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William O. Jones*

ECONOMIC TASKS FOR FOOD MARKETING BOARDS IN TROPICAL AFRICA†

The concern of this paper is the economic efficiency with which tropical African markets supply basic foodstuffs to consumers and direct farmers in their production. The burden of the paper is that governmental boards might perform specific tasks that would significantly improve the economic efficiency of private food-marketing systems, but that in order to perform these tasks the objectives and structure of existing marketing boards will have to change profoundly. It will not be easy to wrench management and staff away from their present preoccupation with handling and policing, but it can be done.

Uses of marketing boards for purposes other than to promote more efficient allocation of goods and resources are ignored. Prominent among these uses are taxation; income stabilization; subsidy of consumers, farmers, or other favored constituencies;[1] ever-normal granaries or buffer-stocks; and attempts to manipulate world markets. Price stabilization is considered only in terms

* Professor Emeritus, Food Research Institute.

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[1] An important reason for establishing maize boards in Kenya and Zambia, perhaps elsewhere, was to protect European farmers from African competition. The neo-Marxist argument that food marketing boards are instigated in order to strengthen the power of the state has enjoyed some popularity among social scientists in recent years. See, for example, Ellis (1983). Robert Bates, on the other hand, finds African food policy to be simply "a form of political settlement" designed to bring peaceful relations between African governments and their urban constituents (1983, p. 297).

of persisting departures from equilibrium as determined by the interplay of domestic and international supply and demand.

The procedure will be to consider which economic imperfections identified in recent studies of African markets might be corrected or modified by some sort of agricultural marketing board.[2] This attempt to match identified imperfections in private African marketing systems with services that might be rendered by marketing boards seems pertinent at a time when the virtues of existing free marketing systems are being demonstrated and when there is widespread disillusionment with marketing boards.[3]

Economic efficiency considerations are much more telling for domestic food marketing than for export marketing. The latter is most often simply a matter of moving crops from farm to port at a price that will induce farmers to grow the crop for market; it is essentially a mechanical or physical process.[4] Furthermore, when export marketing boards were established for cocoa, coffee, cotton, peanuts, and palm oil they simply took over thriving private trades that had developed long before.

The food marketing system has a mechanical side, too, but in addition to assembling products from many growers it must allocate them among many dispersed consumers. The food marketing system does this by generating prices that reflect relative shortages and surpluses of supplies at various marketplaces throughout the system.

National integration of markets for export crops is likely to be better than for crops that are only consumed at home.[5] Farm prices of export crops are

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[2] Arguments depending on naive myths about the irrational behavior of illiterate peasants with bizarre utility functions and ignorant of economic exchange are ignored. Sufficient evidence has already been assembled to assign them to the scrap heap. See, for example, Hill (1956 and 1963); Jones (1960); Hopkins (1973); de Wilde (1980); and Baris and Couty (1981).

[3] See, for example, papers by Irere, Kriesel, and Ilori in Onitiri and Olatunbosun (1974); Mittendorf, Barker, and Schneider (1977); Lele (1977, pp. 501–02); Schmidt (1979); and David Jones (1982).

There were few good words for marketing boards in the 20 case studies presented at the Leiden seminar for which this paper was prepared, and the most severe criticisms were of boards marketing staple food crops and of peanut marketing in Senegal. (See Kwame Arhin, Paul Hesp, and Laurens van der Laan, forthcoming.) Criticisms were on the grounds of misuse of funds, inefficiency of operations, and deleterious effects on farm production. Despite the flood of criticism of food marketing boards, however, only John Abbott condemned them outright, quoting with approval "the final word on this array of objectives" by E. J. Barker, who said that transfer of the marketing board approach to food crops was "a quite inexcusable piece of simplification."

[4] Peter Timmer speaks of engineering efficiency and economic efficiency (1972, p. 61). Compare Jones (1979).

[5] L. J. Unnevehr provides a striking illustration of the effect of an export trade on

simply port prices less costs of assembly, including trading profits. Export crop production tends also to be more concentrated than production of food crops, and this concentration in itself reduces marketing costs. (One benefit of increased commercialization of food crop production is similar concentration.) Parallel influences on market integration result when marketed production is shipped to a distant domestic market center (maize supplies for the Zambian Copperbelt, for example, and gari and cowpeas in Nigeria).

MARKETING BOARDS

Political sanction and support are essential for regular economic exchange. The necessity for some sort of state intervention in the marketing process itself is also generally recognized, but the nature of intervention is more controversial. It may vary from enforcement of a market peace[6] at infrequent periodic markets, through investment in roads, telecommunications, and financial intermediation, to compulsory delivery of crops at harvest and their rationing to consumers.

Marketing boards comprise a varied set of governmental or government-regulated marketing institutions that lie closer to the authoritarian than the anarchic, voluntary-cooperative end of the spectrum. The earliest marketing boards had their origins in pressure from growers for higher and more stable farm prices. Sidney Hoos suggests that they may be viewed as compulsory cooperatives with their roots in Rochdale principles (Hoos, 1979, p. 4). The first national marketing boards were established to raise farm incomes during the Great Depression, and African marketing boards were established for similar reasons when exports were curtailed by enemy action during World War II (but see Cyril Ehrlich, 1970). African food marketing boards in British East and Central Africa were also partly inspired by concern about food supplies for India and the Middle East. More recently, food boards have been advocated variously to assure the domestic food supply, to benefit urban consumers or other constituencies, and to implement government programs for farming and rural settlement.

Among the more ubiquitous arguments for the establishment of national marketing boards have been those stemming from the belief that private marketing was disorganized, exploitative, and inefficient, that marketing margins were excessive, that farm prices were unnecessarily low, and that retail prices were unnecessarily high. The list of alleged imperfections is familiar. David Jones, however, suggests that allegations about market imperfections and the incompetence of private entrepreneurs may have been no more than an excuse

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correlation of price movements among 19 markets on Java. For 171 pairs of markets, dried manioc prices were correlated at .90 or higher in 106 when port prices were at export parity, but in only 27 when prices were above export parity (Unnevehr, 1984). Intermittent imports can also disrupt market integration (Southworth, Jones, and Pearson, 1980, p. 192, note 24).

[6] In regard to market peace, see Bohannan and Dalton (1962, pp. 17–18).

for government control (1982, p. 555).

J. C. Abbott and H. C. Creupelandt (1966, p. 1) define marketing boards as public bodies established by government to improve the marketing of agricultural commodities and empowered to exercise varying degrees of compulsion over producers, traders, and processors.[7] They vary greatly in form and function. At one extreme are advisory and promotion boards that provide market information, engage in market research, promote sales, and do technical work on quality of produce. Their activities are financed by levies and taxes on growers, merchants, and processors. At the other extreme are boards with statutory monopolies over the foreign and domestic marketing of specified crops, and the fixing of domestic buying and selling prices. They administer equilization and stabilization funds, promote and operate marketing facilities, and control imports and exports.[8] Abbott and Creupelandt identify the following types (1966):

1. Advisory and promotional boards;
2. Regulatory boards;
3. Boards stabilizing prices without trading;
4. Boards stabilizing prices on domestic markets by trading alongside other enterprises;
5. Monopoly trading and price stabilizing boards for
   a. export crops and
   b. domestic crops.

PERFORMANCE OF PRIVATE MARKETING SYSTEMS

The notable finding of recent research into private marketing of agricultural products in tropical Africa is that most of what was said about these markets a generation ago was wrong, but the word seems to have taken a long time to get around. African markets are not disorganized, African farmers are

[7] Sidney Hoos (1979, p. 301) assumes producer control in his definition of marketing boards, a concept now more or less obsolete in tropical Africa. But see J. H. Feingold (1976) of the Kenya National Farmers' Union, who complained about government usurpation of grower control of exports and advocated the return of export marketing to international trading firms because of their superior marketing and political clout.

[8] Tanzania, for example, had 10 monopoly marketing boards in 1966: three traded directly (general agricultural products, cotton, and coffee); four traded through designated monopoly agents (tobacco, wheat, sugar, and dairy products); and three traded by compulsory orders and single-channel trading (pyrethrum, papain, and seeds, the last two inactive). There were also two regulatory, promotional, and advisory boards (sisal and tea) (Lamade, 1968, p. 348).

In the United States, farm marketing agreements and orders approximate the less positive interventions of marketing boards; marketing cooperatives and the Commodity Credit Corporation the more directive. Compare Jamison (1972).

not unfamiliar with commercial activity, and African farmers do not respond perversely to prices. Nor are African farmers improvident. Most marketed food crops are grown by farmers who sell only part of their crop at harvest, holding the rest for their own consumption, for operating expenses, and for the seasonal price rise. African farmers know what current market prices are and rarely are limited to only one or two prospective buyers. Private marketing is generally competitive and affords farmers a rather high share of the consumers' dollar while assuring supplies to urban areas at reasonable prices.

This is all the more remarkable when account is taken of the obstacles that private merchants must overcome. The physical task of assembling and distributing staple food crops is enormous. Most of tropical Africa is still thinly populated and road systems are poor. In many countries financial crises and political disturbances have led to deterioration of what roads existed and to extreme shortages of spare parts for vehicles. As a consequence, fragmentation of market systems has increased, even in such areas of well-developed economic exchange as the western Sudan.

Tropical Africa has hundreds of languages. Nigeria alone contains about 150 separate ethnic groups, each with its own tongue. Considerable ingenuity has been required to overcome the barriers to trade presented by language, custom, religious belief, and hostility to strangers, and to establish understanding, trust, and security of contract. Devices employed include trading partnerships, brokerage and safe houses, traders' enclaves, and magico-religious enforcement of market peace and behavior.[9]

Specialization in food crop production is in its infancy. The trading community contains few large merchants of foodstuffs. Not many traders are literate, keep written records, or have bank accounts. Traders operate most often in crowded, poorly equipped marketplaces, and the absence of any sort of trading floor or general meeting place for wholesalers complicates price discovery. There are great differences, of course, in the capacity of national farm marketing systems, depending on the nature of internal transportation, stability of government, population density, government policy regarding commerce, the general wealth of the community, and the extent of commercialization of staple food production and consumption.

Students of private marketing systems in tropical Africa in the 1960s and 1970s have been impressed with how well they operate despite these difficulties of space, demography, and technical development (CILSS, 1977; Jones, 1972; Gilbert, 1969; Southworth, 1981; Thodey, 1968). Uma Lele, with wide knowledge of marketing systems both in tropical Africa and in India, says, "considerable evidence has accumulated with regard to the working of traditional

[9] In an earlier period, traders moving into the forest from the savannah established a line of stations where their caravans could find food and shelter from marauders. Later they were permitted to establish settlements and markets on the outskirts of towns. The movements of traders were not exclusively north to south, particularly after the European conquest. Northern cities too have their strangers' markets.

markets dispelling stereotypes about the degree of oligopolistic tendencies and spacial and seasonal price differences" (1977, p. 501), and Herbert Kriesel, who has studied agricultural marketing on both sides of the continent, goes so far as to say "indigenous private enterprise food marketing in developing countries of Africa is more efficient than statutory marketing of any agricultural product in such countries" (1974, p. 162).

Perhaps recent students of farm marketing in Africa (and elsewhere in the developing countries) have gone a bit overboard in their praise of existing private marketing systems. In their defense, it is fair to say that all had been taught the same stereotypes about the behavior of people in developing countries, and most were surprised, and many were pleased, to find that they were not so: that private African markets can be expected to respond in orthodox fashion and reasonably well to changing demand and supply, and that they can be employed with confidence to implement government distribution policies that are adopted for political or social reasons.

This mild euphoria should not blind students of African markets to their many deficiencies and imperfections. Peter Timmer, Walter Falcon, and Scott Pearson, in their 1983 book, *Food Policy,* (p. 151) observe of markets generally that they "do not always function in the best interests of a broad cross section of society, especially in poor countries where communications and transportation facilities are poor, markets highly segmented, and access ... is greatly restricted. The efficiency and economic gains potentially available from successful market coordination of a society's food system are an empirical issue, not a matter of faith and logic."

DEFICIENCIES AND IMPERFECTIONS

It is useful to distinguish between mechanical, technical, or engineering deficiencies in physical execution of marketing services on the one hand, and economic imperfections that impair market allocations of products and resources on the other. Both reduce potential national economic product. Under the first category may be listed deficiencies in transportation, communication, marketplace facilities, standards and grades, units of measurement, banking services, security in the marketplace, and security of travel. Imperfections may be most easily classified in terms of the requirements for the hypothetical perfect market, conditions that would lead to optimum allocation of goods and services and resources under existing technical conditions. Allocation over time, space, and form is improved, of course, as engineering efficiency improves and physical costs are reduced. Ideally, differences in prices between markets, between seasons, and between forms of the product should approximate costs of transporting, storing, and processing.

Deficiencies

In most tropical African countries road systems are incomplete, road surfaces tend to be poor, and many roads are impassable in the rainy season.

Road transport is frequently handicapped by extreme shortages of imported spare parts, including tires, and infrequency of repair shops and sometimes of fuel stations. Railroads carry a considerable volume of agricultural products from hinterland to port cities and between major regions, but have almost no feeder lines. Telecommunications within most countries are extremely unreliable. Banks are infrequent in the hinterland, and almost all transactions are in cash, although trade is also facilitated by rather personalized forms of informal credit. (See, for example, Southworth, Jones, and Pearson, 1980, pp. 175–77; and Franke, 1982, pp. 33–38 *et passim.*)

The most overt consequence of physical deficiencies in the marketing system is increased cost of moving crops from farm to consumer. High physical marketing costs might be expected to result in large marketing margins, but in fact, gross margins in tropical Africa sometimes appear to be small compared even with those in the highly competitive United States food industry. This may, of course, reflect no more than the complex allocative functions performed by sophisticated marketing systems in the advanced economies.[10] After all, margins are smallest when consumer buys from producer at the farm gate. Reliable information about net trading returns—net margins—is hard to get; such evidence as there is indicates that returns are modest.[11]

High transportation costs may also reduce the effectiveness of allocation over space. If it costs 5 cents to move a pound of grain from one market center to another, and the average price of the grain is 25 cents, then the difference in prices between the two centers can change by as much as 10 cents, or 40 percent of the average price, before the grain will move from one market to the other. The situation with sorghum in Sokoto and Kano, Nigeria, from 1953 to 1966 provides an example (Jones, 1976, pp. 320–21).[12] Poor correlation between changes in the price of sorghum in Kano and in Sokoto was the consequence.

As regards storage, evidence is that most cereals, pulses, and staple root crops are stored on the farm at reasonable cost.[13] The widespread practice of farm storage has more serious consequences, however, for temporal and spatial allocation; these are discussed below.

Information about commodity supplies and requirements is peculiarly de-

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[10] See also papers by M. A. Akintomide, Dunstan Ireri, and C. O. Ilori in Onitiri and Olatunbosun (1974).

[11] John Abbott says (1967, p. 372) "Lack of easily accessible information and of personnel to collect it on a reliable basis has imposed severe limitations on any approaches to efficiency analyses via margins and costs." Recent experience of Food Research Institute scholars in Java and western Africa suggests that merchants may have a better knowledge of costs and returns than was once believed and under proper circumstances be willing to discuss them.

[12] Often called a "gold point" situation.

[13] Cereals and pulses in granaries, yams in yam barns, taro, macabo, and manioc in the ground. Bananas are not stored except in powdered form. Rice and wheat are often stored off the farm after threshing.

ficient. Crop reporting services have been minimally developed and standing estimates prepared in offices in the capital may differ widely from values reported by infrequent sample censuses.[14] Crop estimation from marketings is impaired by widespread speculative holdings of crops on farms.[15] Rate of release of stocks is determined by expectations for the new crop year and variation in other farm income as well as price expectations, so that marketings may sometimes be larger when crops are smaller.

Lack of information about crop condition and unreliable estimates of the harvest are major causes of food crises in countries with monopoly food marketing boards like Kenya, Tanzania, and Zambia. (See for example, Kenya, 1966, pp. 248, 265; Jones, 1980, pp. 313 14.) The problem is made worse by the fact that a much larger proportion of the marketed crop moves through private channels in years when crops are poor i.e., when board prices are below the market clearing price and a much smaller proportion in years of bumper crops when board prices are above market clearing prices.

Imperfections[16]

Markets and marketing systems are economically efficient to the extent that the following conditions are met:[17]

1. Commodities traded are fungible and divisible;
2. Buyers and sellers act in an economically rational way;
3. Each buyer and seller accounts for a small part of the volume traded and behaves as if his actions had no influence on price;
4. Buyers and sellers have entry to all activities in the marketing systems on the same terms; and
5. Buyers and sellers have full knowledge of all forces likely to affect prices and requirements.

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[14] Incorrect information is especially damaging when all parties have the same misinformation a frequent marketing board problem.

[15] See Southworth, Jones, and Pearson (1980, pp. 67 68, 197 83). Hays and McCoy (1978) find principal causes of departure of price spreads from transport costs among seven northern Nigerian cities to be widely dispersed production, dearth of public information about prices, and storage on farms.

[16] Findings summarized in this section are based on Jones (1980, pp. 314 25) and rely primarily on studies in English-speaking west Africa where private food-marketing systems have worked fairly well during periods of political stability. Private marketing of staple foods is illegal (but very lively) in most of English-speaking east and central Africa.

[17] These are conditions for what is called the "perfectly competitive market" and failures to satisfy them are "imperfections." The perfectly competitive market is an analytical abstraction or construct designed to assist in identifying the principal determinants of marketing efficiency, the allocation of foods and resources so as to yield the highest level of consumer satisfactions with existing resources.

Not often mentioned in lists of imperfections but also important is the ability of market participants to respond to trading opportunities when they know about them. This requires not only market access, but also the financial means to carry out transactions that look attractive, and implies both the possession of funds and the ability to employ them.

Against this set of criteria, free African markets score moderately well.

Fungibility and divisibility—A frequent problem is the lack of standardized measures of quantity and quality. Sale of cereals and beans by the bag, pan, or cup and of root crops by the piece makes price comparison difficult, especially between markets. Quality standards are generally lacking, but they seem less important to customers.

Rationality—No problem (see Jones, 1960).

Smallness—May be oversatisfied in retail markets, but in many remote and inaccessible places the buyer often can influence price. Most farmers, however, can choose among numerous independent buyers.

Access—Ethnic dominance of a trade seems not to reduce competition among members of the dominant group, but outsiders are often at a disadvantage.[18] Local trader associations, made up of members of different cultural, language, or religious groups, have similar characteristics. Problems of access may be overcome by trading through brokers or trading partners or in separated marketplaces or market sections.

Knowledge—A major problem that is compounded by the lack of reliable information about the amount and location of supplies. Retail prices of staples are easy to learn—every household buys them—but knowledge about wholesale prices is more difficult. The only effective way to overcome this difficulty is through trading in the market directly, or through establishing close commercial relationships with a resident merchant who does. Wholesale trading floors where open bids and offers are made are rare, and the second stage of price discovery may be difficult.

Response—Response may be limited not only by impaired market access, but by poor communications and underdeveloped financial intermediation. Banks are few, and to carry large amounts of currency is hazardous. In most African societies, an elaborate network of credit among farmers and market intermediaries up and down the marketing chain eases the response for ordinary transactions, but it might not be able to support large increases in volume of trade.[19] Outsiders are again at a disadvantage because they must bear the risk

[18] Although ethnicity may restrict access to some trades, it seems not to inhibit competition among members of the favored ethnic group. Abner Cohen (1969, p. 94) says that the "landlords," the principal factors in the highly structured Hausa cattle trade in Nigeria, are in continual competition and strife with one another, but they can pursue their disputes only within certain limits. He provides a breakdown of the components of marketing margins that shows reasonable agreement with the services rendered and no indication of monopoly profits.

[19] Before nationalization of commodity exports, advances of private exporters were

of price decline alone and find it difficult to raise the money needed to take advantage of a bargain.

Various arrangements have been devised by west African traders to overcome problems of information and response. Trading partners in supply and terminal markets provide access and information but most often only between pairs of markets. (The ancient trans-Saharan trade featured a few family firms with members in numerous markets.) Eastern Nigerian merchants in Umuahia ship palm oil and gari to trading partners in the north who may once have been their apprentices, and couriers travel with the loads, four shipments each way a week, conveying orders, payment, and market news that is posted for all to see. Wholesalers in the Onitsha market order from their rural suppliers and receive market information through letters carried by truck drivers and messengers. Saharan and Sudanic trade has long been characterized by dependence on brokers, permanently located in the large markets, who act in behalf of merchants from a distance and provide accommodations for trader, goods, and livestock.

These measures, some of them actually countervailing imperfections, help to reduce imperfections of knowledge, access, and finance, but they fall far short of the kind of market integration characteristic of the industrialized countries.

MARKET PERFORMANCE

The consequences for a free marketing system of high physical costs, imperfect knowledge, difficulties of market access, and primitive financial intermediation can be seen by examining the effectiveness of allocation of products—of arbitrage—over time and space as indicated by price behavior.[20] Prices set by the market or by government fiat are the primary allocative devices in all societies. (Compare Lukinov, 1971, p. 230, on marketing in the Soviet Union.) Only when prices depart too far from equilibrium do governments resort to rationing and compulsory delivery. The effectiveness of seasonal arbitrage can be judged by the closeness with which average annual increases in price approximate the cost of storage. The efficiency of interyear arbitrage is crudely indicated by the occurrence of crises of supply; if the system is working well, shortages will be anticipated and stocks provided to meet them either by carrying over larger domestic stocks or by obtaining supplies from foreign sources.[21]

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an important source of trading capital. See Bauer (1954, p. 17) and Jones (1972, pp. 150–52).

[20] Arbitrage over form is ignored because of lack of information. It has not been much of a concern of advocates of marketing boards. Perhaps the "jolly miller" has a happier image in western folklore than the merchant trader, although George Evans (1969) says flour millers have had a bad reputation since medieval times when manorial lords monopolized milling and baking (pp. 143–44). The British set up similar monopolies for cotton ginners in Uganda in 1933 according to Cyril Ehrlich (1958, pp. 244ff.)

[21] A notorious failure of the maize boards of Kenya, Tanzania, and Zambia has

The effectiveness of arbitrage over space can be judged roughly by the extent to which prices of a commodity in various markets move together, most often measured by some sort of bivariate correlation coefficient.[22]

Intraseasonal Arbitrage

Contrary to common belief, intraseasonal arbitrage appears to be rather good when nonseasonal influences are removed. This evaluation is not as firm as it might be, however, because of deficiencies in information about costs of storage. Maize prices, in particular, show a rather large increase for a cereal, but whether because of large storage losses or because the supply of maize and competing staples is persistently underestimated is not clear. In general, however, seasonal arbitrage is good, particularly in urban centers, with modest increases for cereals and beans and increases for yams that approximate or are less than the cost of storage.[23]

Interseasonal Arbitrage

The evidence about interseasonal arbitrage is not clear, but there is some indication that it is impaired by tardiness of information about the size of the old crop. Because crop estimation depends greatly on observed flow to market and because most storage occurs on farms, accurate appraisal of production may be delayed until a month or two before the new crop comes in, but it has not been much studied.[24] Interseasonal arbitrage may be a serious problem in countries with monopoly farm marketing boards.

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been their inability to judge supplies, with consequent panic buying as board stocks were exhausted. Monopoly trading rights make supply estimates particularly difficult because of the large illicit trade.

Kenneth Arrow's statement, in his Presidential Address to the Econometrics Society in December 1956 is appropriate: "Economic statistics . . . are the least developed precisely in those . . . countries which have the greatest felt needs for economic planning . . . where . . . the primary responsibility for economic growth has been assumed by the government." (1957, p. 523). It is not entirely certain which way the causal relationship runs.

[22] High correlation of price changes among markets measures no more than that; it is what might be expected if a change in supplies in one market provokes compensating changes in other markets. A high correlation is consistent with the efficient allocation of supplies over space that is to be expected from an efficient marketing system with moderate costs of transportation, communications, and financial intermediation, but it is also consistent with effective monopoly. If it is the latter, on-the-spot observation can be expected to reveal localized gluts and surpluses, not uncommon in cities served by parastatal marketing boards.

[23] Seasonal arbitrage of cattle in the western Sudan is reported by Couty (1977, pp. 635–37).

[24] Erroneous interpretation of such a delayed price response as due to intraseasonal causes is often mistaken for evidence of exploitation.

Spatial Arbitrage

Arbitrage over space is another matter. Markets for many commodities appear badly fragmented even in countries where internal trade in domestic staples across district boundaries is legal. (It is not over most of English-speaking east and southern Africa.)

Consider Elon Gilbert's calculations of the correlation of monthly prices between 29 millet markets and 43 sorghum markets in the northern states of Nigeria from 1952 to 1965 (Gilbert, 1969). These two cereals are commercially well behaved: they store well, are relatively inexpensive to transport, are major components of local diets, and are widely traded. That major markets are interrelated is demonstrated by maps of price links between them at a correlation value of .70 or greater (Map 1). But of the 903 pairs of sorghum prices, only 40 (4 percent) are .70 or more and out of 406 pairs of millet prices, only 30 (7 percent). Furthermore, no pair of sorghum or millet markets was correlated at .90 or higher. A correlation of .70 is not very high. Lele reported weekly price correlations of .90 to .97 between each pair of six major grain markets in India, 1955 to 1965 (1971, p. 89). Faiz Mohammad reported similar values for the Pakistan Punjab (1983, p. 120a). A value of .70 means that less than half of the month-to-month change in prices in city A is associated with similar price changes in city B.

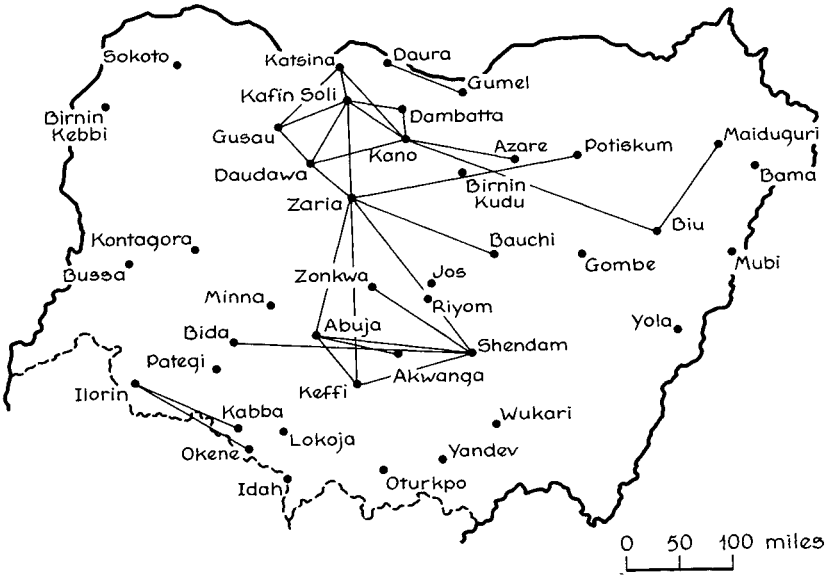
Perhaps this is as much as can be expected, when account is taken of costs of transport and difficulties of communication and finance. (Access is less a problem in northern Nigeria.) The integration of millet and sorghum markets was much less, however, than that reported for 25 gari markets in the southern states and 29 cowpea markets in the north and the southwest. Of 300 pairs of gari markets, 71 percent were correlated at .70 and 15 percent at .85; of 406 pairs of cowpea markets, 30 percent were correlated at .70 and 5.9 percent at .85. Both gari and cowpeas move long distances to provision the large Yoruba cities of southwestern Nigeria.

Comparisons of this sort should not be pushed very far. The price series are of varying length and reliability, and half to three-fourths of the correlation coefficients are below .50. These correlations of prices between free African farm markets were not calculated originally to determine whether the bear danced well, but whether it danced at all. Quite clearly, it does, but equally clearly, not very well.

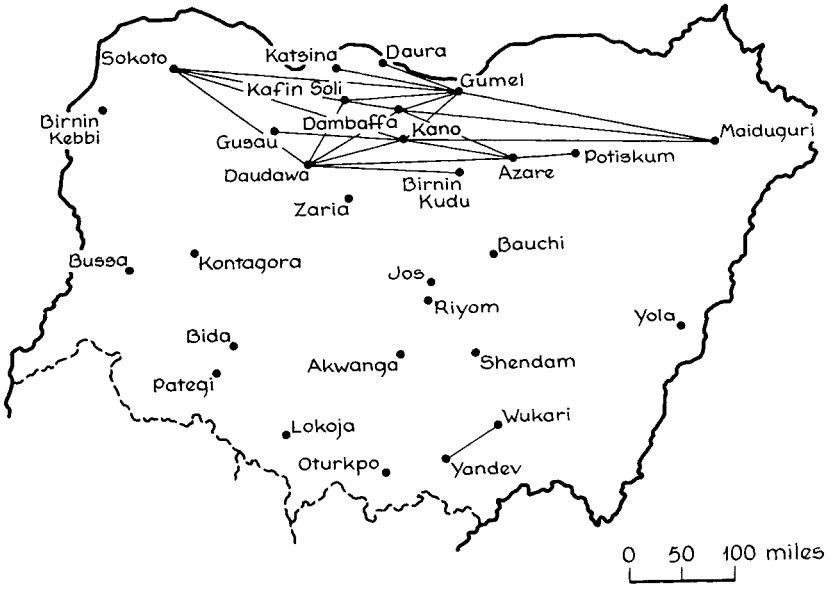
Weak intermarket connections are also demonstrated by detailed analyses of commodity trade flows, which tend to be to major cities, not through them, although increasing specialization in production is beginning to establish multiple market connections to the specialized supply areas. In Nigeria, Umuahia for gari and the country around Shaki for maize are examples, but terminal markets in general are not redistributive centers.[25]

[25] Correlation coefficients may mislead when the direction of flow shifts seasonally, as it does when most of the crop is stored in a few central locations or when foreign supplies are imported to supplement domestic stocks. (See also p. 114, note 5.) The

Map 1–Millet and Sorghum Prices in Northern Nigeria



Sorghum



Millet

Source: William O. Jones, 1972. *Marketing Staple Food Crops in Tropical Africa.* Cornell University Press, Ithaca, New York, pp. 149–50. Lines indicate price correlations of .70 or greater.

The picture of free African markets that emerges is of a set of two-level systems, each focused on a different consuming center, with adjustments at the margins of the supply areas but with long-distance arbitrage only when supplies within the separate areas fall badly out of balance.[26]

The causes of this weak integration of staple food markets lie partly in deficiencies of communication, transport, handling, and finance, but they are also related to the wide dispersion of population in many areas and to heavy reliance on own production for basic foodstuffs. Most rural people probably still obtain at least half of their food energy requirements from their own production, and this is both cause and consequence of small and irregular supplies of food crops in remote markets.[27] If thinly dispersed populations could rely on the market for their staple food supply, they would be more likely to enlarge their production of crops for sale, a first step toward the development of specialized production areas and consequent decline in costs of moving produce to and from farms, thus raising the prices of what farmers want to sell and reducing the prices of what they want to buy. Continued reliance on own food production is partly caused by the thin market. Another major cause of reliance on own consumption is internal insecurity or fear of it, a matter not within the province of marketing boards.[28] Concern about security of holding reserves in the form

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former situation is uncommon in private African marketing systems, and in western Africa the latter was uncommon until recently except for rice, at least for recorded trade. For a model of marketing incorporating reverse flow, see Timmer (1975).

[26] Two-level systems as opposed to redistributive systems are discussed in Jones (1972, pp. 111–14 *et passim;* 1969, pp. 118–22). Armen Zemanian (1980, pp. 370–71), demonstrates how, under certain circumstances, a two-level system can cause prices to move perversely in terminal markets.

[27] Estimates of own production of staple food requirements and of the percent of the crop marketed are varied. Household budget studies in Nigeria in the 1950s and 1960s indicated that rural people in the southwestern states might purchase as much as 70 percent of their calorie requirements, and in the southeastern states 30 percent, but only trivial amounts outside the cities in the north. Polly Hill's study of rural Hausa villages (1972) suggests that food purchases in the north may be larger than thought. Sierra Leone rice farmers interviewed in the 1965/66 Census of Agriculture said that they sold less than 10 percent of the rice they grew, but Dunstan Spencer (1981, p. 210) thinks that the figure for most years is about 35 percent. In Kenya and Zambia about half of the maize crop is sold, in Tanzania 40 percent, with from 20 percent (Kenya) to 80 percent (Zambia) of the amount sold going to the parastatal marketing board (Zambia, 1974; Temu, 1974, p. 39; Jones, 1972, p. 217).

[28] A most convincing demonstration of the effect of disruption of internal security on internal marketing is provided from another part of the tropics by R. H. Goldman (1975, p. 121). Correlation of monthly rice price movements between Jakarta and Bandung in Java from 1953 to 1969 ranged from .80 to .99, mostly in the .90s, except in 1956, 1958 to 1960, and 1966, all years of "dramatic deterioration in political conditions and internal security," when they fell to .39, −.53, .02, .28, and .64.

of commodities rather than cash, however, is a matter that a marketing board might help with.

Better integration among town markets could contribute to integration of bulking markets in addition to stabilizing supplies and prices in the towns and facilitating specialization in production. This is a sure way to reduce the risk of food shortages and hunger. Of the first importance, then, are measures to reduce obstacles to spatial integration. Almost equally important is the need for better knowledge of changes in national supplies.

Although African markets for domestically consumed food crops work well without the marketing board poultice, many in spite of legal monopolies of state agencies, they could work better. It is certainly worthwhile to examine ways in which some sort of marketing board might assist them.

GOVERNMENT'S ROLE IN OVERCOMING DEFICIENCIES AND IMPERFECTIONS

Many of the defects in Africa's food marketing can only be overcome by governmental action, and others can be overcome more quickly with such help. An important question is when, if ever, the statutory marketing board can be considered an appropriate instrument for reducing marketing costs and improving the allocation of farm products and resources.

Physical Plant

Roads, bridges, telecommunication, mails, and marketplaces are usually recognized as governmental responsibilities in tropical African countries. But there is no reason why their construction or maintenance should require the establishment of a marketing board,[29] although private merchants have built such facilities when governments neglected to do so. Government most often enters only negatively into vehicle maintenance, to the extent that it restricts supplies of fuel, lubricants, parts, and accessories. Public road and rail transport are, of course, important for marketing in some parts of Africa, but they are not appropriate marketing-board responsibilities.

Regulation of Trading

There is considerable precedent in tropical Africa for governmental intervention in market behavior. Some sort of government sanction appears to be necessary for regular market meetings to occur,[30] and general supervision of marketplaces and market meetings is usually by government officials or their

[29] Roads built by the Kenya Tea Development Authority may be cited as an outstanding exception. (See Uchendu and Anthony, 1975.)

[30] Brian Schwimmer (1976, pp. 43–46) tells how towns in the Suhum area of southern Ghana were brought into being by farmers who needed markets in the newly developed cocoa area and formed political entities to sanction them.

delegates. Standards and grades, weights and measures, hygiene, market entry, honesty in trading, prevention of collusion, and enforcement of contract are certainly matters of public concern and merit government action. They might properly be responsibilities of a department of marketing charged with rendering the same services to agricultural marketing that departments of agriculture render to agricultural production.

Deficiencies in roads, vehicles, and telecommunications are major causes of poor market integration, of surpluses and low prices in one location and of shortages and high prices not far away. Improvement of communication should have a high priority in national budgets, but it is costly and takes time. Nor is it the only cause of poor spatial integration. Even if roads are much improved, problems of information and ability to respond to market opportunities to correct market disequilibria will persist. Gradual improvement of communications will reduce obstacles to spatial arbitrage but will not eliminate them.

Information

Crop acreage, crop condition, size of harvest, and size of stocks determine interseasonal movements of prices within boundaries set by import and export parity, but knowledge of their magnitude is neither necessary nor sufficient for effective spatial arbitrage—not sufficient because they tell nothing about demand, and not necessary because competitively determined prices can substitute for them. Furthermore, crop statistics tend to be costly and unreliable, whereas the general level of prices is easy to learn. Collecting and disseminating such information is an appropriate task for a department of marketing, and some African governments now record monthly wholesale prices in selected markets, though often only for official use. To collect daily price information is likely to be costly and ineffective unless it is already being compiled by the trade, as it is in some places. (The Umuahia Food Traders Union in Nigeria is an example.) Under African conditions its dissemination is also likely to be long delayed. Wholesale prices in African markets typically are not arrived at openly, so that the second stage of price discovery, the price at which goods change hands, can only be determined precisely by trading. Yet the difference between general level of prices and the prices of actual transactions may make the difference between profit and loss in interspatial arbitrage.

The best way to obtain reliable information about prices in other markets is the way most African wholesalers do, by buying and selling through local trading partners, brokers, or agents (compare Hays and McCoy, 1978, p. 187). The greater the trading capacity of such a merchant, the better his market information and the more effective his spatial arbitrage. This in fact has been a principal advantage enjoyed by the largest European and American firms trading on world markets.

There seems to be more involved in imperfect spatial arbitrage, too, than costs of transportation that can be lowered by better roads and vehicle maintenance and knowledge about prices. Access and finance may be even more important. The Ibadan wholesaler who knows that prices are lower in town B

than in town A where he usually buys, but doesn't buy in town B because he doesn't have a "customer" (trading partner) there, is thinking about availability of funds and protection from being cheated by local merchants, matters of less concern when trading with a merchant from whom he buys regularly.

Although competitive market prices summarize all information in the system at any moment, they may mislead about future prices if stocks information is inaccurate, for accurate knowledge about size of carryover is essential for interseasonal arbitrage. The position of stocks may also affect spatial arbitrage by its influence on the speed with which supplies can be brought to deficit areas.

TASKS FOR A MARKETING BOARD

These two aspects of agricultural marketing in tropical Africa—arbitrage and location of stocks—might benefit from a marketing board of Abbott and Creupelandt's type 4. Arbitrage over long distances and off-farm storage of stocks could be undertaken by a well-funded national trading company that was required to compete alongside private firms but enjoyed a competitive advantage in interspatial arbitrage because size and number of transactions provided reliable market information and because its consequent trading position assured access to many markets and ability to respond to market opportunities.

Spatial Arbitrage

Profits from effective intermarket arbitrage increase with the information assembled and with the number of transactions, themselves an important source of market information. Movements of prices in an efficient free market are the surest guide to shifts in local supply and demand relationships.

An adequately financed national trading company, charged with earning profits from arbitrage among major market centers, could contribute a great deal to efficient market integration, but only if it traded alongside independent private firms. If it were set up as an effective monopoly, prices would no longer convey information about local supplies and requirements or serve as indicators of market conditions.

Such a marketing board differs from Abbott and Creupelandt's type 4 in its definition of stabilization as reducing the magnitude and duration of deviation of market price from equilibrium price. Perhaps Abbott and Creupelandt are thinking of the same thing when they speak of "wide" and "sharp" price changes, but there must be at least a suspicion that by stabilizing prices they mean making prices constant, in which case arbitrage will not take place (See Bressler and King, 1970, pp. 138–39).

Price stabilization defined in terms of persisting departure from market equilibrium should be distinguished from other kinds of market operations that might be carried out by such a board, like price support in underdeveloped areas with good potentials (the infant-industry approach to economic development) or

buffer-stock programs to protect against errors in interseasonal arbitrage,[31] or consumer subsidies. When such distortions of equilibrium prices are considered necessary to satisfy development, welfare, or political requirements, the board should be compensated specifically. If it is not, the primary task of spatial arbitrage will be compromised, as it is now by monopoly food marketing boards that engage in territorial pricing.[32]

A national trading company charged with trading between principal bulking and terminal markets could solve problems of information, access, and finance that now handicap the private staple-food trade. Buying and selling through trading agents (brokers) in principal markets would provide it with necessary information about prices and local supplies, information that could be conveyed by couriers when telecommunications are inadequate; market access could be assured by contractual arrangements with resident trading agents;[33] and financial intermediation could also be assured by resources of the state. (This is not as big a problem in urban markets as it can be in rural markets that have no banking facilities at all.)

Storage

Though spatial arbitrage is the most troublesome defect in market performance, storage is probably the most troublesome aspect of market behavior, not because of the costs of storage but because the location of stocks makes access costly and knowledge about their magnitude imperfect. Farm storage is not costly and farmers need pay only small out-of-pocket costs in order to hold produce from harvest to sale. They are also likely to regard produce as a safer store of value than cash or bank accounts.

For a marketing board to undertake to store the entire marketed share of a crop from harvest to harvest can be a costly proposition. If the Kenya National Cereals and Produce Board in 1980/81 had been required to store the marketed half of the crop, about 1,000,000 tons, in order to meet seasonal requirements, it would have had to make an average investment of at least US$65 million for eight months.[34] Calculations are similar for Zambia and Tanzania. Such a

[31] Anne Peck (1979) adduces strong arguments to demonstrate that when a marketing system is operating smoothly, government-financed buffer stocks simply replace stocks that would have been carried commercially by private firms.

[32] A marketing board of the type proposed is also excellent protection against distortion by private monopoly.

[33] The Bohannans' account (1968) of Tiv preference for Hausa traders, who lived with them year-round, over Igbo traders who did not, even though the Igbo paid higher prices, is in itself a cogent argument for relying on local buying and selling agents.

[34] In fact, the Board purchased only 400,000 tons of domestic maize but it imported 460,000 tons (Kariungi, 1983). Grower price was US$133.33 a ton for the 1980 crop (United States Department of Agriculture, 1981).

burden may be more than simply interest foregone; there may be an absolute problem of raising the money at all.[35]

Another function that might be undertaken by a department of marketing or a national trading corporation would be the operation or licensing of secure warehouses for merchant or farmer storage of grains, pulses, and other storable staples, and issuance of negotiable warehouse receipts that could be used as security for bank loans. (It is probably too much to hope that stocks could be hedged on the Chicago Board of Trade, but it is not impossible.) Government operation of crop storage facilities has not been very impressive in Africa, but perhaps some marketing board funds could be used to finance construction of warehouses for private management.

If establishment of such warehouses and availability of loans against warehouse receipts were accompanied by convincing official approval of merchant storage, it might be possible to reduce merchants' fear that they will be prosecuted and their stocks confiscated if they engage in this socially useful speculative service. If merchants felt that their stocks were secure, they would welcome the trading flexibility it would provide. It will not be easy to persuade merchants in most African countries that it is safe to admit to owning stocks greater than are needed for current transactions. The effects of twenty years of enlightened performance by government can be cancelled by one misguided seizure of stocks in a "crisis." Confidence might be restored more readily if the marketing board or marketing department undertook to insure stocks in storage against such an occurrence.

Persuading farmers to convert their stocks of food crops to cash at time of harvest so that the amount and position of stocks can be estimated better will also take time, but evidence from central Ghana in the 1970s indicated that a few more prosperous farmers with easy access to markets were already doing so (Southworth, Jones, and Pearson, 1980, p. 177). Farmers who hold stocks for the seasonal rise cannot be sure that it will occur—prices are influenced by more things than the cost of storage—and may prefer not to incur risk. It is conceivable, of course, that some farmers might be willing to trust their speculative stocks to a bonded warehouse when inflation or domestic unrest makes them reluctant to hold cash.

A Proposal

A national trading company could assist in correcting certain major deficiencies in the marketing of storable staple foodstuffs like cereals and pulses in various tropical African countries—deficiencies in spatial arbitrage caused by

[35] Pamela Cox reports in her article in this issue of *Studies* (p. 153) that the Kenya cereals board was unable to buy all of the maize that was offered to it in 1978, 1982, and 1983 and that the board was months behind in its payments to farmers in December 1983. Kenya coffee growers frequently finance a large part of the coffee marketing board's operation, receiving part payment on delivery and full payment only after the board has sold the entire crop.

problems of information, access, and finance and difficulties in interseasonal arbitrage caused by ignorance about the size of the stocks.[36] Such a board would be charged with competitive trading in designated staples between major terminal markets and with establishing, perhaps operating, bonded warehouses where merchants and farmers might store these commodities. It probably should not initially be authorized to engage in international trade; it will have its hands full conducting long-distance internal trade economically at the outset. It will also be easier to maintain its competitive character in internal trade than in foreign trade, where marketing boards have proved to be such a convenient taxing device. It might be associated with a department of agricultural marketing charged with fostering marketing efficiency (not with raising farm prices.)

Accomplishment of the proposal would not be easy. Marketing boards as they now exist in almost every African country have quite different objectives, and their staffs are ill-suited to aggressive merchant activities. In fact many of them, particularly the food boards, find it difficult if not impossible to accomplish the simple tasks of buying, assembling, and storing a few hundred thousand tons of grain.[37] The poor performance of marketing board employees is a convincing argument in favor of John Abbott's recommendation for "maintaining and building up the services of private firms in the produce trade" and "in continuing to use these sources rather than by extension of the board's own organization" (1974, p. 235).

But the central direction of the proposed board would differ completely from that of existing boards, and this would call for a basic reorientation of staff. The task will not be "to provide a good buying and collecting system for farmers' crops" (private traders do that), "to market them economically" (private traders do that too), or "to sell them on the best possible terms overseas" (the task of export boards).[38] Instead the task is to follow market prices

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[36] In reviewing the draft manuscript for this article, Roger Gray found parallels between what is proposed here and government-founded American mortgage corporations (Federal National Mortgage Association (FNMA), Government National Mortgage Association (GNMA), Federal Home Loan Mortgage Corporation (FHLMC)) that operate for profit and "have undoubtedly reduced market segmentation, provided finance, and enabled more rational storage."

[37] Frank Ellis (1983, p. 216) said that large numbers of Tanzanian state enterprises were up to 5 years in arrears in preparation of accounts, and Creupelandt (1983, p. 9) said of marketing agencies in the Sahelian countries that "some ... haven't even presented regular financial statements for several years."

[38] Abbott and Creupelandt (1966, p. 75) define the primary function of a board of type 4 as to buy in the open market when and where prices are very low and to sell when they are very high. The board proposed in these pages need not wait until prices are very low to buy or until prices are very high to sell. All it need conern itself with is whether the difference in prices between two markets is large enough to more than cover costs of moving produce between them and whether the difference is likely to persist until stocks can be moved.

in major domestic markets and to move produce from one market to another when a profit can be made by doing so, thus stabilizing prices among markets and over time by preventing large or persistent departures from equilibrium.

There is a great difference between price stabilization that consists of buying and selling at fixed prices over a period of weeks, months, or years and price stabilization that attempts to reduce lags and restrain overreaction to changing market conditions. The first transfers the risk of price change from farmers and merchants to government at the risk of progressive distortion of supplies from requirements. The second increases the reliability of prices as indicators of the relationship between supply and demand, and in this way it enhances their adjustment. The first destabilizes, the second equilibrates.

The perfect market, as conceived by Holbrook Working, reflects instantly all that can be known about supply and demand; a change in prices reflects a change in supply or demand that could not be foreseen, hence prices in a perfect market pursue a "random walk" through time. (See Working, 1958.) Some price uncertainty is thus inevitable in the perfect market if it is to achieve an economically optimum allocation of resources; uncertainty will be lessened by improved information and capacity of traders to respond. Any attempt to reduce price uncertainty by fiat is likely to reduce the efficiency of allocation, although it may sometimes be necessary to impose limits on the rate of change in prices in order to dampen hysteria or price manipulation.

As the tropical African economies mature, it is expected that private trading firms will develop with national capacity comparable to that of the national trading company. When this happens, it is appropriate that activities of the governmental agency, with its ever-present threat of political intervention, should be brought to a close. The risk of private monopolies seems slight. As Cyril Ehrlich said (1982), "long before African countries became independent there were measures to eliminate competition" by the establishment of farm marketing boards in Kenya and Zambia, perhaps elsewhere; this agitation was strongest among European farmers who feared the competition from African farmers. It will be a long time before a principal problem in private African food marketing ceases to be that merchants are too small.

Could It Happen?

Directors and staff of existing marketing boards are likely to find it difficult to achieve this change in objectives.[39] The notorious inability of existing food marketing boards to perform the tasks assigned to them is only partly

[39] There are interesting accounts of similar difficulties that the United Africa Company went through when it felt compelled to convert its west African activities from buying produce for export to selling merchandise to African consumers. Changing Indonesia's food supply board (BULOG) around from an agency charged with buying as cheaply as possible in order to provision the army and the cities into an agency charged with aggressively supporting farm prices was very difficult and required at least five years. (See Afiff and Timmer, 1972, pp. 135, 142, 156; Mears, 1981, pp. 544–

a consequence of politically inspired overstaffing and of managerial incompetence. It stems in large part from the fact that the price-fixing task assigned to them is an open invitation to bribery and corruption that becomes stronger the further prices depart from equilibrium. Even if it were not, and cadres were incorruptible and conscientious, enforcement would still require massive and equally incorruptible police action. (Wartime experiences with price control in the industrial nations give some notion of the difficulties.)

The task of the proposed national trading company is much simpler. Although the market can be a stern taskmaster, the staff would be working with it rather than against it. As Peter Temu has said, if private enterprise is not only tolerated but actively encouraged, it can serve "as a yardstick against which to measure the economic performance of public operators" (1983, p. 14).

There are competent, alert staff at all levels, some with commercial experience and more with commercial ambitions. Unfortunately there are not many, and of those not a few already have their eyes on more remunerative employment in private commerce and industry. Nevertheless, there are probably enough in most African countries to provide cadres that, with proper support, could conduct profitably the kind of commercial activities described here. It cannot be done all at once. Acquisition of trading skills will take time, even for those who have already learned how to requisition, transport, store, and invoice. One of the surest ways to sort the sheep from the goats is to make rewards depend on achievements—on trading profits. After all, to buy cheap and sell dear is not entirely foreign to tropical Africa.

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47, 574; and Mears, forthcoming.) What is asked of a national trading company is an even more difficult change of purpose. When Peter Bauer suggested that African governments "consider the promotion of a company for trading (including warehousing) in local produce" in 1962, he assumed that an expatriate firm would have to be brought into partnership to carry out actual operations (1965, p. 127). See also Abbott (1974, pp. 238–40) on the difficulties of combining public responsibility with commercial responsibility.

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