in the marginal product of factors employed in the two tradable goods sectors. The *consumption effect* is simply the change in real income and consequent shifts in the demand for non-tradables. Changes in imports signify changes in production *capacity* and have no direct influence either on resource pulls or consumption. ϵ .

Suppose that the buffer stock authority pursues its price targets by undertaking some form of market intervention (stock accumulation) for stabilizing the price of particular commodities, with reference either to a normalized trend of the commodity price index or a movement in the index of manufactured goods prices imported by the commodity-producing countries. The increase in the relative price of primary commodities, however induced, gives rise to shifts in factor demands and adjustments in

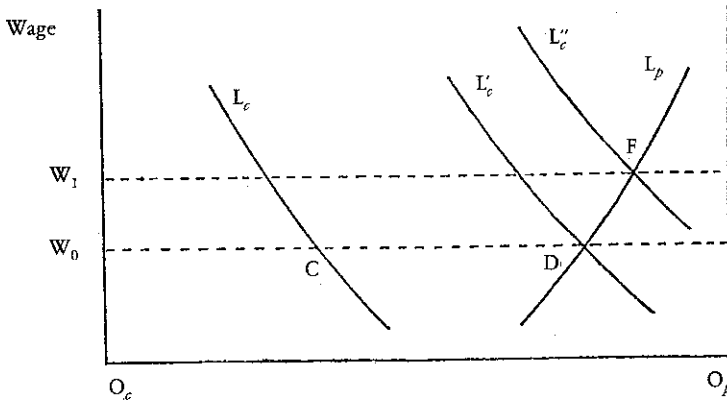
the markets for labor and capital. Figure 1 (a) depicts the capital market, with the rental for the use of capital measured on the vertical axis, and the total supply of capital measured by the horizontal segment $O_c O_p$. Capital inputs into commodity sector are measured from the origin O_c , while the distance to the left of O_p measures capital inputs into processing. It is assumed that the demand for capital in each sector is a decreasing function of its rental, relative to the given output price.

Figure 1

(a) Capital Investment



(b) Labor Employment



K_c is the demand curve for capital allocation to the commodity sector at the pre-stabilization goods price ratio. Similarly, K_p is the demand schedule for capital employment in the processing sector for the same product price ratio. Initial equilibrium with full utilization of capital is given at A, where the two factor demand curves intersect at the rental rate r_0 .

By analogous reasoning, we obtain the labor demand schedules for commodity production and for processing as L_c and L_p , respectively, in panel (b). The only difference is that, unlike capital, we assume unemployment of labor. Initially, employment of labor in commodity and in processing is determined at points C and D respectively, where the factor demand schedules intersect the line w_0 , which signifies the prevailing wage rate.³ The level of initial unemployment is, therefore, given by the segment CD.

The production effect is reflected in the ability of the commodity producing sectors to draw resources away from other sectors, due to a rise in the marginal product of factors employed in producing primary commodities. It should be noted that the production effect of price stabilization works in exactly the same way as price enhancement, viz., an increase in profitability of production, and hence demand for factors at given product and factor prices.⁴ As a result, commodity sector's demand schedule for capital shifts upwards to K'_c , and a new equilibrium is attained at B. At B, the rise in the price of capital to r_1 causes capital to shift out of the processing sector. This "resource pull" results in a fall in capital investment in the processing sector from O_pP_0 to O_pP_1 , and a rise in the commodity sector from O_cP_0 to O_cP_1 in panel (a).

The resource pull has the same potential implication for labor employment in panel (b). However, due to the presence of initial unemployment, an upward shift of the commodities' labor demand schedule to L'_c need not raise the wage rate. Only if the commodity sector's labor demand schedule continues to shift upwards, for instance to L''_c , will the wage rate rise to w_1 . In reality, the stability of the wage rate w_0 may persist beyond D, because the reduction of output in the processing sector would effectively shift the L_p curve in panel (b) downward. Nevertheless, national income rises with a correspondingly higher production of commodities than of processing.

³ Wage rate w_0 is not a market-clearing wage, however. It may be appropriately viewed as a minimum wage, possibly determined by institutional considerations.

⁴ If it is true that investment and production in commodity sectors are constrained by price stability, the latter should serve to raise the profitability by eliminating planning uncertainties. In any case, stock accumulation phase of the buffer stock operation is synonymous with a rise in the relative price of the sector's output, and should have the same effect as indexation.

A. Consumption Effect

The consumption effect of commodity price stabilization and indexation arises from the impact of a rising national income on the real wage and the demand for non-tradables. Due to the production effect analyzed in Figure 1, price stabilization and indexing lead to a rise in the national income in the short run. Whether the rise in national income translates into a rise in real income depends on the real wage measured in terms of non-tradables.⁵ Since the production of non-tradables requires only labor inputs which are in excess supply (panel b, Figure 1), the production effect in tradable sectors need not lower the output of non-tradables. Hence, the attainment of price targets does indeed lead to a rise in real income. In fact, the output of non-tradables can rise in the short run, in accordance with the income consumption path, and without a rise in price.

But successive increases in real income and demand along the income-consumption curve produce an excess demand for non-tradables, and hence a rise in their price. Given a positive income elasticity of demand for non-tradables, their prices and outputs would necessarily rise in the long run. The long-run consumption effect, therefore, is likely to lead to a fall in real wages measured in terms of non-tradables. The labor demand schedule for non-tradables in Figure 1 (not drawn) will shift upward and indirectly lead to a further fall in the output of the processing sector. This conclusion rests on the assumption that non-tradables are the only consumption good, and may have to be modified in a more comprehensive model which includes imports as consumption goods as well. Then, and depending on the constancy of the improved barter terms of trade, real wage need not fall. However, if the trade balance deteriorates because of (a) a fall in the output of processing, or (b) a continuing rise in the domestic demand for imports, the fall in the real wage again becomes likely.

B. Effects on Factor Income and Its Distribution

The effects on factor income depend on changes in factor utilization and their prices. It is clear that the short-run production effect raises the profitability of factor use in the commodity sector, while lowering it in the processing sector. As a result, the return to factor specific to each of the sectors will rise or fall, depending on the direction of change in the profitability. If commodity production is relatively capital-intensive and processing labor-intensive, then the return to capital is likely to rise in ab-

⁵ We assume that the exchange rate remains fixed through the actions of the central bank.

solute terms, while the return to labor is likely to fall.⁶ The opposite would be the case, if factor proportions are reverse. As far as consumption effect is concerned, it must raise the profitability of labor employment in the production of non-tradables, and is likely to put an upward pressure on wages. The ultimate effect on wages and rentals would depend on the relative strength of the production and consumption effects.

The resulting distribution of income between capital and labor is not quite straight-forward. The answer requires a precise specification of relative factor intensities in all three sectors, and the extent of factor substitution in each as factor prices change. If technology is to be introduced into the analysis, there may be a large number of possible configurations of relative factor prices and factor intensities. If commodity sectors are assumed to be relatively labor-intensive, a rise in the price of their output will raise the wage rate, and with it the capital-intensity of both sectors. The distribution of income will move in favor of wage-earners, both in relative and absolute terms.⁷ The improving distribution of income in favor of labor is reinforced by the consumption effect which raises the price of non-tradables. If, on the other hand, commodity sectors are assumed to be capital-intensive, the effect on distribution of income is ambiguous. The production effect alone would tend to move the distribution of income in favor of the owners of capital, while the consumption effect would tend to pull it in the opposite direction. The net effect depends on the relative magnitude of the two contrary effects. Furthermore, if capital investments in commodity producing sectors are foreign-owned, as is very likely, the distribution of income may even reduce the gains from trade.⁸

III. Inter-Sectoral Allocation and Economic Growth

The effects on resource movements analyzed in the preceding section are necessarily static and signify once-and-for-all changes in the allocation of resources. But the cumulative processes that they generate are bound to have more permanent repercussions on the structure of production and on future economic growth. The subject of economic growth is one of the

⁶ There appears to be no *a priori* grounds for assuming either a lower or a higher capital-intensity in the commodity producing sectors, relative to processing activities. In a number of significant cases, production of primary commodities is relatively more capital-intensive per unit of output than processing, e.g., bauxite mining as compared to production of alumina.

⁷ This is in accord with the Stolper-Samuelson theorem.

⁸ See Bhagwati and Brecher (1980).

least-developed areas of economic analysis, in particular because of the implicit assumption that one single composite commodity (e.g., GDP) is produced which is characterized by fixed and invariable composition through time.⁹ For our particular purpose, the assumption of invariance of relative composition of the economy is clearly unsatisfactory. The effects of changing profitabilities and resource movements on the *structure* of the economy have to be brought into the analysis.

In order to concentrate on the structure of the economy, it is necessary to translate the resource pulls in the factor space into output space. $T_0 T_0$ in Figure 2 represents the transformation surface between the two tradable goods, viz., commodities and processing. The "distorted" relative prices before stabilization and indexation are indicated by the slope of the line P_0 , which reflects the distortion in producer prices due to planning uncertainties arising from price fluctuations and possibly a negative trend in barter terms of trade.¹⁰ Initially, production is assumed to take place inside the transformation surface at a point such as Q_0 , because of the unemployment of labor in panel (b) of Figure 1. The resource pulls discussed in the preceding section imply that the short-run effect of commodity price stabilization and indexing is to shift the locus of production from Q_0 to Q_1 . The change in the relative prices to p_1 has a beneficial effect in moving the production to the efficiency frontier.¹¹ Welfare through trade (by importing the desired intermediate products) is maximized at w_1 . It is clear that accumulation through trade will increase the production capacity in commodity producing sectors.

The growth of the economy over time is portrayed by an outward and symmetrical shift of the transformation surface to $T_1 T_1$.¹² The cumulative effect of sustained resource movements through time leads to the new, long-run production equilibrium at Q_2 . The economy has a higher ratio of commodity output to the output of processing at Q_2 than at Q_1 and, as a result, the structure of the economy has undergone a change. The sustained rise in the profitability of production and resource movement into

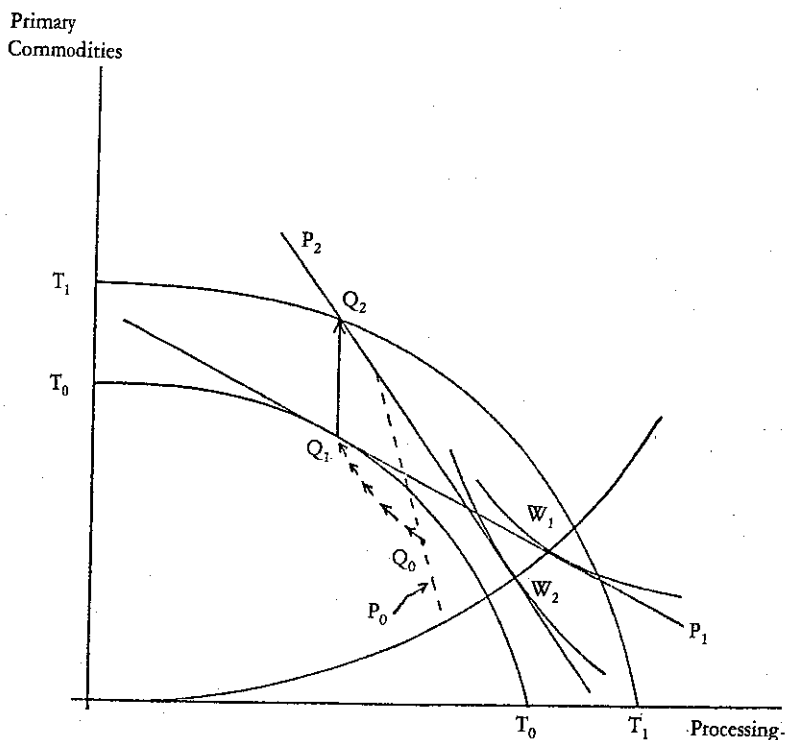
⁹ For a recent criticism of the treatment of economic growth, see Pasinetti (1981). Pasinetti argues that the expansion of the economic system without a change in its relative composition through time is not only unlikely, it is impossible.

¹⁰ The instability of prices that reduces the profitability of production is effectively a form of price distortion.

¹¹ This is precisely the efficiency gains reflected in an increase in the real GDP that Dick, *et al.* (1982) have measured for Ivory Coast and Kenya through indexation of core commodities exported by them.

¹² A sustained rise in total productivity works like a Hicks-neutral technical change and implies an asymmetric shift of the transformation surface. We do not pursue that line of reasoning in this paper. Nevertheless, the effects of the asymmetric shift in the transformation surface are broadly similar and merely reinforce the conclusions of our analysis.

Figure 2



commodity producing sectors impart a "bias" to economic growth, in the sense that the output of the other tradable sector does not increase.

If the relative prices implied by P_1 can be sustained in the long-run, economic growth as such would seem to present no problem. This is probably the case which the proponents of the commodity program have in mind. But the hypothesis embodied in this case of economic growth which is neutral to the changes in economic structure does not correspond even roughly to what in the long run is happening in the real world. A sustained rise in the output of the commodity sector makes it unlikely that its relative price can be maintained for long at the ratio given by P_1 .¹³

¹³ A great deal of available evidence suggests that efforts to raise commodity prices in the past have resulted in a large increase in supply. See, for instance, Lewis (1977). The increases in supply are due to both expanded production by established producers well as to influx of new producers.

By increasing the production of commodity sector, one is back at the original problem, i.e., a supply-created price instability. Furthermore, it reinforces the dependence of economic growth on a narrow range of commodity exports.

It should also be noted that it would generally not be possible to raise commodity prices above their normal market-determined levels by buffer stock operations, without the buffer stock agency running out of resources to finance ever-increasing levels of stocks over time. In reality, the fact that available financial resources for buffer stock operations are limited and that the costs of storing large stocks of commodities are high means that their prices cannot be raised appreciably without an export quota or a cut in production by some other means. An additional factor is that commodity price increases inevitably lead to the development of synthetic substitutes in consuming countries and, therefore, increase the price elasticity of demand.

Therefore, buffer stock operations are unlikely to be effective either in eliminating the price fluctuations or in keeping prices higher than their market levels for any duration other than the short-run. In fact, whatever limited effectiveness they have in the short run is likely to be undermined in the long-run precisely by their success in maintaining higher prices which results in an influx of resources into commodity sectors. In the long run, the change in the structure of the economy, more than the failure of buffer stock operations, implies a more permanent shift in relative prices, such as the one depicted by P_2 . In that case, economic growth based on expansion of commodity sectors leads to a lowering of welfare at W_2 .

IV. Concluding Remarks

The production effects of price stabilization and indexing of primary commodity prices in this model have a strong presumption in favor of a negative impact on the viability and future growth of processing and other tradable sectors. While the lessening of production risks and uncertainties in the commodity sector would confer short-run gains in real income and consumption, at the same time stronger incentives are created to increase the level of investment and employment in those sectors. The situation may be preferable to the one in which wide fluctuations and extreme instability prevailed, but those little to prompt a shift to resources toward a more diversified and balanced structure of production. The future growth of the economy comes to depend more than ever exclusively on the commodity sector, and the vulnerability to price fluctuations is increased rather than diminished. For these reasons, the implications of the pursuit

of target prices through buffer stocks for economic growth in producing countries are uniformly negative.

While the terms-of-trade gain is likely to have a favourable impact on national income, it would also strengthen the forces that tend to concentrate the production factors in commodity sectors. If fluctuations in particular commodity prices are deemed undesirable, the correct policy would call for diversification of exports, at least partially, towards products with lesser fluctuations or with fluctuations that are not synchronized. It would seem, therefore, that purely financial measures to deal with temporary instability in foreign exchange earnings, such as the IMF Compensatory Financing facility and the EEC's Stabex scheme, are preferable in so far as they are not linked to maintenance of any particular production structure.

References

- Bhagwati, J. and R. Brecher, "National Welfare in an Open Economy in the Presence of Foreign-Owned Factors of Production," *Journal of International Economics*, 10, 7, 1980.
- Dick, H., et. al., "Indexation of UNCTAD Core Commodity Prices by Buffer Stocks or Export Quotas," *Journal of Development Economics*, 11, 1982, 379-401.
- Lewis, A., *The Evolution of the International Economic Order*, Princeton University Press, 1977.
- Pasinetti, L., *Economic Growth and Structural Change*, Cambridge University Press, 1981.
- UNCTAD, "An Integrated Programme for Commodities: The Role of International Buffer Stocks," TD/B/C.7/166, Suppl. 7, and TD/B/C.7/166, Suppl. 7/Add. 7, December 1974.
- , "Consideration of Issues Relating to Establishment and Operation of a Common Fund," TD/B/IPC/CF/2, 1976.

