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THE IMPACTS OF MAIZE MARKET LIBERALIZATION IN KENYA†

Commodity marketing boards have come under increasing pressure to disband or privatize. "Market liberalization" represents a plethora of reforms intended to reduce government participation in commodity markets. Economists have long been critical of such institutions, citing the inability of marketing boards to achieve government objectives (for example, Jones, 1972, 1984). Economists have been joined in recent years by policymakers. Some within developing country governments see the jettisoning of subsidized marketing boards as a way to deal with burgeoning public deficits. Many members of the international donor community have become less interested in seeing aid monies used to sustain recurrent expenditures of marketing boards, particularly when such expenditures achieve little in the way of equity-related goals. In the view of many of its proponents, market liberalization is synonymous with unleashing the private sector, clearing the way for more rapid economic development.

The specific implications of reform for the commodity market in the host economy often are ignored by the proponents of market liberalization. Such detail seems unnecessary to those who view privatization with a sort of reli-

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gious fervor, and empirical information is often unnecessary to exact compliance by developing country governments. Reforms usually are part of structural adjustment programs and are linked explicitly to the provision of budgetary or balance of payments assistance from donors. Such attitudes may underestimate the importance of interest groups that favor marketing boards and maintenance of the status quo. However ineffective marketing boards may be, they usually are successful at serving some subset of producers or consumers. Most often, urban consumers (especially those in the capital city) will be well cared for by the marketing board. Moreover, some members of government invariably benefit from marketing boards, usually in the form of employment opportunities or transfers associated with rent-seeking or corruption. Other policymakers are cautious about change and are more comfortable with an entity they know and understand; to this group, "market liberalization" has about as much attraction as jumping off a cliff.

Given the interests of such groups, retrenchment from initially agreed reforms comes as little surprise. An interesting example of this problem is provided by the recent experience of Kenya's National Cereals and Produce Board (NCPB). Few developing country institutions have received so much criticism for such an extended period of time (Jones, 1984; Cox, 1984; Pinckney and Gotsch, 1987). Donor-instigated reforms, linked to structural adjustment assistance, have stipulated a large reduction in the board's participation in the maize market. The NCPB is expected to change from a major market participant, charged with enforcement of pan-territorial and pan-seasonal prices, to a buyer and seller of last resort. In spite of much criticism and official acquiescence in donor-sponsored policy reforms, the NCPB has demonstrated remarkable staying power. Initial agreements to remove restrictions on inter-district movements of maize have been rescinded, promises to reduce the number of buying and selling centers have not been implemented, monopolies on international trade have been maintained, and consumer and producer prices still are decreed by the government.

Throughout the iterative process of bargaining, concessions, and recalcitrant behavior, donors have been unable to generate good predictions about the expected impacts of market liberalization. Convincing governments to make lasting reforms, particularly in the more important commodity markets (such as those for staple foods), requires more detailed identification of possible consequences of liberalization. Research results may do little to persuade the groups well-served by current policies, but they provide crucial evidence for reformers. Such information also may help alter the opinions of policymakers who support current policies because they are uninformed or have little direct stake in the current system. This paper explores some of the likely impacts of potential reform of the Kenyan maize market. The following section describes the present role of the NCPB and the results of fieldwork undertaken in the first half of 1992 to ascertain the structure of private trading and processing. Imperfect enforcement of the board's regulations has allowed a thriving private trade in maize; a study of private maize trade affords a use-

ful opportunity to characterize some of the changes that could result from wholesale reform of the market. Because processing activities are carried out primarily by the private sector, a detailed understanding of them within the regulated environment provides useful insights into the potential for change.

STRUCTURE OF THE MAIZE TRADE

Maize is the most important crop in Kenyan agriculture, grown in almost all agro-ecological zones and on nine-tenths of Kenya's farms. Eighty-five percent of the crop is grown on smallholdings. Maize is produced with a variety of farming technologies, varying from labor-intensive smallholder operations with few purchased inputs to large, capital-intensive farms. Yields range widely among regions and over time, reflecting the variability in agro-climatic and weather conditions. One of the reasons advanced for the presence of maize in especially inhospitable zones is that local markets and NCPB facilities are not reliable, especially in drought years (Pearson et al., 1992).

The NCPB is a major participant in the maize market. Pan-territorial and pan-seasonal prices are established annually by an interministerial price review committee for every level of the marketing chain. The board purchases maize through a network of buying centers situated throughout the country. In principle, when a district's production exceeds local demand and the price falls to the official floor price, the board is expected to intervene and buy all the surplus. The NCPB is responsible for transferring these surpluses (coming mainly from the western and central parts of the country) to deficit areas to prevent prices there from rising above the official ceiling price. When necessary, the board uses international markets to cover aggregate deficits or eliminate surpluses. Imports have been required in three or four of every ten years.

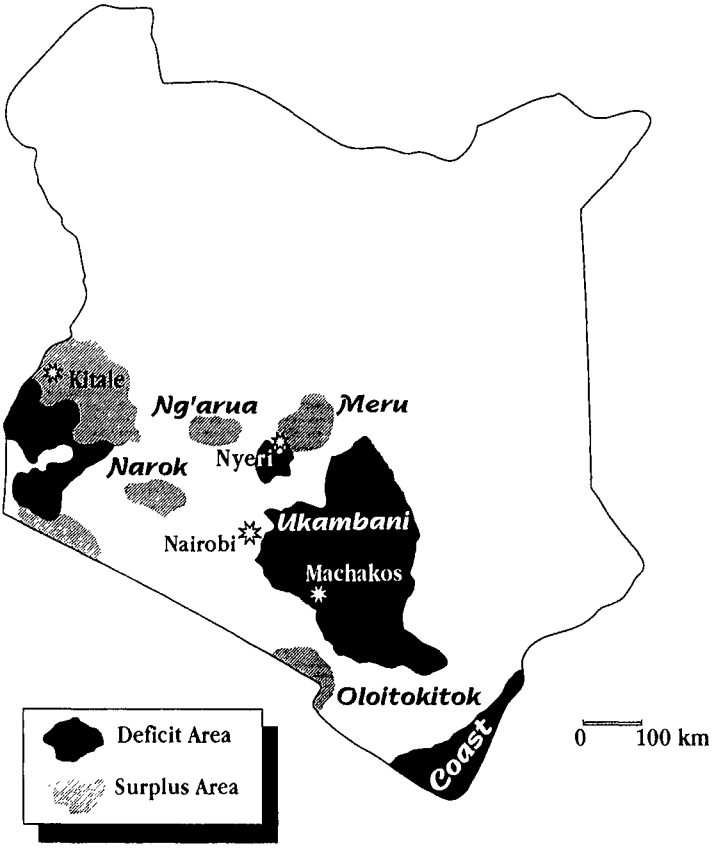
Most maize is not marketed, but consumed on the farm. Estimates for 1983-89 are that only 41 percent of total production was sold (CBS, 1990). Of this amount, the NCPB accounted for a substantial, but not overwhelming, proportion. Except for the drought years, the share of NCPB purchases in total production has never exceeded 27 percent. In 1991, the share reached its lowest level (12 percent) since 1980 (Monke et al., 1992).

The private informal market thus provides an important alternative to selling maize to the NCPB. The informal market mainly serves rural areas, consisting of small amounts transported legally over short distances and larger amounts marketed illegally, often over long distances. Informal market transactions often violate movement controls, an instrument intended to limit the participation of private traders in the maize market. During the 1980s, the maximum amount that could be transported across district borders without a permit was one (later 10) 90-kg bag. Such permits were rarely issued by the NCPB. In part because of aid donor pressure to liberalize maize marketing, this limit was extended to 44 bags in March 1991; for 1992, the limit was raised further to 88 bags (8 metric tons (mt)). The immediate impact of these changes was unclear; in many regions, police remained adamant about

enforcement of the earlier limits. Permits from the NCPB became more commonplace, but were sold to cover movements that were, in principle, legal. In November 1992, movement controls were reinstituted on amounts larger than 10 bags.

Collection of information about the informal part of the maize market was a principal task of a collaborative field research effort in early 1992, undertaken by a team from Egerton University, the University of Arizona, and Stanford University. More than 450 interviews were conducted with farmers, transporters, retailers, store owners, millers, and NCPB and other government officials. Policemen stationed at the many roadblocks throughout the countryside were often a valuable source of information. A wide range of areas was studied, including the coast, the southern border (with Tanzania), and the Mt. Kenya area (see Map 1). Closest attention was given to the central and western maize surplus areas (Trans Nzoia, Uasin Gishu, Nandi, and Bungoma Districts), Nairobi, and the western deficit areas of southern Kakamega, Kisumu, Siaya, and Busia. Observations in these areas afforded good insights into typical patterns of local and longer distance trading systems.

Map 1.—Study Sites in Kenya



Interviews focused on each level of the marketing chain to generate a composite picture of the private marketing system. At almost every level, interview subjects needed careful prodding and verification that the research team was affiliated with a university rather than with the government. Such needs testify to the fragile, quasi-legal status of the private trade in maize. Once credibility of the researchers was established, however, most groups spoke freely. Farmers are the main source of stored maize (other than the NCPB) and provided information about selling patterns over the year. They also gave leads to the location of private traders. Traders were generally the most suspicious of the interviewed subjects, but almost all eventually were willing to discuss their businesses. The quality of responses varied greatly, however, and the team needed to make judgments about the reliability of the information collected. Enough cooperation was found to give a good idea of the trading routes and the costs of trading. Returns to trading were the most sensitive topic. Retailers and owners of small stores were the most reliable sources of information about prices over time and the sources of maize during different times of the year. Their responses provided useful cross-checks on the information provided by farmers and traders. Various public employees—policemen, customs officials, and NCPB officials—also were interviewed.

The pattern of trade for the local rural market was similar in all regions studied. Farmers deliver small quantities (usually not more than a few bags of maize) to the local retail market or store. Transport is provided by a variety of methods, including headloading, bicycle, donkey, pickup truck, or matatu (the ubiquitous transport-for-hire service, usually a pickup truck or station wagon). Maize delivered to the market is sold by market women, often a member of the farm family.

Maize destined for other market locations generally goes through small stores (Chart 1). Typically, these stores have one or two people working; the number varies with the volume of activity. Throughput is in the range of 100 to 300 mt per year. Stores are very flexible parts of the marketing system. Entry is simple, requiring only the rental of a building in the market or village (costs were usually only a few hundred shillings per month), a weighing scale, and cash to finance transactions. Store owners might maintain a particular location throughout the year if the region provides adequate business. This situation was most common in areas having two harvests per year. But many store owners migrated, following the patterns of peak activity from market region to market region. The number of stores in a particular market thus would vary during the course of the year. Three was a typical number for a market area during the off-season; this number would increase to as many as 25 during the peak season.

The aim of these stores is not to stock products for long periods of time in anticipation of price rises, but to turn over as much maize as possible in a given period. The very strong preference of traders is to maintain small stocks. The largest inventory encountered during the survey was 1900 bags

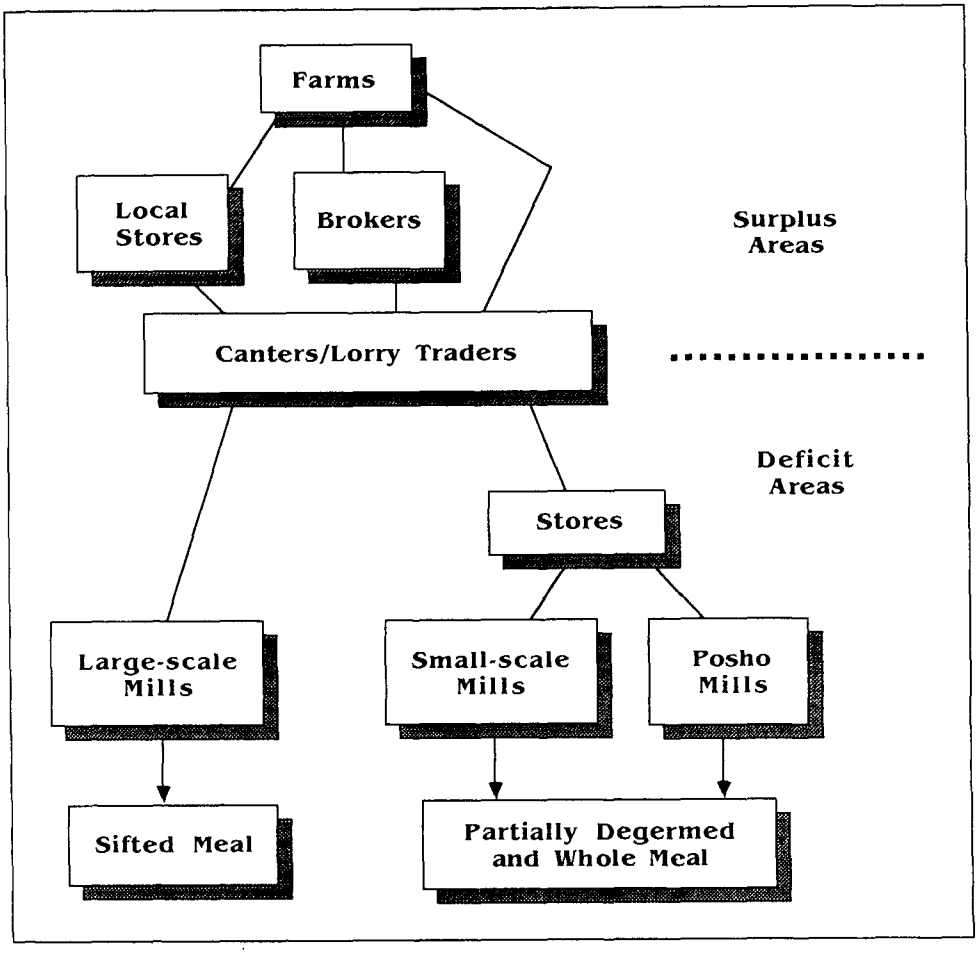
(about 171 mt); 60 bags (5.4 mt) was more typical. The capacity of almost all stores was less than 400 bags. If buyers were not immediately forthcoming, store owners usually would hire lorries and deliver the maize to NCPB or to deficit areas some distance away.

This concern with spatial rather than temporal arbitrage stands in contrast to the private sector activity patterns seen in other African markets, where the tendency has been for traders to emphasize intertemporal functions rather than regional integration (Jones, 1972; 1984). In Kenya, the storage activity is left to farmers and the NCPB. Such behavior is at least partly a response to the uncertainties created by irregular enforcement of official prices. The board often is ineffective at enforcement of pan-territorial and pan-seasonal prices because maize is not available for sale in deficit areas at the appropriate times or because board purchasing (selling) operations are not functioning effectively in surplus (deficit) areas. As a result, maize prices usually vary over time and among regions. Sometimes, the variations are dramatic (Sharpley, 1986; Schluter, 1984; Rocco, 1990). Price variations among regions can be recognized and exploited by private traders with relative certainty. Private traders take full advantage of the board's ineffectiveness in pan-territorial pricing. At any particular time, maize moves toward whichever regional market is providing the most attractive price. Arbitrage is far from perfect, and substantial inter-regional price variations remain in spite of private movements. Nevertheless, regional movements can be credited with reducing the deviations from pan-territorial prices.

Exploitation of arbitrage opportunities that arise from ineffectiveness in pan-seasonal price policy is quite another matter. The prospect of positive returns to storage is conditional not on the contemporaneous ineffectiveness of the NCPB, but instead on the board's failure to intervene in the market at some future time. The extra risk for the private trade in seasonal arbitrage is that poor enforcement always can be rectified over time. If the NCPB should decide to supply a market where prices had been rising, prices would fall back to the official price and traders would lose all of the accumulated costs of storage. High costs of capital (interest rates in informal credit markets are commonly 10 percent or more per month) mean that losses would be substantial, even if the stock were held only for a few months. For most regions, the prospect of NCPB intervention seems plausible enough to prevent much storage by the private trade.

Such price risks are less onerous for farmers, who store primarily for home consumption. The financial storage costs of farmers' marketed surpluses are relatively low. The storage facility is justified by home consumption needs, and marketed surpluses are so small that they do not impinge on the capacity of the storage facility. The marginal cost of farm storage facilities thus is near zero. For farmers, the occasional losses that arise from NCPB enforcement of pan-seasonal prices occur largely as opportunity costs—the farmer loses the time value of revenues that could have been realized by earlier sale. For many farmers, the opportunity cost of revenues foregone will be

Chart 1.— Structure of Long-Distance Maize Trade in Kenya, 1992



less than the rate of interest in the informal credit market because of their limited ability to act as lenders in such markets. But even if the informal credit interest rates were used to estimate opportunity costs, such costs are at least partially offset by the contributions of extra stocks to household food security—the value of having maize available to cover unexpected consumption needs or unexpected losses in storage. Hence, farmers are more willing than traders to bear the extra price risk occasioned by the NCPB's imperfect enforcement of pan-seasonal prices.

Most stores are patronized by lorry traders (Chart 1), who bulk the commodity and move maize over distances as large as 600 km, often to urban markets such as Nairobi or Mombasa. In the surplus areas, store owners are joined, or even displaced, by brokers soliciting maize from farmers. Brokers locate farmers with maize to sell, inspect, weigh, and sew the bags, and wait in the nearest market for the arrival of a lorry. At times, especially during the

peak selling season after harvest, lorry owners take on the brokering activity themselves and buy directly from farmers. Lorry traders also buy maize from NCPB depots in the surplus areas when on-farm supplies decline or become more expensive than NCPB supplies.

Most lorries involved in the long-distance maize trade have capacities between 8 and 12 mt, or 100 to 150 bags. Smaller lorries (canters), with capacities about half as large as the big lorries, are more common on the shorter routes. The general pattern of trade is to leave the surplus areas in the morning and sell from market to market in the deficit areas until the load is finished. In the evening, the trader returns to the surplus area. Entry to the lorry trade is constrained only by a trader's ability to raise the Kenya shillings (KSh) 30,000 to 50,000 needed to purchase a lorry load of maize. At times, the load represents the combined resources of several individuals. Most lorries are rented.

The interactions between government regulations and private trading behavior are most apparent in the longer distance trading. By early 1992, loads of 88 bags of maize were legally entitled to free movement across district boundaries, so long as the seller accompanied the load and movements did not occur at night. But police continued to require movement permits. On shorter routes, traders typically were willing to take a chance that no police road blocks would interfere with their transport. They thus would forgo the permit. On longer routes, since the number of roadblocks was larger, the risks of loss were greater and permits were always obtained. Government authorities or others were quite willing to take advantage of police policy and freely sold permits to traders. Because permits could be so easily purchased, traders emphasized larger trucks and loads routinely exceeded the 88 bag limit. The need for permits increased the cost of trading, but usually did not prevent maize movements.

After maize arrives in the deficit area, it moves to a store, usually closely associated with a mill (Chart 1). Almost all maize is milled before consumption. Three major types of meal are produced, each associated with a different milling technology. Sifted maize meal is produced by the large-scale mills with capacities between 2,000 and 5,000 mt per month. These mills are located mainly in urban areas—more than half of installed capacity of these mills is in Nairobi and Mombasa. In this technology, all the germ and bran are removed from the kernel and only the starch and gluten are processed into maize flour. This product is particularly popular in urban areas because it is the easiest to prepare and has a much longer shelf-life than the alternative products (ILO, 1984).

Small-scale mills, or granulated mills, have capacities between 300 and 1800 mt per month. They are built locally and produce partially degermed meal and whole meal. Milling often is done on a custom basis, allowing the millers to avoid the potential constraints of official pricing policy. The smallest mills are known as posho mills. They are simple electric or diesel-driven grinders, with capacities of 90 or 100 mt per month. Posho mills produce only

whole maize meal, always on a custom basis. These mills are ubiquitous; every local market in Kenya has at least one. They are the dominant technology in rural areas.

Regulation of the milling industry is directed most intensively at the large-scale mills. The NCPB requires all large-scale mills to obtain licenses for construction and operation and will not sell maize to a mill without such approvals. The board thus controls the location of mills; often, mills are located in immediate proximity to NCPB stores. Mills purchase maize according to quotas. Before 1986/87, all maize supplies had to be obtained from the NCPB. Since then, quotas have been relaxed somewhat. By the 1990/91 season, only 70 percent of maize supplies had to be purchased from the board. These limits are generally moot because of all the other regulations on milling activity. Each mill is required to file weekly reports on the acquisition of maize supplies and the disposition of maize meal with the board (permits are required to sell maize meal across district borders). In-mill and ex-mill prices are set by policy; they are held almost constant across regions (varying less than KSh 10 per 90 kg bag) and throughout the year. Because of these price controls and the movement controls, large-scale millers have little incentive to engage in long-distance trading. Most large-scale mills (about 70 percent of installed capacity) are located in the deficit areas. Each mill serves only its local district market.

Average capacity utilization in the large-scale milling industry is below 25 percent. Mills in deficit areas average 17 percent; mills in surplus areas, 30 percent. Capacity utilization among small mills averages about 41 percent. The posho mills average 54 percent. Part of the explanation for these low utilization rates is that milling activity is somewhat seasonal. Small-scale and posho mill activity decline in the immediate pre-harvest period, coinciding with a decline in the private marketing of locally produced maize. During this period, the large-scale millers have their peak activity, and sifted maize meal often can be found in rural markets and other areas normally dominated by whole meal.

RESPONSES TO MARKET LIBERALIZATION

The response of the private trade to liberalization of the maize market is likely to be most evident in the long-distance trade and the large-scale milling industry. These parts of the trade are directly affected by government regulations—movement controls for maize and sifted flour, controls over location and capacity utilization of sifted flour millers, and obligations of large-scale mills to purchase the stocks of the NCPB. Attention in this analysis thus is focused on the economic impact of changes in the technology of long-distance transport, the relocation of sifted mills toward surplus producing areas, increases in storage activity by the large-scale mills, and changes in the rate of capacity utilization in large-scale milling. Changes in the location of large-scale mills are feasible because these mills produce a storable product, mak-

ing possible long-distance transport of maize flour instead of maize grain.

The other parts of the private trade—the short-distance trade within rural areas, storage activity by rural store operators, and the small-scale and posho millers—also would be affected by market deregulation and a diminished presence in the market of NCPB, but to a lesser extent than the long-distance trade. Local trade in maize is largely unhindered by maize policy. Problems sometimes occur with police at local roadblocks, but these problems arise independently of maize regulations. The most significant impact on local maize trade is likely to involve the scale of transport, as large lorries become legal and displace the smaller canters. Off-farm storage in rural areas would become a more attractive undertaking without the specter of the NCPB and pan-seasonal prices, but capital constraints may prove a limitation on the magnitude of this activity.

Although the board also imposes some regulations on the registration of small-scale mills, these do not appear to have limited very much the number of mills. Only 76 of 200 registered small-scale mills are operational. Posho mills are manufactured locally, and their number is not restricted. Because these mills produce a highly perishable end-product (whole meal), the mills need to locate near their consumers. Such firms may well find opportunities to expand in a liberalized market. But this adjustment, as well as the others alluded to above, depend very much on the decisions taken about price levels. These decisions are largely independent of deregulation of the trade. Even in a liberalized market environment, the government may choose to influence price levels. In this instance, the growth of the private trade and small-scale processing depends on the relative prices set for the different maize flours and consumer responses to those prices.

Costs and Returns in the Maize Trade

One of the main concerns of the fieldwork was to query individuals involved in the maize trade about the costs and returns to trading. The former estimations proved much more straightforward than the latter ones. Representative trading activities were identified to represent different scales of operation and different locations. Input requirements for each activity were discussed with each respondent. Relevant market prices were collected from traders and from other local sources in each of the market locations. Although judgments needed to be made about the value of trader time, the costs of bribes, and the risk (and frequency) of physical losses in trading, these problems were tractable.

Much more complicated was assessment of the margins available to maize traders. In principle, these margins were fixed by policy. In practice, prices for maize and maize meal varied a great deal among locations. Within each destination market, the selling prices of maize were similar for all traders. In almost all of these markets, competition among buyers and sellers was evident. But among the destination markets studied, the price of maize varied.

Within the deficit areas, these variations were as much as 30 percent. In December 1991, for example, the price of maize in the deficit area of Machakos was about KSh 4600/mt; in Nyeri, the price was about KSh 3500/mt. In the surplus markets supplying maize to traders, price variations were smaller, usually 10 percent or less. December prices in Kitale (in the west) and in the Meru region (in the central part of the country) were between KSh 2700 and 3000 per mt; both these quotations were below the official producer support price of KSh 3300/mt.

Pan-territorial floor prices for producers thus were not guaranteed by board operations. Official producer prices varied by less than KSh 100/mt between surplus and deficit regions. Actual price variations encountered in this study were as much as KSh 1900/mt, or 60 percent of the official price. Similar discrepancies between official prices and market prices were found over time. In principle, price policy permitted no seasonal variation; in practice, prices over time often varied widely.

Among processed maize products, the consumer prices for sifted maize meal conformed closely to the official prices established by the NCPB (about KSh 6000/mt maize meal), reflecting the success of board policy in monitoring the trade of the large-scale sifted maize millers. But the prices for the partially sifted and whole meal products deviated substantially from the official prices. Official prices for unsifted maize meal (No. 1) were about KSh 4100/mt meal; observed market prices were about KSh 6500. For whole meal, the product of the posho mills, official prices were the same as for the price of No. 1—KSh 4100/mt. Observed market prices for whole meal ranged from KSh 4300/mt in surplus areas to as high as KSh 6300/mt in some deficit markets.

Table 1 presents data on the costs of maize marketing for the long-distance private trade and describes the simulated impacts of different liberalization scenarios. Although many different activities and combinations of activities could be presented, attention here focuses on a system that is likely to show the most substantial impacts from liberalization—the long-distance transport with large-scale milling. The system represents the bulking and movement of maize from Kitale, one of the main surplus producing areas in the west, to the principal deficit market of Nairobi, about 500 km away. Large-scale millers produce sifted meal, the most prominent form of consumed maize, particularly among urban consumers.

The costs described in the base case are those of the officially sanctioned system—technologies and practices that are not in violation of the movement controls and other policies in force at the end of 1991. Transport is assumed to be done by 4 mt canters, trucks that are well-suited to the 44-bag, free movement regulation. In principle, the limit on movement controls was raised to 88 bags in 1992; in practice, such loads still required movement permits in most areas.

Table 1.—Costs of Maize Marketing and Processing Under Liberalization
(1991 KSh/mt maize grain)

	Simulations of market liberalization				
Activity/inputs	Base case	Elimination of movement controls	Relocation of milling and storage	Increased capacity utilization	Total costs
Collection of maize					
Store	6				6
Store owner	28				28
Store labor	11				11
Scale	11				11
Working capital	17				17
Miscellaneous	4				4
Transport (500 km one way)	(4 ton canter)	(15 ton lorry)	(15 ton lorry)[a]		
Transport equipment	206	133	106		106
Fuel	595	248	198		198
Tires	116	80	64		64
Repairs and maintenance	79	28	22		22
Insurance	51	18	14		14
Road license	2	1	1		1
Driver	37	26	21		21
Turnboy	28	23	18		18
Trader	278	278	222		222
Large-scale milling	(deficit area, 17 % capacity utilization)			(surplus area, 38 % capacity utilization)	
Fixed Costs					
Buildings	115			52	52
Machinery	277			124	124
Other Equipment	3			1	1
Labor					
Skilled	127			57	57
Unskilled	41				41
Intermediate Inputs					
Electricity	62				62
Oils and Grease	1				1
Packaging Materials	385				385
Phytosanitary Treatment	1				1
Transport	79				79
Insurance	24				24
Repairs & Maintenance	69				69
Rental Services	8				8
Working Capital	57				57
Miscellaneous	12				12
Changes in value of by-product			-148		-148
Storage costs	(NCPB)		(mill)[b]		
Overhead	944		25		25
Handling and carrying	176		310		310
Total costs	3852				1906
Savings from liberalization		557	1100	289	1946

Source: Authors' surveys.

[a] Transport costs are lower because lorry assumed transport sifted maize meal instead of unprocessed maize.
[b] Carrying costs are estimated at KSh 200/mt (KSh 4000/mt maize * 6 months storage * 10 percent interest). The cost of handling and losses (2 percent) are estimated at KSh 100/mt maize).

Among the items listed in the transport cost budget, the greatest uncertainty involved the valuation of trader time and expertise. In the survey, traders indicated that a price differential of KSh 25 per 90 kg bag (KSh 278 per mt) was the minimum necessary to induce them to trade maize. This sum covers a number of cost items that are difficult to measure—the personal valuation of time, the bribes that might have to be paid, physical losses, and the risk of jail or fines for offering bribes to an incorruptible policeman. All of these adverse events were reported on the Kitale-Nairobi route during 1991.

Cost data for milling were based on the responses from 12 of the 21 operating large-scale mills. These mills operate at very low rates of capacity utilization—those in the surplus areas averaged only 17 percent. Low utilization rates reflect two general problems. Because of the pan-territorial, pan-seasonal pricing policy, millers can not profitably store or transport sifted meal to distant markets. Even though the pricing policies are not enforced in many regions, attempts by millers to exploit arbitrage opportunities would be noticed easily by the NCPB and probably looked upon unfavorably. Large-scale mills depend on the NCPB for much of their maize supplies, and arbitrage activity could easily provoke damaging retaliatory behavior by the NCPB. Mills also suffered frequent down-times from problems with procurement of maize from the NCPB. Each mill produces its own brand-label maize flour, and poor quality of maize supplies would sometimes force the mills to close down to safeguard consumer loyalty. Because of low rates of capacity utilization, fixed costs and skilled labor (largely a fixed cost as well) account for 40 percent of total milling costs. Storage and transport of maize to the mills are handled by the NCPB. In the deficit areas, transport usually is minimal. Mills often are established adjacent to NCPB stores, and the maize can be taken directly from the NCPB silos.

Total costs of the baseline system are KSh 3852/mt maize grain, nearly three times as large as the official margin. The official margin for this route was KSh 1350/mt maize—the value of sifted meal (KSh 4950/mt maize grain-equivalent) plus the value of by-products (KSh 400/mt maize grain-equivalent) less the ex-depot price from NCPB stores in surplus areas (KSh 4000/mt maize grain). Given this substantial difference between costs and returns, how does the private sector manage to participate? Three adjustments are critical to establish positive private profitability in the long-distance maize trade. First, all storage costs are borne by the NCPB. The board covers part of these costs by the margin between ex-depot prices and prices paid to farmers (KSh 700/mt maize in 1991/92). Second, most traders do not use the 4 mt canters for longer distance transport, but instead rely on the larger 15 mt lorries. These lorries

have costs per mt only 60 percent as large as the costs of the smaller canters (Table 1, column 2). To use such transport, however, traders need to secure permits; the (illegal) market price for such permits in 1991 was about KSh 20/bag (KSh 220 per mt). These adjustments reduce the private sector marketing costs to about KSh 2400/mt maize.

The remainder of the adjustment to the margin is borne by farmers in the form of lower maize prices. The NCPB ex-depot price has little direct relevance for the long-distance trade. The implicit farm-gate price necessary to sustain positive private profitability in the system described in Table 1 is KSh 2950/mt maize, or KSh 265/bag. This price was about 10 percent below the official NCPB purchase price (KSh 3300/mt or KSh 300/ bag), but well within the range of post-harvest prices observed in the surplus area markets (KSh 2700-3000/mt maize). Even though NCPB prices were higher, the observed market prices were attractive to some farmers because of the lack of logistical difficulties with delivery and the absence of payment delays. Both of these problems were common complaints made by farmers about the NCPB system.

These adjustments make for profitable trading opportunities. Nevertheless, the present magnitude of long-distance trade is small. Large-scale mills in the deficit areas, whose margins are tightly controlled by NCPB policy, procured only about 5 percent of their supplies from the private trade. Most or all of this amount is bought in the immediate post-harvest period, when maize grain prices are lowest and thus attractive from the perspective of the millers. Much more prominent activities for the private trade involve the shorter routes and the market outlets that are less rigidly controlled by NCPB policy. Large mills in the deficit areas obtained about 20 percent of their supplies from the private sector. Small-scale millers (producers of the less rigidly price-controlled No. 1 meal) in the deficit areas purchased about 30 percent of their maize supplies from the private trade; in the surplus areas, this share rose to about 60 percent.

Liberalization and Potential Costs in the Maize Trade

The baseline results show that substantial potential exists for prices to increase in the maize market. If government subsidies to the NCPB were eliminated, movement control regulations were strictly enforced, and the producer price were effectively supported at the official level, all of the costs described in the baseline system would be passed on to the consumer price for sifted maize meal. The sifted maize meal price necessary to support the officially sanctioned marketing system described in the base case would be about KSh 9000/mt maize meal (KSh 7150/mt maize grain-equivalent). This value is about 45 percent above the 1991/92 price for sifted maize meal. The tradeoff between consumer price increases and continued subsidization of the maize market warrants close examination of the possible impacts of liberalization.

Most attention by policymakers and donors has focused on movement controls (Table 1, column 2). Raising these limits has been a priority within

the donor-supported Cereals Sector Reform Program, and schedules for decontrolling maize movements have been stipulated in a number of financial assistance agreements between the Government of Kenya and various donors. Effective decontrol of maize movements would legitimize the use of the larger, 15-mt lorries in place of the smaller, 4-mt canters and would result in cost reductions of about KSh 560/mt maize for the long-distance route described in the base case. Although larger lorries could play a wider role in the shorter route trading as well, cost reductions would be correspondingly smaller.

But far more savings can be realized from deregulation of the processing sector and transfer of storage activity to the mills (Table 1, column 3). Such changes imply a very substantial reduction in the operations of the NCPB. The monitoring of prices could still be maintained, but the board would participate only as necessary to support the floor price for producers (the current support price is KSh 3300/mt maize). Most NCPB storage activity (if undertaken at all) would be related to long-term food security needs, rather than the provision of normal operating stocks. Under a freer market, millers in the deficit areas would have a strong incentive to relocate to the surplus areas. Since sifted meal has only 80 percent of the weight of unprocessed maize, relocation to the surplus areas would allow transport costs to decline by about KSh 170/mt maize.

A further savings would be realized from reduced transport of the by-products. Under the present system, many of the by-products of maize milling are returned to the surplus areas for use as animal feeds; the surplus regions also are the main dairy regions. Elimination of the "double-transport" of the feed component of maize would allow a cost saving of nearly KSh 150/mt. Storage costs of the private sector also appear to be substantially lower than those of the NCPB. Millers in surplus regions again would have an advantage relative to some of the deficit regions, such as Mombasa, where climatic conditions make storage more difficult and costly. Surplus regions tend to have more favorable climatic conditions for storage, thus adding to their competitive advantage.

If the milling sector were deregulated and milling capacity began to shift to the surplus regions, changes would be likely in the rate of capacity utilization (Table 1, column 4). These changes probably would occur gradually. Because capital costs of mills are sunk costs, millers would be able to tolerate relatively small margins. But as plants and equipment wear out, replacement of many mills in the deficit areas will not be justifiable and surplus area mills will be able to expand their markets. At present, large-scale mills in the surplus areas operate at about 30 percent of potential capacity (after adjusting potential capacity for public holidays and the off-days stipulated in trade union agreements). The simulation reported in Table 1 increases the observed rate of capacity utilization of mills in the surplus areas by 25 percent; buildings, machinery, other equipment, and skilled labor are judged to be capable of handling the increased output without further increases in inputs. The simulated increase brings the utilization rate to 38 percent of potential; costs of processing then decline by about KSh 260/mt maize relative to those of the base case.

Higher rates of utilization and greater cost savings may well be possible.

The total impact of market liberalization on the costs of maize marketing is dramatic (Table 1, column 5). If all the reforms were implemented, marketing costs would decline by nearly KSh 2000/mt maize, to about half of their 1991 level. Such cost reductions would allow the government to sustain the 1991/92 official marketing margin without subsidies from the government budget. The official consumer and producer prices thus are consistent with a much reduced government role in the maize market. Instead of heavy involvement in the day-to-day operation of the maize market, government efforts (and budget) would be freed to focus on the more germane threats to national food security—year-to-year variability in domestic demand and supply balances.

The other major benefits and costs of liberalization involve the consumers and producers in the less-regulated markets. The private sector is thriving and active, with many participants and substantial entry (and exit) in spite of restrictive regulations. There is no reason to doubt that the private sector would expand rapidly in the event of deregulation and therefore provide closer links between markets in surplus and deficit areas. Consumers in surplus areas and producers in deficit areas would lose if the liberalization of trade led to a reduction in inter-regional price variation and closer correspondence between market prices and official price targets; consumers in deficit areas and producers in surplus areas would gain. But measured in terms of output, in surplus areas producers outnumber consumers and in deficit areas consumers outnumber producers. Unless equity concerns are particularly biased toward consumers in the surplus areas and producers in the deficit areas, net gains to the less-regulated areas from market liberalization will be positive.

CONCLUSION

As the proponents of market liberalization suspected, the potential benefits of market reform are great. Maintaining the present marketing system would require continued subsidization from the government budget and would penalize farmers and consumers in the less well-regulated markets. Alternatively, a greater reliance on market forces—private trading with larger-capacity vehicles and expansion of milling and storage activity by the private sector—could sustain the official marketing margin (the difference between the official consumer and producer prices). In that situation, the marketing margin could be maintained without government subsidies. This prospect makes more attractive a decision to reduce the presence of the NCPB in the market. Equity-related goals of policy, represented in the official consumer prices for maize meal and the producer prices for maize, need not be sacrificed with reduced government regulation of the market. Prices would demonstrate seasonal and regional variation, but probably less than currently occurs with imperfect enforcement of policy prices. The only substantial losers from reform would be the employees of the board and members of the private sector—large-scale millers in deficit areas—who presently depend on

board practices for their profitability and existence.

The largest savings from liberalization arise from changes in the regulations that are most closely respected by the private sector—stipulation of the location of large-scale mills, movement controls for maize meal, and pan-seasonal prices. In these cases, enforcement or fear of enforcement of the regulations has proven an effective deterrent to private sector activity. Gains from reform of movement controls are of a lesser magnitude. To the extent that the private sector is able to evade movement controls, these gains already have been captured by the economy. Movement decontrol would lower maize marketing margins by reducing the extent of bribery and illegal payments for movement permits that are a feature of the present marketing system. But these costs are mostly transfers from maize consumers and producers to public sector employees, rather than foregone efficiency gains. Whereas the emphasis of donor-sponsored reforms has been on deregulation of movement controls, changes in the location of processing and transfer of the storage function to the private sector offer the largest reductions in marketing costs and the greatest gains to the economy. Movement decontrol is thus only one step, albeit a critical one, toward a low-cost maize marketing system.

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