



The case against reintroducing price stabilisation schemes in Papua New Guinea: a study of cocoa

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This paper presents a summary of the advantages and disadvantages of commodity price stabilisation. The weight of evidence is against the reintroduction of price stabilisation schemes. If they are to be introduced, it should be left to industry organisations to operate them on a strictly self-funding basis. A preferred approach is to stabilise incomes of producers directly rather than stabilise product prices, by means that do not rely on government intervention in product markets.

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Tree crop industries in Papua New Guinea are susceptible to fluctuations in world market prices because of their relatively small size and openness, and low supply responsiveness by growers to price changes in the short run. Producers are unable to influence world prices because they face close to perfect elastic demand for their exports.¹ These factors encouraged efforts to stabilise domestic prices in the past.

Commodity price stabilisation schemes for tree crops were in operation in Papua New Guinea from the late 1940s until a decade ago (see Jolly et al. 1990 and SRI International 1990 for detailed descriptions

of these schemes). Cocoa stabilisation began in 1974, operated by the Cocoa Board (Gimbol 1992). Tree crop stabilisation schemes were initially set up to provide income support to smallholders in periods of low world prices by levying producers in times of higher prices. The government also became concerned about macroeconomic instability in the wake of the 1976 coffee boom.

The objectives of price stabilisation policies have therefore been set at both microeconomic and macroeconomic levels. At the microeconomic level, stabilisation policies are assumed to smooth widely fluctuating prices that lead to inefficient uses



of resources, especially if producers expand too much in response to high prices and liquidate assets in periods of low and unprofitable prices. They also aim to protect smallholders from volatile incomes and extended periods of low incomes. At the macroeconomic level, governments use price stabilisation policies to attempt to minimise the destabilising effects of fluctuations in foreign exchange earnings on the rest of the economy, allowing them to plan for economic development with greater certainty and ease.

Efficiency and equity concerns for smallholders have been of prime importance in respect of producers' welfare in Papua New Guinea while growth of the particular tree crop industry has been the primary aim at the industry level (Brogan and Remenyi 1987). MacWilliam (1995) commented that one of the principal objectives of commodity stabilisation was to promote smallholder production. The ascendancy of smallholders, 'was achieved through a state organised and supervised scheme of smallholder production', and that price stabilisation schemes 'should be seen as components of the policy supporting smallholder agriculture' (MacWilliam 1995:26).

When they were in operation, the major mechanism of price stabilisation schemes had been to decrease the variability in export revenue through the use of buffer funds. Buffer funds were accumulated by imposing levies on exports when world prices were high to pay for bounties distributed when prices fell below designated lower threshold prices. By reducing variability in export prices, it was expected that greater macroeconomic and microeconomic stability should eventuate.

Funds in all stabilisation schemes were exhausted by 1989, and the schemes no longer could be kept in operation (SRI International 1990). Stabilisation ceased, and was replaced by price support in the form of an Agriculture Guaranteed Price Support (AGPS) scheme that the government operated

between 1990 and 1994. It is difficult to be unequivocal about whether the AGPS scheme was a form of price support distinct from the stabilisation schemes or a temporary measure to tide over the insolvent schemes until world prices returned to a level that would enable the debts to the government that were accumulated by the schemes to be repaid. In the end, the debts were repaid when prices increased but stabilisation schemes did not resume their operations. Also, STABEX funds provided by the European Union were used to support the repayments, thus violating the self-funding character of buffer fund schemes.

No decision has yet been made to reintroduce price stabilisation in the cocoa industry. But pressures from growers and a recent decision by the Coffee Industry Corporation to reintroduce a scheme for coffee producers (Stapleton, Alu and Wheeler 1999) suggest that the issue of stabilisation remains topical in all the major tree crop industries.

The purpose in this paper is to review the evidence on price stabilisation in the cocoa industry in Papua New Guinea. While the focus is on cocoa, the assessment applies equally well to other tree crop industries. Evidence is gathered from previous studies of stabilisation in tree crop industries in Papua New Guinea. Where none is available, reliance is placed on accumulated evidence elsewhere in the developing world, particularly as it applies to cocoa and other export tree crops.

Microeconomic impact of stabilisation

The most common justification of price stabilisation is to minimise welfare losses incurred by small producers as a result of the instability of export revenue they earn. Secondary microeconomic justifications for price stabilisation have efficiency motives.



Pricing efficiency

Potential efficiency gains from price stabilisation include its ability to improve resource allocation within the agricultural sector and between agriculture and the other sectors; increase the saving capacity of smallholder exporters, influence planting decisions; and improve maintenance decisions of tree crop producers.

On the other hand, price stabilisation schemes have the potential to create sizable distortions that reduce the level of export receipts. Prices have been separated from short-run marginal costs, thereby removing the incentive to produce more in periods of high prices and less in periods of lower prices (Claessens and Duncan 1993). Hence, mis-allocation costs may also be significant if, in the short run, producers have responded to price signals that mask true long-term market trends. With prices supported during periods of prolonged low world prices, the stabilisation schemes have most likely lessened incentives to producers to divert resources into more profitable activities, stifling the process of diversification needed to reduce a chronic over-dependence on resource rents.

One of the reasons stabilisation schemes were set up was to encourage higher levels of investment. However, Fleming and Piggott (1989) found no evidence from their work in South Pacific countries to support either a positive or negative impact of price instability on investment levels. Jarrett and Anderson (1989) and Fleming (1992) argued that investment has probably been reduced through forced savings during periods of high prices, consistent with the permanent income hypothesis that windfalls earned when prices are high tend to be saved and invested. With uncertainty surrounding export prices, conservative estimates have often been made to keep producer prices at a lower than average level. Stabilisation schemes would have thereby dampened incentives to firms to innovate and expand

during periods of high export prices, affecting investment in export agriculture. In the long run, the schemes may well have led to intersectoral resource distortions. Offsetting these negative impacts, price stabilisation can increase the overall effect on tree crop production of new plantings by encouraging more plantings in periods of low prices. Output expands in periods of high prices because the trees planted when prices are low tend to reach full production capacity when prices return to high levels, given cyclical price movements. Fleming (1999) noted that these effects tend to be small in magnitude.

Equity considerations

The equity argument for cocoa price stabilisation is based on the following assumptions.

- Cocoa smallholders are among the poorer members of society in Papua New Guinea.
- Greater price stability is actually achieved through stabilisation, and translates into greater income stability.
- Cocoa producers are risk averse.
- Export earnings make up a significant proportion of the incomes of cocoa producers by which they maintain their standards of living.
- External market forces are responsible for the variability in cocoa export earnings.
- Export price changes are fully transmitted through the marketing chain to the cocoa producers.

The first assumption is difficult to test. But Gibson and Rozelle (1998) provide evidence of a high level of poverty among tree crop producers, so price stabilisation could have a positive equity impact. The next four assumptions are questioned below. The fifth assumption is largely based on the existence of a competitive market situation in the cocoa industry (SRI International 1990) and appears to hold. SRI International undertook some simple analyses of cocoa



price transmission, and concluded that 'bounties are not absorbed by the marketing agents, but are largely transmitted to producers' (1990). Simmons and Yarbrow (1993) reported evidence that the cocoa producer price incorporated bounties paid and levies incurred at the export level.

The evidence is largely favourable on whether price stabilisation reduces producer price volatility in Papua New Guinea. Gumoi (1992) showed that the cocoa stabilisation scheme had been the second most effective in reducing export price variability after the copra stabilisation scheme. Price stabilisation appears to have had only slightly reduced instability in growers' incomes, however. In cases where the marketed surplus of a producer varies inversely with the industry-level marketed surplus, the stabilisation schemes have actually made the producer's income more unstable (Fleming and Piggott 1989).

In their review of price stabilisation, Jolly et al. (1990) suggested that price stabilisation schemes create only small net economic benefits, and that their justification depends on political considerations. SRI International was more positive.

In sum, stabilisation has had a definite overall positive microeconomic impact. By effectively reducing the price variability faced by exporters, the schemes reduced the risks involved in producing these crops. Moreover, by investing balances in interest bearing accounts, the funds were able to pay bounties more often than levies, such that the average price was higher than the world price (1990:55).

SRI International (1990) took a rather narrow welfare view of the potential benefits and costs of price stabilisation. Other factors cast doubt on their findings and those of others who have pointed out the welfare benefits of price stabilisation.

First, for stabilisation schemes to yield risk-reduction benefits to smallholders in Papua New Guinea, a strong assumption

needs to be made about the degree of their risk aversion. Fallon (1992) observed that price stabilisation has been most successful in situations involving risk-averse farmers. But the assumption that cocoa smallholders are at least moderately risk averse has not been supported by empirical evidence; in fact, little is known about their level of risk aversion. The use of this criterion in assessing the welfare gains from stabilisation was challenged by Fleming (1992) who claimed that it assumes the operators of stabilisation schemes are more skilled at managing risk than are the individual households.

Second, the estimates of the additional returns on the investment of funds accumulated in deposits in the stabilisation schemes by SRI International (1990), for example, ignore the opportunity costs of these deposits to the smallholders. The financial costs of price stabilisation have been high, especially given scarce financial and qualified labour resources. The fact that industry organisations could obtain higher interest rates on deposits of stabilisation funds than smallholders were capable of doing by themselves, reflects more on the inadequacy of saving opportunities in rural areas than an inherent superiority of stabilisation schemes over individual stabilisation strategies.

Third, the source of variability in export revenue needs to be identified in order to treat the relevant cause of the problem. Thus far, emphasis has been on countering demand variability, yet Onchoke (1996) found that domestic supply factors are as influential as demand factors. If this is true, the effectiveness of price stabilisation in reducing the external shocks becomes less relevant to stabilising producers' incomes. There is other evidence that price stabilisation does not necessarily translate into export revenue stability (Fleming and Piggott 1989). Some world price variations are partially offset by demand and supply



interaction effects (Fleming 1992) and exchange rate movements (Jarrett and Anderson 1989). Gilbert (1993) and Claessens and Coleman (1993) also demonstrated that price stabilisation schemes are not appropriate to achieve objectives such as income stabilisation and the collection of tax revenues. If the objective is to stabilise incomes rather than prices, policymakers should address income stabilisation directly.

Finally, there is some evidence that price stabilisation schemes have created inequity, favouring estates over smallholders where smallholder supply is more price elastic than that of estates (Fleming and Piggott 1989; Jarrett and Anderson 1989). In his study of coffee price stabilisation, Mwesigye (1989) estimated that funds were transferred from smallholders to estates, although the transfers were not substantial. While evidence slightly favours the proposition that tree crops smallholders are more price responsive in supply than estates in the short run, it is not conclusive.

Macroeconomic impact of stabilisation

The macroeconomic justification of price stabilisation is based on the assumptions that Papua New Guinea is an open economy that depends heavily on imports and foreign capital, and relies primarily on an agricultural export sector that faces volatile world prices. Volatility in the external sector thereby creates difficulties for macroeconomic management. When prices are high and foreign reserves are low, for example, there is pressure on inflation and the exchange rate, respectively.

Commodity price stabilisation schemes are supposed to help insulate the economy from external shocks that would hinder the achievement of broader development goals by varying domestic demand, government

revenue and foreign exchange earnings. The national government therefore expects them to complement its macroeconomic policy framework.

Kannapiran (1999a) assessed the extent to which the commodity price stabilisation schemes had met their macroeconomic objectives, and concluded that their impact is now likely to be minimal. His modelling results suggest that the schemes had failed to stabilise the macroeconomy, and had adversely affected the external balance. The macroeconomic impacts of changes in tree crop export earnings were found to have been significant prior to the boom period for mineral and energy exports, but have been declining over the years since the boom began. Tree crop export variability continues to affect GDP, but to a diminishing extent. On the other hand, it appears to affect the balance of payments to an increasing degree. With increased diversification in the rural and mineral exploration sectors, however, the economy appears to be growing strongly enough to withstand the shock of this variability. Money demand and the levels of private consumption and investment are also affected. Again, the impacts are less since the boom. The inflation rate, nominal interest rate and employment rate appear not to be significantly affected by changes in tree crop export income.

Kannapiran (1999a) concluded that overall, commodity stabilisation schemes now have a smaller role in stabilising the macroeconomy than they had in the past. Agricultural exports have declined in importance with rapid growth in the minerals sector, reducing their impact on GDP. Even by the 1980s, end-of-year deposits made up only about 20 per cent of the broad money supply, suggesting there has been no significant impact on the money supply from the agricultural stabilisation funds (Jarrett and Anderson 1989).

On a broader canvas, Cashin et al. (1999) used monthly data on 44 primary products



from IMF (1999) to assess how long it takes for external price shocks to dissipate. They declared that policymakers

...need reliable estimates of the magnitude and duration of commodity price shocks when considering countercyclical stabilisation policies. Although policy initiatives that smooth national income and consumption may be effective in the face of short-lived price shocks, long-lived shocks call for policies that enable countries to adjust to new income and consumption levels (Cashin et al. 1999:42).

The length of time of the lag was found by Cashin et al. (1999) to be considerable for all four of the major tree crop exports in Papua New Guinea. Average duration was shortest for palm oil (64 months) and coconut oil (70 months). It was substantially longer for 'other milds' coffee (150 months) and permanent for cocoa. It is more than mere coincidence, Cashin et al. (1999:43) concluded that failed stabilisation schemes have involved commodities typically subject to long-lived shocks. This is because such price shocks depress prices for a long time, making commodity price stabilisation schemes ineffective and rendering unsustainable external borrowing to smooth consumption.

Self-funding stabilisation schemes

In order to succeed in the goals set for them, commodity stabilisation schemes should be self-financing, balanced, predictable, well managed, and have low administrative and resource costs for efficient operation. Gilbert (1993) recommended that the following criteria should be considered to achieve such aims

- ability to predict long-run price trends
- insulation of the scheme from the general government budget, ensuring deficits

and surpluses of the scheme are not recorded in the accounts or used as a taxing vehicle

- sterilisation of scheme funds from the national economy
- pursuit of compatible goals.

The price stabilisation schemes in Papua New Guinea have not achieved these aims. In particular, they have been less than successful on the criteria of fund sterilisation, self-financing and predictability. Stabilisation funds have been only partly sterilised (Kannapiran 1999b). The cocoa and other stabilisation schemes had been reasonably well managed until the late 1980s, with low administration costs and satisfactory transmissions of bounty payments to growers. But it was clear by 1989 that the fund managers could no longer keep the schemes self-funding because farm-gate prices were above export prices, a result of consistently low world prices prevailing for major commodity exports. It led to the exhaustion of funds in the stabilisation schemes for the four main tree crop industries between mid 1988 and mid 1991.

Prolonged low world prices and inadequate strategies to determine threshold prices and fund balances have hampered the continuity of cocoa funds in Papua New Guinea. This is unsurprising, as Larson and Coleman (1993) reported that there is now a persuasive body of empirical evidence that the world market prices of commodities such as cocoa follow a random walk process punctuated by short periods of non-linear errors brought about largely by exogenous factors that are impossible to predict. They used simulation models to demonstrate how a random walk series can generate sufficient periods of low prices to guarantee the exhaustion of a buffer fund.

A constant strain on any stabilisation program...is the stochastic component of commodity prices, which renders the financial...exhaustion of resources a



statistical eventuality. ...as a practical matter, managers of stabilisation funds must treat the future as unchartable even when...market agents are fully aware of the deterministic and stochastic components of price movements (Larson and Coleman 1993:68).

Because future prices cannot be predicted, appropriate rates of levies and bounties are not known with any degree of certainty. The government has compounded these difficulties in ensuring self-balancing funds by overriding the bounty and levy formulas at its own discretion, undermining public confidence in the schemes. The temptation to reduce the collection of levies and keep threshold prices unduly high is ever-present (Opa 1991).

Government action to override a formula can be justified if it can be shown that the formula is unsuitable for determining the appropriate threshold price. Use of a 10-year moving average of world prices, adjusted for inflation, might not be appropriate when trends in real prices and irregular cycles exist. Over the past two decades, periods of low and volatile world prices have found the formula wanting, alternately leaving funds too high or exhausted. Opa (1991) suggested that costs of production and world prices should both have been considered in determining the threshold level. Arguably, the use of the consumer price index for Port Moresby has also made the threshold price too far removed from the long-term price trend (Overfield 1991).

Problems have also arisen because of restrictions on the amount of funds paid out annually, allowing them to be diverted to other purposes. It has been suggested that only 50–75 per cent of the funds should be loaned out annually, but such an approach has been criticised for potentially weakening the ability to stabilise producer prices (Claessens and Coleman 1993; Overfield 1991).

The timing of bounties and levies has been subject to error because the calculation of bounties draws comparisons with average prices in the previous year while levies use current prices. Hence, time lags and the use of different formulas for levies and bounties have led to situations of levies and bounties being paid simultaneously (Jolly et al. 1990).

The tendency to deficits in the face of unstable cocoa export prices presents a paradox to policymakers intent on reducing price risk to cocoa smallholders: schemes are likely to fail when they are most needed. On the other hand, fund managers are likely to find it easy to meet their self-funding objective when the stabilisation scheme is least needed by smallholders. The exhaustion of cocoa stabilisation funds in 1990 in Papua New Guinea in the midst of a period of low world prices was not a unique event. A reintroduced cocoa price stabilisation scheme is likely to face the same danger of massive fund deficit in the future if world cocoa prices fluctuate widely unless its managers are able to adjust the formulas for bounties and levies.

Modifications have been suggested, such as restructuring the organisation of the funds, and improving the formula to reflect the appropriate threshold prices and determine the optimal size of the funds. For example, Overfield (1991) proposed a five-year moving average with no adjustment for inflation as an alternative determinant of the threshold price. Unfortunately, the cocoa industry would probably face even greater dangers from incorrect forecasting, moral hazard and political interference without strict guidelines for the application of a set of stabilisation formulas. The situation where export prices remained below the threshold price for a prolonged period in the late 1980s and early 1990s is indicative of the likely future risk of exhaustion of stabilisation funds.



Box 1 Assessment of commodity price stabilisation

Advantages

Reduction in price variability can reduce income variability and improve the welfare of risk-averse smallholders.

Reduction in export revenue variability can aid macroeconomic stabilisation.

Clearer trends in producer prices of tree crops can improve production and investment decisions at the farm level.

Reduction in price variability can encourage smallholders to maintain their plantations when world prices are low, reducing the risk of long-term decline in the yield potential of trees or palms.

Disadvantages

Price stabilisation does not necessarily translate into more stable smallholder incomes.

The macroeconomic importance of the tree crops sub-sector in economic stabilisation has been substantially reduced in recent times.

Forecasting trends in world commodity prices is very hazardous, and requires considerable time inputs by skilled and experienced people who have high opportunity costs.

Incorrect forecasts of price trends by managers of stabilisation schemes can send the wrong price signals to producers and result in inappropriate levels of stabilisation funds.

Undue political pressures can be placed on managers of stabilisation funds.

Anomalies can occur in setting levies and bounties, and the transfer of bounties back to producers.

The level of aversion by smallholders to price risk can be over-stated because they commit only small amounts of cash to production and have proved capable of managing their price risks on their own.

Moral hazard can be a problem where there is an expectation that the national government will step in to provide support to schemes when they run out of funds.

Fluctuations of export prices in tree crop industries are impossible to predict, making the effective operation of price stabilisation schemes difficult.

Rating

Potential impact	moderate
Efficiency	low to moderate
Equity	moderate
Practicality	low
Risk of adverse economic outcome	moderate to high

Source: Fleming, E. and Yala, C., 1999. *An Assessment of Policy Options for the Tree Crops in Papua New Guinea*, National Research Institute, Waigani:17.



Assessment of cocoa price stabilisation

A summary of the advantages and disadvantages of commodity price stabilisation is presented in Box 1. Details are also provided of its rating on the criteria of potential impact, efficiency, equity, practicality, and the extent of the risk of an adverse outcome. The weight of evidence is against the reintroduction of price stabilisation schemes. If they are to be introduced, it should be left to industry organisations to operate them on a strictly self-funding basis. A preferred approach is to stabilise incomes of producers directly rather than stabilise product prices, by means that do not rely on government intervention in product markets.

Note

- ¹ Gibson (1994) estimated price elasticities of export demand of at least -12 for coffee and -11 for cocoa. Similar high elasticities can be expected for copra and palm oil (Fleming and Piggott 1989).

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