WHY AND HOW TO STABILIZE PRODUCER PRICES FOR EXPORT CROPS IN DEVELOPING COUNTRIES

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by

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Traditionally, most developing countries have attempted to stabilize the prices paid to producers of agricultural export products. In large part, they have done so because of the marked instability of world agricultural prices and the belief that they could not rely on international attempts to stabilize prices.

In trying to stabilize domestic producer prices, countries have followed one of two basic approaches. In some countries, a public marketing agency buys from the producer (at an official price) and sells abroad. In other countries, private operators continue to be responsible for marketing but the government or a public agency has assumed financial responsibility for stabilization, either directly (through taxation or subsidy) or through a stabilization fund. Various criticisms have been leveled at both of these types of interventions in agricultural export prices in recent years.

Large public marketing agencies, responsible for all domestic marketing operations and often for external marketing as well (and, in many areas, for rural extension or credit distribution) have proved to be inefficient. Their inefficiency was one cause of the growing tax burden on agriculture. Today, there is general agreement on the need to promote more competitive marketing systems (except in certain agroindustrial sectors, such as cotton, where this may be too difficult technically).

The financial stabilization agencies have also been criticized for their methods of operation. It is true that they have generally made producer prices less unstable than world prices -- in both nominal and real terms (prices deflated by a price index). However, at least until the early 1980s, their policies generally led to a decline in the ratio of real producer prices to real world prices. Public levies on export products have risen in periods of rising prices and the extra revenue has been allocated to finance public expenditures; as a result, funds have not been available to support producer prices when prices were falling. Stabilization systems, then, have often failed to fulfill their initial purpose and have resulted in inadequate price incentives and mediocre agricultural performance. More recently, following the sharp fall in world prices of primary products and the inability of many stabilization funds to sustain producer prices, criticism has also focused on the exorbitant cost of stabilization to the public finances of countries striving to reduce their budget deficit.

Despite these problems, many developing country governments continue to favor stabilization funds method. In contrast, many economists recommend passing world price fluctuations through to the producer (see, for example, World Bank 1987). This issue is a major area of controversy for structural adjustment policy.

This paper examines whether it is appropriate to retain financial schemes for stabilizing producer prices for agricultural export products. To that end, the paper looks at three questions:

- What are the objectives of an agricultural price policy for export crops?
- What are the main types of price policies, and what are their advantages and disadvantages in light of these objectives?
- What are the implications of a particular policy for marketing and public finance?

Answers to these questions draw on country experiences, particularly in African countries where agricultural export products are the main sources of foreign exchange earnings.
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Objectives of Agricultural Price Policy

Primary objectives

Price policy for export crops of developing countries should pursue four objectives. Frequently, the objectives are in conflict, and tradeoffs are necessary among them.

Accordance with world price trends. A first objective is to link the producer price to the long-term world price trend. The trend of producer prices, on which production depends, must not deviate for long from that of the world price. If the producer price tends to fall below the world price, the country can lose the advantage of increased production since the producer price will not provide sufficient incentive. If the price tends to deviate upward, the crop can absorb too many productive resources, with excessive production resulting; there is also a risk that this production will be unprofitable and will have to be subsidized by the rest of the economy.

It is not, therefore, economically efficient for a country to allow the domestic price relationships between its main crops to deviate from their world price relationships. This has often happened, however, as with coffee and rice in Madagascar (where rice marketing has been deregulated) or cocoa and coffee in Côte d'Ivoire (where the producer prices for both are the same even though the world price of coffee has been above that of cocoa for years).

The objective of keeping producer prices aligned with world price trends and thereby maintaining their incentive value is justified by the price sensitivity of supply of agricultural products. Many studies have supported the view that the supply of many individual agricultural export products is an increasing function of the level of real producer prices (Askari and Cummings 1977, Bond 1983, Lecaillon et al. 1987, Bonjean and Marodon 1988), even though the aggregate agricultural supply price elasticity is low (Chhibber 1988, Mellor and Ahmed 1988).

When there is an acute shortage of consumer goods in rural areas, however, a rise in producer prices may not lead to an increase in production. It may even have the reverse effect: when farmers have nothing to buy with the additional income generated by the price increase, they may work less to maintain their given level of consumer goods purchases, assuming that the prices remain fixed (see, for example, Berthelemy and Gagey 1984 and Guillaumont and Bonjean 1988). This means that remunerative prices are necessary but not sufficient to increase production. Marketing and transportation conditions must also be such that farmers can acquire consumer goods, thereby conferring utility on supplemental monetary income (see Azam and Faucher 1987, Azam and Besley 1988, and Berthelemy and Morrisson 1987).

Contribution to the national budget. A second objective of price policy concerns the contribution to the budget of taxation of agricultural exports. Since export crops constitute a substantial part of economic activity and are easy to tax, they are an important source of revenue for hard-pressed governments. However,
taxation of exports may conflict with the principle that the tax system should not discourage exports. In particular, indirect taxation based on export value should be avoided in favor of direct taxation of income from export-related activities. But it is difficult to tax farmers directly, so government levies on agricultural exports often represent a substitute for income tax.\(^2\)

There is a tradeoff, then, between the short-term financial objective, which leads to an increase in the rate of taxation, and the long-term economic and financial objective of raising the level of economic activity (and consequently the tax base). In any case, if the tax rate is excessive, total revenue will diminish because of the elasticity of agricultural supply to prices. There exists a threshold point beyond which further taxation leads to more than a proportional diminution of the tax base (the Laffer curve effect). In other words, an increase in the tax rate for agricultural export products increases fiscal receipts only as long as the relationship between the producer price and the world price does not fall below the level \(e/(1 + e)\), where \(e\) is the price elasticity of supply.\(^2\) In fact, the threshold is relatively low, which seems to make a relatively high tax rate possible: with an elasticity of 0.5 to 1 (the most frequent estimates of short-term elasticity), the critical ratio of producer price to international price is one-third to one-half.

It is unlikely, however, that the tax authorities will be able to hold to the guideline outlined above, for at least two reasons. First, price elasticity of supply is greater over the long term than the short term, and this raises the critical threshold level. And second, if the tax rate is higher than that in neighboring countries, part of production will be smuggled abroad, to evade taxation.

Also important to consider is the impact that taxes on agricultural exports have on the tax base. A fall in exports due to a sharp rise in taxation is likely to reduce foreign exchange earnings, leading to procurement difficulties for intermediate goods and, consequently, to a fall in production, which further reduces foreign exchange earnings. The impact of this vicious circle\(^3\) on total income and on the tax base goes well beyond the “primary” impact of a fall in producer prices on the production of exportable agricultural goods.

**Stability of producer prices.** A third objective is to ensure some degree of stability of producer prices and income. This objective rests on three hypotheses. The first is that stabilization of producer prices means stability of producer income. This hypothesis does not hold good for all cases, however. It does not apply to a closed market (local food products), where price variations are due chiefly to fluctuations in the quantities produced. In that case, prices are inversely proportional to quantity and help to stabilize income.

Also, whether the hypothesis holds at the country level and for export products, depends on the country’s influence on world prices for a particular product. For export products whose world price is independent of the production of the country concerned (a price-taker country, with only a small share of the market), price instability is independent of production volume and is therefore an autonomous factor in income instability. In some years, it may happen, however, that exogenous factors such as weather conditions fortuitously give rise to contradictory movements of prices and
quantities, so that the income effects offset each other.

The situation is less clear in a country that is a major or dominant producer and whose export volume helps to determine the world price (a price-maker country). Price variation may well be an income stabilization factor, but for this to be the case, the variation in the quantities produced by the country must be the chief cause of world price fluctuations and the effect must be rapid. The outcome may be different, however, for products for which demand plays a dominant role, as illustrated by the cases of cloves and vanilla in Madagascar. Although Madagascar is an important world producer of cloves, fluctuations in the world price of this product are influenced more by variations in production and imports in Indonesia (the leading producer and importer) than in Malagasy production. In the case of vanilla, although Madagascar is the leading exporter and producer and so has an appreciable impact on prices, price instability is also attributable to demand fluctuations due to the existence of a dominant importer (the United States accounts for 40-60 percent of world imports) and of a synthetic close substitute for vanilla. Natural vanilla accounts for only a tiny fraction (5 percent) of the world market for vanilla-based perfumes, so a small shift in the United States from natural to artificial vanilla leads to a relatively large change in demand for natural vanilla. For these two products, then, stabilization of producer prices relative to world prices apparently helps to decrease rather than increase the instability of producer income.

The second hypothesis underlying the objective of stabilization of real producer prices is that income instability depresses production. To the extent that a declining marginal utility of income prevails, as is generally assumed, the more stable a given average income the higher the utility. This is the basis of risk-averse behavior. The result is that, other things being equal, production of crops that yield unstable revenues will be less desirable than production of crops that yield stable revenues. This has two effects: farmers will allocate available time to the stable crops and they will seek ways to improve their productivity. Instability, by making farming investments and innovations riskier, also diminishes recourse to credit. While the effect of risk aversion is difficult to capture in an econometric analysis using time-series data, it is probable that economies where most producers are small farmers with low creditworthiness and limited capacity to cope with instability are particularly sensitive to price instability.

But even if price instability exerted no effect on the average level or on the growth of production, it could have unfavorable repercussions in the case of crops that are subject to industrial processing, such as cotton or oilseeds. Since price instability engenders production instability (a function of the elasticity of supply), and since plant size must be large enough to process the largest crops, price instability (of supply) can generate higher average processing costs.

Stability of budget receipts. A fourth, often neglected, objective of price policy is to avoid severe instability of fiscal (or parafiscal) receipts. Once producer prices are stabilized, government (in the broad sense) absorbs world price instability. If stabilization is achieved through taxation of exports that contribute substantially to the budget, the effect is to make public revenue very unstable. This instability contributes to
poor public management, as experience in many countries shows. If world agricultural prices collapse, an entire category of receipts may completely disappear, and the government may even have to resort to massive subsidies. Price booms also create problems because of the difficulty of managing sudden surpluses. Decisions to increase expenditures (for example, in the form of civil service recruitment, poorly prepared investments, and so forth) have often been unwise or difficult to reverse, in many cases leading to macroeconomic imbalances that have necessitated the current round of adjustment policies (see Guillaumont and Démécq 1988).

**Tradeoffs among objectives**

Simultaneous achievement of all four objectives is not possible. The need for tradeoffs is evident in the relationship that, by definition, links the producer price \( p_D \) to the world price expressed in local currency \( p_W \), to the public taxation rate \( t \), and to the unit marketing and unit processing cost \( c \):

\[
(1) \quad p_D = p_W (1 - t) - c,
\]

where \( p_W = p^* x e \), \( * \) denotes a price in foreign currency units, and \( e \) is the exchange rate (domestic currency relative to foreign currency).

The first objective (alignment of producer prices with world prices) calls for stable and relatively low rates of taxation -- in other words, protection rates near zero. The second objective (funding of the national budget), however, implies relatively high tax rates (low or negative protection rates). The last two (stability of producer prices and stability of government receipts) imply tax rates that fluctuate in response to world prices. But these last two objectives can also be in conflict: in order to stabilize producer prices, tax rates have to vary in the same direction as world prices whereas to stabilize government revenue, they have to vary in the opposite direction. The problem, therefore, is how best to reconcile these possibly conflicting objectives.

**Alternative Policies**

While many different price policies for agricultural export products are possible, each meeting the defined objectives to a different degree, they can be reduced to four major types (table 1; also see the appendix for simulations of each type of system for the case of coffee producer prices in Madagascar). These are examined below, after some preliminary remarks on the need to avoid misalignment of the real exchange rate.

The discussion of policies presented in the next few sections assumes that the official exchange rate is not overvalued and can therefore be used to express world prices in national currency. If the national currency is overvalued, then using the official exchange rate results in an artificially low price in national currency; overvaluation constitutes implicit taxation of producers, to the benefit of importers. Also, overvaluation of the currency often forces a devaluation, generating a sudden change in the world price expressed in national currency that should normally permit an increase in the real producer price. However, this result actually occurs only if the share of the rise in the export price in national currency that is passed through to the producer is more than offset by the general price rise generated by the devaluation (see P. Guillaumont 1988).
Table 1. Major types of agricultural producer price policies for export crops

<table>
<thead>
<tr>
<th>Features</th>
<th>Absolute stabilization</th>
<th>Total pass-through</th>
<th>Partial stabilization</th>
<th>Partial stabilization (floor and ceiling prices)</th>
<th>Trend-based pass-through</th>
<th>Two partial stabilization systems combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals Adaptation to world price trend</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Short-term producer price stability</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Modalities Guaranteed f.o.b. price</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Subsidy possibility</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

A good agricultural price policy, whatever the type adopted, is thus easier to implement if it is accompanied by an economic policy that avoids overvaluation of the national currency. In the opposite case, where the currency is likely to experience periods of high overvaluation and large devaluations, the world price in national currency has to be measured using a "reference" or equilibrium exchange rate. Also, where inflation is high and variable and the exchange rate is allowed to float (as in the African and Latin American countries in which foreign exchange is sold at auction), administered prices are very difficult to manage. In this case, an agricultural price-setting policy for export crops may not be possible. Thus, a policy of administered agricultural prices implies some degree of stability of the nominal and real exchange rates.

Total stabilization

A policy of total stabilization of real producer prices involves defining a production objective for each export crop and determining the price that will induce farmers to produce the desired amounts. In principle, the price is arrived at by examining the price elasticity of supply or by determining the marginal cost of production. A policy of this type implies indexing the guaranteed nominal price of each crop to a suitable consumer price index. A guaranteed f.o.b. price is arrived at by adding unit marketing cost to this price. Public taxation is then equal to the difference between the export price realized and the guaranteed f.o.b. price.

This system totally severs the link between producer prices and world prices and is likely to lead to severe resource misallocation. Moreover, it makes the level
of public taxation unpredictable and places it at the mercy of variations in world prices. Not only is the average rate of taxation uncertain, but the entire burden of world price instability is borne by public finance (in the broad sense). This destabilizing effect on public revenue is intensified in many developing countries where taxation of export products accounts for a high share of public revenue.

In practice, most stabilization fund schemes that appear to be similar to the system described above are really quite different. They have operated with all the drawbacks of such a total stabilization scheme but without its advantages. Producer prices have not generally been indexed to the price of consumer goods but have been adjusted at irregular intervals. This has resulted in instability of the real price and often in a declining long-run trend. The effects of such schemes in two countries as different as Côte d’Ivoire and Madagascar are illustrative of this experience. The following data show average level and variability of the real producer price index of coffee during 1970-85 (1970 = 100) for these two countries (based on CERDI 1988):

<table>
<thead>
<tr>
<th></th>
<th>Côte d’Ivoire</th>
<th>Madagascar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>96.8</td>
<td>93.7</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>11.9</td>
<td>22.1</td>
</tr>
<tr>
<td>Coefficient of variation (%)</td>
<td>12</td>
<td>24</td>
</tr>
</tbody>
</table>

The history of coffee in Madagascar, in particular, exemplifies the risk of a sharp downward trend of the real price over the long term. Moreover, the cases of Côte d’Ivoire and Madagascar demonstrate how difficult it is for governments to manage fluctuations in resource inflows: in these countries, as in others, instability of public revenue has been a root cause of questionable investment choices and macroeconomic disequilibria.

**Total pass-through**

At the opposite extreme are agricultural export price schemes that transmit all world price fluctuations to the producer. In this type of system, the tax rate remains constant and, when applied to export value, produces revenue that varies with the world price.

If the tax rate is relatively low, the first objective (alignment with world prices) is achieved. A relatively low rate reflects the tradeoff between the objective of remunerative prices and the need for public revenues. A system in which taxation is proportionate to export value is logically reflected in a relatively low level of taxation in relation to world prices. Since farmers bear the entire price risk, it is appropriate to allow them the means to do so in the form of incomes that are higher on average than they would be under a scheme that included the possibility of subsidies when prices were very low.

In a system in which world price movements are fully passed through, the objective of stabilization of producer prices is by definition abandoned. With no guaranteed f.o.b. price or official producer price, producers do not know at the start of the season what price they will receive. How great the disadvantages of such a system are depends on the magnitude of the fluctuations to which export product prices are exposed. Also, farmers’ ability to cope with such fluctuations depends on the nature and size of their land holdings and on their traditional practices. While the assumption
is that farmers will learn how to manage a volatile income, this learning process is difficult for small, marginal farmers with no effective way to invest or to borrow. For this reason, it is desirable to complement such pass-through policies with policies that relax the investment and borrowing constraints.

It should also be noted that pass-through schemes with ad valorem taxation (even at a fixed rate) do not protect public finance against instability. They do, however, make public revenue appreciably less unstable than under stabilization schemes since the instability merely reflects that of world prices. However, to the extent that unit marketing costs remain constant, producer prices are a little more unstable than world prices (see equation 1). Also, it has proved politically difficult to apply a constant rate of taxation regardless of the world price level.

Coffee and tea policy in Kenya is an example of a pass-through type of system. However, Kenyan policy deviated from total pass-through during the export commodity price boom of 1977. Since then, some progressivity has been introduced into the tax rate based on the world price level, which contributes some stabilization to producer prices. The system, which has not hindered the growth of production in Kenya, may not be appropriate in other countries, however. Kenyan farmers have had decades of experience learning to adjust to producer price instability. They have been able to do so because their farms are fairly large, are connected by a network of cooperatives, and are fairly well integrated into the monetary system. Increased price instability in countries where conditions are different might affect production negatively.

The Kenyan experience also shows that a pass-through system can lead to macroeconomic instability and to the well-known Dutch disease phenomenon. In Kenya, the extra income earned when international prices were high was invested mostly in real estate. The effect was to increase the relative price of nontraded capital goods, which favored owners of capital, who were largely urban dwellers (Bevan et al. 1987). This caused the real exchange rate to appreciate, which adversely affected the incentives for the production of tradables relative to nontradables.

**Moderated stabilization or bounded pass-through**

Between the two systems sketched above are two hybrid partial stabilization schemes. One, moderated stabilization, reduces the price rigidity of total stabilization, while the second, attenuated pass-through, reduces the price uncertainty that results from a total pass-through system. These two systems meet the price policy objectives defined earlier to different degrees.

With the moderated stabilization scheme, a number of variations are possible. Their common feature is that they are based on reference prices fixed in advance as a function of production or social objectives. These prices do not change automatically as world prices change, although they may be modified as the international climate (and the production objective) changes. The principal types of moderated stabilization system work as follows:

- The reference price is a guaranteed minimum price (or floor price); when the world price falls below that price, government subsidies make up the difference.
The reference price represents a maximum (ceiling) price; when the world price rises above that price, the government levies a tax equivalent to the whole of the difference.

Both a floor and ceiling price are set, and world price fluctuations are passed on in full within the zone marked by the two prices.

A proportionate or progressive tax/subsidy system that goes into effect when the world price rises above or falls below the reference price.\(^5\)

Combinations of these four systems are also possible, with the most common being the guarantee of a minimum price coupled with progressive taxation above that price.

This is the strategy that is used in some Latin American countries.

The moderated stabilization system distributes the burden of world price instability between government and producers, with the nature of the distribution depending on the modalities and rates applied. As a result, depending on where the emphasis is placed, this type of system approaches, more or less closely, one or the other of the two polar systems (perfect stabilization and total pass-through of instability). And the more such systems approach the polar types — for example, the more producer prices are stabilized — the more they share the weaknesses of those types of systems — in this case, the greater the risk of dissociating domestic from world prices.

This can be illustrated, first, by the floor price case, which is often proposed as an intermediate solution between total stabilization and total pass-through. The higher the floor price is set, the more it stabilizes the producer price but the more it also dissociates it from the world price, whereas the lower the floor price, the more likely it is to have no real impact. And, where the floor price is not indexed to domestic prices, its impact will decline progressively under the effect of monetary erosion. The ceiling price exhibits the same ambiguity: the higher it is, the more likely it is to have no practical significance, but the lower it is, the more likely it is to lead to excessive taxation of farmers and dissociation from the world market price. And here too the risk of erosion is high if the ceiling price is not indexed.

The floor price and ceiling price systems do not, therefore, appear to be based on a valid analysis of the economic disadvantages of producer price instability. These systems ensure neither the short-term stability of producer prices nor their alignment with the world price trend. In brief, the risks are the same as those for which the two polar schemes are criticized. But moderated stabilization/bounded pass-through systems reassure the opponents of the two polar systems and find a sort of moral justification in the refusal to pay farmers either "not enough" or "too much." Thus they represent a sort of political or moral compromise between the two polar approaches.

**Trend-based pass-through or adaptive stabilization**

A second way to achieve partial stabilization without the pitfalls of the moderated stabilization system is to avoid creating lasting distortions in domestic prices relative to world prices by defining a guaranteed f.o.b. price based on the world price trend. Since estimating future prices is little more than guess work, the surest way to tie producer prices to world prices is to base producer prices on past world price trends.
This can be achieved using a "past trend value," expressed in constant local currency and calculated simply as the moving average of previous year prices.

To avoid excessive government taxation, an average tax rate is defined (as in the total pass-through scheme). This rate expresses a long-term tradeoff between adequate remuneration of producers and satisfaction of the financial needs of the state. The average tax rate, applied to the world price trend level, determines the amount of unit taxation and, when this is deducted from the trend value, gives the guaranteed f.o.b. price; deducting average marketing cost from the guaranteed f.o.b. price then gives the producer price.

In principle, the producer each year receives the equivalent of the trend value of the world price, reduced by marketing costs and an amount of taxes calculated at a constant rate. As a result, the effective rate of taxation differs from the theoretical rate as a function of the gap between the effective and the trend level of the world price; it can even become negative (a subsidy).

The producer price is thus partially stabilized: it evolves from year to year in accordance with the moving average world price expressed in national currency. Stabilization is only partial, and the burden of instability is shared between producers and government. This is also the case in many so-called stabilization schemes, but in this case the sharing is more rational since the world price trend is respected, and stabilization, which follows an automatic rule, no longer serves as an opportunity for excessive taxation of producers.

The other type of partial stabilization, moderated stabilization or bounded pass-through, entails an immediate pass-through of world price fluctuations to producer prices within the zone defined by floor or ceiling prices, but this system carries the risk of dissociating prices in the medium and long term. In contrast, this second type of partial stabilization has a low immediate pass-through of world price variations but minimizes the risk of dissociation in the medium term.

The two partial stabilization schemes can of course be combined. For example, government taxation (or subsidy) can be applied to only a certain portion of the spread between export price and reference price, itself defined as a function of the previous export price trend. This kind of scheme is applied, under complex rules, to coffee and cocoa in Papua-New Guinea, probably because the moving average is calculated over such a long period (10 years) that, in the absence of a modulated taxation/subsidy rate, it would result in almost total price stabilization. A simpler method -- and one more in line with the price policy objective of producer price alignment with world prices -- would be to diminish the degree of stabilization by shortening the period on which the guaranteed price is based.

Marketing and Public Finance Implications of Price Policy

The choice of a price policy cannot be based solely on how well a policy meets its predetermined objectives. It has to take into account the country's economic structure and the management capacity of the various participants in the production and export sectors; that is, it must take into account the marketing and taxation management implications.
In the past, marketing boards and stabilization funds have traditionally performed three functions:

- **Producer price stabilization**, a function that has been exercised only partially because real producer prices have generally remained unstable, and stabilization funds have rarely subsidized producers when world prices fell; in other words, the funds' main effect has been on changes in the tax rate levied on producers.
- **Control of domestic and external marketing** (sometimes even monopoly control).
- **Management of part of the proceeds**.

These three functions are not independent. Each producer price policy option (total, zero, or partial stabilization relative to world prices) has repercussions on marketing methods and public finance management. Price policy must take into account these repercussions, and consistency must be ensured between functions.

**Consistency between private marketing and public stabilization**

Price policy has implications for both domestic and external product marketing.

**Domestic marketing.** Everyone agrees that the private sector should have a major role in domestic product marketing, except perhaps in integrated agroindustrial sectors where the objective should be management that is independent of the government and in accordance with free market principles. Private sector participation introduces competition and so helps to ensure the lowest cost for marketing and to prevent producers from losing too large a share of the realized export price. Marketing margins are undoubtedly also affected by the nature of the producer price-setting system. The question, then, is whether a system of guaranteed f.o.b. prices can increase or decrease these margins.

In pricing systems with a guaranteed f.o.b. sales price or guaranteed export price (total stabilization and trend-based pass-through systems), the guaranteed price is equal to the sum of the official producer price plus processing, transportation, and marketing costs, which are provided for in a scale or a price list. Some believe that this system opens the government to pressure from dealers and leads to overestimation of marketing costs. Moreover, whatever the precautions taken to ensure competition among dealers, one cannot be sure of the price actually received by producers: in other words, a guaranteed f.o.b. price does not imply a guaranteed price to the farmer.

In countries such as Madagascar, where marketing costs vary by region and competition is imperfect, nothing ensures that the official purchase price to the producer, which is tied to the differential, will be respected. But where the guaranteed f.o.b. price is linked through an established mark-up to a producer price, it is possible, as in Côte d'Ivoire, to officially announce the amount of the "normal" producer price at the start of the season, well before collection, and to publicize it widely. This procedure increases the likelihood that the price will in fact obtain as long as marketing credit is available, as was the case in Côte d'Ivoire until 1987. Advance notification of a price also facilitates one-time payments to farmers for their harvest.

In systems without a guaranteed f.o.b. price, there can be no official season-long purchase price because the purchase price
depends on the export sale price, which is determined only when export contracts are concluded. Publicizing the "normal" producer price is more difficult when the price is variable and is not known at the start of the season. Moreover, farmers may receive only a payment on account at the time of delivery instead of a final payment, as happens in Kenya. The farmers' confidence about receiving the remainder of the payment then depends on their confidence in the dealers or cooperatives that act as intermediaries and, more generally, on the quality of credit facilities. This type of system seems not to be well-suited to the poorer developing countries in Africa, given the many obstacles to its smooth functioning even where conditions seem favorable (as in Kenya, with its large farms, cooperatives, communication and credit facilities, dynamic private business sector, and rapid dissemination of information about world price data).

An alternative approach, where the marketing board or the stabilization fund is responsible for export sales, would be to determine a definitive producer price based on the expected or estimated export price. The board or fund would then bear the risk of any fluctuation in world prices between collection and export. Futures markets could provide some assistance in setting prices, but they do not exist for all products. Generally speaking, the assumption of this price risk is an incremental cost that will be passed on to the producer.

External marketing. Foreign sales are handled either by a public agency with monopoly power, such as a stabilization fund, or by private enterprises, which, depending on the country, are controlled and competitive to varying degrees. While a public export monopoly is compatible with the various price policy objectives distinguished earlier, it has the disadvantage that export marketing efficiency cannot be assessed by comparing the performances of different operators. It may also give rise to directly unproductive rent-seeking activities by those who operate the export facility. For that reason, competition among private operators is often preferred. This second solution is consistent with the policies of total pass-through of world price fluctuations or moderated stabilization, neither of which is based on a guaranteed f.o.b. price.

Where price policy guarantees an f.o.b. price, marketing enterprises are likely to have little incentive for getting the best possible sales terms since the entire profit goes to the state. To meet this objection, incentives can be introduced to motivate the marketing enterprises to try to get the best price — for example, basing their remuneration on proceeds from sales and not on the guaranteed f.o.b. price, which means that their profit margin does not form part of the established mark-up.

Delinking the stabilization fund and the public treasury

There are three methods of managing public levies on export crops: in the framework of the national budget, through a stabilization fund, and some combination of the two, which can take several different forms. The need to choose among these arises only if the policy aims to stabilize producer prices and involves the possibility of a subsidy. In the absence of a price stabilization objective, levies consisting of taxes normally go to the national budget.
In practice, stabilization schemes have had serious drawbacks because the funds they accumulated when prices were high were used to finance public spending and so were not available to finance subsidies when prices were low. Stabilization schemes have also had two negative consequences for public spending policy.

First, the schemes violated the traditional rules of public finance concerning budget unity and universality, according to which the whole of public expenditure should be contained in a single document and the fiscal receipts should not be allocated to particular spending items. These rules are expected to equalize the social marginal utility of the various categories of public expenditures and so to guarantee the rationality of public choices.

Second, allocating most of the levies to public finance leads to revenue instability. Revenue instability can contribute to poor spending choices since expenditure decisions during periods of sharp price rises are often made quickly and with less care than at other times. Moreover, since public expenditures tend to rise more when receipts are rising than they fall when receipts are falling, increased instability contributes to budget imbalance.

What is needed is a clear and rational division of responsibilities between the national budget and the stabilization fund. The government can be responsible for managing fiscal-type resources levied to finance public expenditures, including those intended to promote the production of agricultural export products, and the fund can be responsible for managing the revenues raised for stabilization.

The modalities of the sharing of levy proceeds are not independent of stabilization policy.

The problem of sharing the funds arises when the price scheme is aimed at total or partial stabilization of producer prices and involves the possibility of subsidies. In the case of total stabilization schemes, fiscal revenue could be stabilized by setting an appropriate budget levy that reflects the sector's normal expected contribution to public expenditure financing. To stabilize the real value of these public receipts, the levy must be proportionate to the guaranteed f.o.b. price rather than to the realized export price. In the case of partial stabilization schemes, which tax/subsidize the spread between the world price and a reference price, it is also necessary to define the budget levy rate as a function of the reference price rather than the realized price in order to stabilize revenue. The issue of sharing stabilization funds does not arise in the case of policies based on the total pass-through of world price fluctuations. Nor does it arise in the case of trend-based pass-through schemes, which by definition include an average fiscal levy rate defined as a function of the trend price, which makes sharing between the budget and the fund automatic.

In all cases where a normal budget levy is set, the stabilization resources managed by the fund stabilize both real producer prices and the budget levies on the subsector. Rwanda's Equalization Fund is an example of this type of system. The advantage of stabilization on the trend world price is that it does not freeze the volume of export-based budget receipts but indexes the amount of unit taxation allocated to the budget to the trend of the real world price.

Where producer price stabilization is the objective, resources managed by the stabilization fund need to be invested in ways that conserve their real value and
permit them to be mobilized quickly. The macroeconomic consequences of the investment decision must also be considered. For both these reasons, placing the funds with the treasury should be avoided because, as experience has often shown, they would then be used to finance public expenditures. Their liquidity would become uncertain and they would still contribute to expenditure instability.

To facilitate the coordination of fund resource management and monetary policy, funds ought to be placed in the central bank -- assuming the bank is independent of the treasury -- rather than in commercial banks. In this way, part of the money created as the counterpart of export receipts would be sterilized during a period of rising prices and rapid growth of exports; conversely, in a period of falling prices, drawings on this account would result in incremental money creation. The central bank should of course be authorized to pay interest on the deposits of the fund at not less than the inflation rate in order to conserve their real value. It would also be desirable for the fund to have the legal capacity to borrow in the event of exhaustion of its resources.

Another solution, practiced by some stabilization funds in the past, is to place the stabilization funds abroad. Theoretically, this solution has the advantage of helping to stabilize not only domestic money creation but also foreign exchange receipts. It also allows the fund to conserve the real value of its holdings. Despite its many benefits, however, this solution may meet with political opposition.

Conclusions and Recommendations

This paper has sought to define an agricultural export price policy that meets four objectives: respects the trend of world prices and ensures incentives for producers, contributes to the financing of public expenditures, ensures some degree of stabilization of real producer prices, and ensures at least moderate stability of budget receipts. Of the policies that meet these objectives to varying degrees, the trend-based pass-through or adaptive stabilization scheme comes closest to reconciling the objectives. First, it ensures some stability of real producer prices while also linking changes in those prices to changes in real world prices. Second, guaranteeing an F.O.B. price makes it possible to set and publicly announce an official producer price before the season starts, thereby increasing the likelihood that producers will not receive a significantly lower price -- provided that the marketing system is competitive; moreover, a producer price set for an entire season and announced before the season starts is a greater incentive to producers than an uncertain price.

Finally, the system's automatic character and the tying of its tax rate to the guaranteed F.O.B. price ensure a stable tradeoff between the objectives of adequate remuneration of producers and adequate public expenditure financing. It consequently avoids the chief drawback of traditional stabilization schemes, which have favored budget financing to the detriment of incentives to producers.

To avoid this system's tendency toward marked instability of public receipts, some operating rule needs to be established for distributing levies between the stabilization fund and the public budget. One way to do this is to assign to the national budget the receipts from a levy calculated as a certain constant percentage of the guaranteed F.O.B. price; the fund would then receive a variable...
levy (or pay the subsidy) equal to the realized export price minus the guaranteed f.o.b. price, the budget levy, and, perhaps, the marketing margin. In this way, the pricing policy serves to stabilize both producer prices and budget receipts.

Under this principle, the fund remains simply a stabilization fund, with no responsibility for public expenditure choices -- choices that the government is in a better position to make within the budget framework. This solution also implies placing the fund's resources outside control of the public treasury.

Appendix

Simulation of Nominal and Real Producer Prices and Unit Public Taxation in Madagascar

In order to examine the specific implications of the various pricing systems, we simulated the evolution of nominal and real producer prices for coffee in Madagascar and of unit public taxation that would have occurred between 1970 and 1986 under each system and compared these situations with what actually occurred.

The calculations were made on the following basis (see CERDI 1988):

- Unit real marketing cost equal to effective cost;
- Reference price (total stabilization and moderated stabilization schemes) equal to real 1970 price (the maximum real price of the last 25 years) plus real marketing cost;
- Average tax rate (total pass-through and trend-based pass-through schemes) equal to 20 percent (approximately the rate at the beginning of the 1970s);
- Rate of taxation of the spread between world price and reference price (moderated stabilization scheme) equal to 50 percent;
- Trend world price (trend-based pass-through scheme) calculated on an average of seven years;
- The instability of the price measured by the standard deviation.

All four schemes would have led over the period to an average real producer price that was higher than the actual average price (table A-1). Moreover, the partial stabilization systems would have been more favorable to producers than total stabilization, given the behavior of world prices.

Real price instability is of course at a maximum in the case of the total pass-through scheme and at a minimum (zero) in the total stabilization scheme. Price fluctuations under the moderated stabilization scheme (at the rate of 50 percent) were between those for total pass-through and those for trend-based pass-through schemes. Both partial stabilization formulas led to more marked instability than was found in the observed real price.

The results for average level of unit real taxation are the reverse of those for average real price: taxation is maximum in the observed actual situation and minimum in the case of total pass-through of price fluctuations.

Instability of unit taxation is minimum in the case of total pass-through and maximum in the case of trend-based pass-through.

The trend-based pass-through scheme comes closest to reconciling the different price policy objectives. However, it has the disadvantage that it entails marked instability of unit public taxation.
Table A-1. Comparison of simulation results for the four main producer price policies for coffee in Madagascar, 1976-86
(1975 Malagasy francs)

<table>
<thead>
<tr>
<th></th>
<th>Real producer price for coffee</th>
<th>Real public levy on coffee (per kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>average</td>
<td>standard deviation</td>
</tr>
<tr>
<td>Actual policy</td>
<td>129</td>
<td>27.3</td>
</tr>
<tr>
<td>Total stabilization</td>
<td>196</td>
<td>0</td>
</tr>
<tr>
<td>Total pass-through of international price fluctuations</td>
<td>272</td>
<td>118.4</td>
</tr>
<tr>
<td>Moderated stabilization: taxation/subsidy of the spread between international price and reference price, at a constant rate (50 %)</td>
<td>274</td>
<td>74.4</td>
</tr>
<tr>
<td>Adaptative stabilization on the trend value of real international price (measured on 7 years)</td>
<td>245</td>
<td>50.4</td>
</tr>
</tbody>
</table>

Note: Producer prices and public levies were deflated by the 1975 consumer price index.
This article owes much to the discussions conducted in CERDI on agricultural price policy among a team that included Jean-Paul Azam, Catherine Bonjean, Gérard Chambas, Marielle Deméocq, Jean-Jacques Faucher, and Régis Marodon. Many thanks are due to Jaime de Melo for his several pertinent remarks on a preliminary version.

1. It is understood here that the relevant world relative prices are not current cyclical prices but their foreseeable average level. For that reason, long-term world market trends are more significant than short-term variations.


\[ R = \text{public revenue levied on crop exports} \]
\[ q = \text{the supply of export crops} \]
\[ p_x = \text{the export price (less the marketing costs)} \]
\[ p_p = \text{the producer price} \]
\[ e = \left( \frac{\delta q}{\delta p_p} \right) \text{ the elasticity of the supply of export crops} \]
we have
\[ R = (p_x - p_p)q \]
\[ \frac{\delta R}{\delta p_p} = p_x \frac{\delta q}{\delta p_p} - p_p \frac{\delta q}{\delta p_p} - q \]
since \[ \frac{\delta q}{\delta p_p} = e(q/p_p) \]
\[ \frac{\delta R}{\delta p_p} = eq \frac{p_x}{p_p} - eq - q \]
so \[ \frac{\delta R}{\delta p_p} > 0 \text{ when } p_x < \frac{e}{p_p} \frac{e}{e+1} \]

4. The analysis is difficult, but not impossible. It has been done, for example, in the case of coffee in Madagascar (Guillaumont and Bonjean 1988).

5. Whereas in the floor and ceiling systems with the simplest rules, the taxation (or subsidy) rates are equal to 0 or 1, depending on the respective positions of the world price and the reference price, it is possible to provide for rates between 0 and 1 through either proportionate or progressive taxation of the difference between the world price and the reference price. In the case of progressive taxation, it is appropriate to define not only a reference price but also a scale -- also indexed -- comprising increasing rates by difference segments. This system is illustrated fairly well by the Kenyan policy applied to coffee since 1977, which includes slight progressivity in accordance with a scale expressed in current currency. Where only taxation applies, the mean taxation rate is logically lower than when it is accompanied by subsidization since the lack of compensation in the case of a price fall implies limiting the taxation rate when prices are average or high. For that reason, the mean taxation rate in Kenya is low.

6. That is, of the world price converted into national currency and deflated by the domestic consumer price index on the basis of the final year.

7. Note that the tax rate really reflects the tradeoff between producers and government only to the extent that the currency is not overvalued.

8. The greater the number of years on which the average world price is calculated, the more stable is the producer price and the greater the share of instability born by the government.
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