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## **Interactions Between Food Market Reform and Regional Trade in Zimbabwe and South Africa: Implications for Food Security**

by

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# **INTERACTIONS BETWEEN FOOD MARKET REFORM AND REGIONAL TRADE IN ZIMBABWE AND SOUTH AFRICA: IMPLICATIONS FOR FOOD SECURITY**

by

T.S. Jayne, T. Takavarasha, and Johan van Zyl

November 1994

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## 1. INTRODUCTION

Throughout the world, the major share of staple food costs to the consumer is typically accounted for by marketing costs. The maize-based agricultural economies of Southern Africa are no exception: in Zimbabwe and South Africa, farm-gate maize prices over the period 1985-1994 accounted for only 37% and 32% of the total value of commercial maize roller meal.<sup>1</sup> This implies that productivity gains within the marketing system that would reduce marketing costs by 10%, for example, would have a larger impact on the cost of food to consumers than a 10% reduction in farm production costs brought on by new farm technology. Efforts to improve farm-level productivity are absolutely critical to achieve broad-based rural income growth and food security (Mellor 1976; Staatz 1994). Yet, as we indicate below, the potential for future farm-level income and productivity growth in the region may be intimately tied to future productivity growth in the broader food system.<sup>2</sup>

A major role of agricultural policy is to identify policy changes that may induce technological innovation and productivity growth throughout the food system, in order to increase the living standards of people who must relate to it in one way or another. While food market reform has been subject to contentious and often emotional debate over the last decade in Africa, the debate has generally been over assumptions about how food markets work in reality as opposed to theory, and how markets actually respond to particular forms of policy change (Hewitt de Alcantara 1993; Jiriyengwa 1993; Dioné 1991; Lele and Candler 1984). The lack of consensus is partially due to a shortage of empirical, ground-level information linking specific policies to specific impacts. It is in this context that we draw on applied analysis in Southern Africa to make some observations on recent food market reforms and their effects on the performance of food systems in the region.

Domestic food market reform also has important implications for regional trade. Regional competitiveness is determined not only by differences in farm production costs (soil fertility, rainfall, input costs, etc.) but also on the costs of distribution, storage, and processing that make up the bulk of the final cost of food to consumers. To the extent that food market reform would alter demand patterns, choice of technology, and relative costs throughout the various stages of countries' food systems, regional trading incentives are a function of domestic food policy. The latter part of this paper considers how potential food market reform in South Africa will alter relative prices, trading incentives, and distributional consequences within the region. Particular emphasis is given to Zimbabwe and South Africa, the two largest traders of maize in the region.

We highlight five conclusions:

1. Food market reform in Zimbabwe, as in Tanzania, Malawi, and Kenya, has been associated with increased marketing board budget deficits. The marketing boards'

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<sup>1</sup>For further evidence in Africa and Asia, see Ahmed and Rutaji (1987).

<sup>2</sup>The food system refers to the various stages and modes of coordination required to produce food and put it on consumers' tables, including input supply, farm production, distribution, processing, and retailing (see Shaffer 1980).

financial crises primarily reflected governments' view that they could continue to mandate their food marketing boards to buy and sell at fixed prices throughout the year irrespective of market conditions in the nascent private trading channels legalized through market reform. While market reform, as it has been implemented in these countries, has exacerbated marketing board deficits, this result is clearly not inevitable if reform were accompanied by a more flexible marketing board pricing policy, which responded to changes in private trading conditions. The experiences of these countries have important implications for the design of food market reform in South Africa.

2. Maize market reform in Zimbabwe and Kenya has reduced the margin between the producer price of maize and the consumer price of maize meal, by opening up distribution and milling channels previously blocked by regulation. These developments have had a beneficial effect on household food security.
3. The welfare of South African white maize farmers is indirectly yet intimately tied to the efficiency of South African maize distribution and processing system. The future magnitude and direction of maize trade under a less controlled external trading environment will depend greatly on the nature of impending food market restructuring in South Africa. Food market reform in Zimbabwe, for example, has substantially altered the relative costs of maize meal between Zimbabwe and South Africa. A lack of productivity growth in South Africa's maize marketing system is likely to depress its farmers' maize output, farm prices, and share of the South African maize meal market under a less regulated external trading environment. Farmers in Zimbabwe are likely to benefit from strong incentives within South Africa to import maize meal from Zimbabwe.
4. The foregoing indicates that domestic food market reform in South Africa — as a means to reduce the margin between farm gate prices and retail maize meal prices — will be a critical prerequisite for the continued viability of the South African maize sector under a less regulated regional trading environment. This conclusion has important implications, not only for commercial farmers, but also for the development of a Black smallholder farming sector in South Africa.
5. Conversely, the beneficiaries and losers of domestic food market reform in South Africa will differ depending on whether controls on external private trade are relaxed as well.

## 2. HISTORICAL RATIONALE FOR CONTROLLED MARKETING SYSTEMS

Controlled marketing of staple food products throughout Southern Africa was established partially in response to a unique set of conditions in Southern Africa. First, the staple crop in the region, white maize, is thinly traded on world markets. Second, most of the population of Southern and Eastern Africa lives in landlocked cities and remote rural areas facing high transport costs to coastal ports. Third, maize production in the various countries of Southern Africa is positively correlated (Koester 1986; Jayne and van Zyl 1994). Table 1 shows that maize yields in the major production regions of South Africa, Zimbabwe, and Zambia tend to fluctuate in tandem. Thus, the potential for regional trade is impeded, *inter alia*, by the fact that shortfalls in one country tend to coincide with shortfalls in neighboring countries. Fourth, the region is prone to frequent drought. Cereal yields are among the most unstable in the world.<sup>3</sup> These structural features suggest that reliance on private trade alone to offset production fluctuations would involve large price fluctuations between export and import parity levels in the absence of substantial inter-annual stockholding (Muir and Takavarasha 1989).<sup>4</sup> The social and economic disruptions caused by instability in staple food prices have given rise to the region's historical commitment to food price stabilization and associated market regulation.

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<sup>3</sup>Botswana, Swaziland, Lesotho and Zimbabwe have the highest cereal yield variability in Africa over the period 1970-92 (Goldman and Block 1993). Cereal yield variability was defined as the standard deviation of residuals of logged cereal yield from trend. Cereal yield variability of these countries was more than double that of four Asian countries for which data was presented.

<sup>4</sup>Similar problems in landlocked areas of West Africa have been discussed by Delgado (1992).

**Table 1. Correlation Coefficients of White Maize Yields Between Selected Regions and Production Units in Southern Africa, 1983 - 1992**

|  | South<br>Africa,<br>Eastern<br>Transvaal | South<br>Africa,<br>Northwest<br>Region | Zimbabwe,<br>commercial<br>farm sector | Zimbabwe,<br>smallholder<br>sector | Zambia,<br>smallholder<br>sector |
|--|--|---|--|------------------------------------|----------------------------------|
| South<br>Africa,<br>Orange Free<br>State | .64                                      | .63                                     | .92                                    | .80                                | .67                              |
| South<br>Africa,<br>Eastern<br>Transvaal |  | .54                                     | .72                                    | .53                                | .51                              |
| South<br>Africa,<br>Northeast<br>Region  |  |   | .60                                    | .46                                | .65                              |
| Zimbabwe,<br>commercial<br>sector        |  |   |  | .93                                | .69                              |

However, the effective control of prices by government required suppression of uncontrolled private trading that would interfere with the aims of the official marketing system. Some of the practices used in Zimbabwe, South Africa, Kenya, Malawi, and Zambia to preserve the dominance of the official marketing system and impede private trade have included: (1) prohibiting private maize movement across district or zonal boundaries, including into urban areas; (2) preferentially supplying the marketing board's grain to a select group of "vertically-integrated" industrial processing firms; (3) setting a narrow margin between the producer and selling price of the marketing board, such that private trading is rendered unprofitable in many areas and the marketing board/urban processors become the sole maize buyer/seller by default; and (4) mandating a state monopoly on cross-border trade. While such policies have imposed heavy costs on their grain sectors (Child, Muir, and Blackie 1985; Willemse et al 1993; Jayne and Chisvo 1991; Bryceson 1993; Masters and Nuppenau 1993), textbook free market prescriptions have been ignored throughout the Southern Africa region because they have failed to satisfy policy makers' concern with the instability issue.

A second fundamental reason for the development of controlled maize marketing systems in Zimbabwe, Kenya, Zambia, and South Africa was the former white governments' aim to protect the interests of European farmers at the expense of African smallholders (Mosley 1983; Keyter 1975). Into the early 1900s, African farmers accounted for the majority of the food produced and marketed to urban centers in both Kenya and Zimbabwe. As the number of Europeans engaged in farming rose over time, African farmers were increasingly perceived as a threat. Substantial evidence from Kenya, Zambia, and Zimbabwe indicates that African maize surpluses were capable of being generated at prices below the cost of production on European farms, and that the organized European farm organizations successfully lobbied in the colonial legislatures for protection on the grounds that they could not compete without it.<sup>5</sup>

A variety of colonial regulations were subsequently passed that raised the profitability of maize production for European farmers at the expense of Africans. These included: (1) continuing the forced removal of Africans from the majority of the country's high-potential farming land and confining them to less-productive "reserves" with poor infrastructure and market access; (2) imposing a variety of taxes on African households to increase their incentives to move off their farms and work as wage laborers; (3) establishing state crop buying stations European farming areas (commencing in 1934) without parallel investments in African farming areas; (4) offering Europeans a higher price than Africans by levying a "rake-off" tax on the latter; and (5) establishing restrictions on grain movement across the boundaries of reserves to towns, mines and other demand centers where African production could otherwise undercut European-produced goods.<sup>6</sup> These policies eroded Africans' dominance over food marketing in the country and simultaneously contributed to the growth of European agriculture in Kenya, Zambia, and Zimbabwe during the 20th Century. Clearly, as in all other regions of the world, the rationale for controlled marketing systems in Eastern and Southern Africa must be viewed in its historical and political context.

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<sup>5</sup>See, for example, Keyter (1975), Mosley (1975), and Jansen (1977). Without protection, according to the Secretary of Agriculture of Rhodesia in 1934, "the extinction of the European farmer through native competition must be merely a question of time" (National Archives of Zimbabwe: S1542/M2, Darwin to CNC, July 1934).

Perhaps not surprisingly, the protection of European maize producers was initially strongly opposed by white consumer interest groups in both Kenya and Zimbabwe, primarily animal feeders and plantation farms, on the grounds that this would substantially raise the cost of maize.

<sup>6</sup>Occasionally, when exogenous shocks constricted food supplies relative to national requirements, the state temporarily took steps to stimulate African food production (such as the Master Farm Program) but this program was periodically discontinued when food supply gluts reduced farm prices, and colonial officials had to "declare publicly that they never intended to 'teach the natives to grow maize in competition with European producers'" (Phimister (1988), p.235, quoted in Binswanger and Deininger (1993), p. 5).

The effects of the controlled market structure that evolved from colonial policies to stabilize food prices and protect European farmers have not been confined to the sphere of farm production alone. We argue that the controlled marketing systems have also profoundly altered maize consumption habits and choice of technology in the maize processing industries throughout Southern and Eastern Africa, with important implications for household food security. We further argue that, while successfully stabilizing maize meal prices to some extent, the controlled market environment has generally inflated food costs and adversely affected both urban and rural food insecurity in other important respects.

### **3. LESSONS FROM EXPERIENCE OF FOOD MARKET REFORMS IN SOUTHERN AFRICA**

This section presents key results of research in Southern and Eastern Africa, with implications for future food policy in the region. The discussion is not intended to be exhaustive. Rather, we focus our discussion on four critical issues that have repeatedly arisen in the process of food market reform in the region: (a) food self-sufficiency vs. food self-reliance; (b) rural food security; (c) urban food security; and (d) government budget deficits associated with marketing board trading losses.

#### **3.1. Food Self-Sufficiency vs. Food Self-Reliance**

Food self-sufficiency involves meeting domestic demand through production and stockholding. Food self-reliance involves meeting a country's requirements through a combination of production, stocks, and trade, with the mix depending on the relative costs of procurement from each source.

A fundamental issue guiding the management of a national food system is identifying the least costly way to secure national food requirements (Rukuni and Eicher 1987). This objective, however, has normally been subordinated to the pursuit of food self-sufficiency, which has often been elevated to a policy goal unto itself throughout Southern Africa, rather than being a consequence of a deliberate strategy to meet national food requirements at the lowest cost. Upon independence in Zimbabwe, the continuation of a pricing policy geared toward maize self-sufficiency had been widely perceived to promote broad-based income growth and food security in the neglected smallholder farm sector, as the vast majority of rural smallholders throughout the region devote more land to maize production than any other crop.

On the surface, the pursuit of maize self-sufficiency in Zimbabwe and South Africa, and the associated controls on food pricing and trade, appears to have reflected the interests of farmers at the expense of consumers. This is especially true where imports could supply a particular area more cheaply than domestic production. Prices in South Africa, especially in the coastal regions, have clearly been driven up beyond those that would prevail if import controls were relaxed (NAMPO 1994). In the case of Zimbabwe, Jayne and Rukuni (1993) found that a policy of food self-reliance, involving a relatively small amount of imports, would have reduced the average cost of maize to consumers by about 1% to 16%, depending on the weather, compared to a pricing policy geared to achieve food self-sufficiency.

Yet these findings, while important, do not necessarily mean that the pursuit of food self-sufficiency is misguided, because of potential dynamic linkages between domestic food production growth and non-farm sectors. Mellor has demonstrated in India, for example, that because most of the rural poor are engaged in agriculture, stimulating rural incomes through agricultural growth is likely to fuel the demand for agricultural wage labor and for goods in non-

farm sectors. Yet there is a major difference whether such agricultural growth occurs through new technology and increased productivity, or through protecting farmers from competition.

The magnitude of growth linkages also depends on the skewness of productive resources in rural areas, because the potential of money to be widely recycled through the economy depends in part on how narrowly concentrated the first round of beneficiaries of a direct income effect would be. Survey research in Southern Africa over the past decade has begun to shed light on this issue, generally revealing a quite skewed distribution of productive resources and benefits from food supply expansion (Cousins, Weiner, and Amin 1992; Kirsten and Sartorius von Bach 1992; Amani and Maro 1991; Kandoole and Msukwa 1992; Low 1986; Jackson and Collier 1988; Odhiambo and Wilcock 1990; Weber et al 1988). In Zimbabwe, a country that has exported maize in 21 of the past 23 years, a large portion of rural farmers are in fact net buyers of maize during a normal year. Within the smallholder sector, 1% of the farms (located mainly in the Mashonaland maize belt provinces) have accounted for 44% of the income from Grain Marketing Board purchases over the 1986/87-1991/92 marketing years (Jayne and Rukuni 1993). Nationally, 1% of all farms in Zimbabwe (i.e. about 1,600 large-scale commercial farms plus about 9,000 smallholder farms) have accounted for 70% of the GMB's purchases (Table 2). In the drier and generally poorer areas, where 62% of Zimbabwe's smallholders reside, the proportion of net grain buyers can be 70% or more even in a normal rainfall year, with about half of these households purchasing over 50% of their annual grain requirements (Hedden-Dunkhorst 1990; Stack and Chopak 1991; Sunga et al 1990).<sup>7</sup>

Two major conclusions may be drawn from these findings. First, maize pricing policy in Zimbabwe has extremely concentrated direct benefits. Most rural smallholders derive little or no direct benefit from higher maize prices.<sup>8</sup> This is also undoubtedly the case in South Africa (van Zyl and Coetzee 1990). Second, many farm households are directly hurt by higher maize prices because they are maize purchasers. Given the skewed concentration of assets among the rural sector, and without a major redistribution of productive resources in rural areas, it is questionable whether the objective of broad-based rural income growth is compatible with a price policy geared toward complete maize self-sufficiency in these countries.

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<sup>7</sup>Mellor and others had made this point decades ago in Asia, but the perception of rural food self-sufficiency in Africa has been modified more slowly, since lower population densities in most of Africa were connoted with land abundance and relatively egalitarian distribution.

<sup>8</sup>Although higher maize prices could, other things equal, contribute to the incomes of low-income smallholders by stimulating the demand for agricultural wage labor, household survey data indicates that wage labor income is marginal for most smallholder families in Zimbabwe (Stack and Chopak 1990).



**Table 2. Concentration of Income from Maize Sales to Zimbabwe's Grain Marketing Board (1985/86 to 1991/92).**

| category                      | total number (approx.) | number of farmers that sell maize to GMB | GMB maize purchases (annual average) |                                    |   | % of total GMB expenditures on maize purchases accruing to |
|-------------------------------|------------------------|--|--------------------------------------|------------------------------------|---|--|
|                               |                        |  | tonnes                               | tonnes per family that sells maize | tonnes per all families within category |  |
|                               |                        |  | (C)                                  | (D)                                | (E)                                     |  |
| (A)                           | (B)                    |  |                                      |                                    | (F)                                     |  |
| <b>Commercial farms</b>       | 4,000                  | 1,652 <sup>a</sup>                       | 490,902                              | 297.2                              | 122.7                                   | 46   |
| <b>Smallholder households</b> |                        |  |                                      |                                    |   |  |
| top 1% of maize sellers       | 9,000                  | 9,000                                    | 254,182                              | 28.2                               | 28.2                                    | 24   |
| top 2%-10% maize sellers      | 81,000                 | 81,000                                   | 275,556                              | 3.4                                | 3.4                                     | 26   |
| remaining households          | 810,000                | 24,000                                   | 47,948                               | 2.0                                | 0.06                                    | 4  |
| all smallholders              | 900,000                | 114,000                                  | 577,686                              | 5.1                                | 0.6                                     | 54   |
| <b>All farms</b>              | 904,000                | 115,652                                  | 1,068,588                            | 9.3                                | 1.18                                    | 100  |

Row D = C/B; Row E = C/A; Row F = C/total GMB maize purchases

<sup>a</sup> based on 1985/86 to 1990/91 marketing year.

Source: Jayne and Rukuni 1993.

This point should not be construed as an argument for altering the rural-urban terms of trade. To the contrary, results elsewhere indicate that in countries characterized by a large gap between import and export parity, high food prices drive up wage costs and the real exchange rate, making these countries less competitive in international trade and slowing overall economic growth by raising production costs in the non-agricultural sectors. Examples of this "food bottleneck," first described by Ricardo in the early 19th Century, have been documented by authors such as Mellor (1976) and Delgado (1992) to analysis of growth strategies in India and the Sahel.<sup>9</sup> Because of important backward and forward linkages, the price of maize undoubtedly influences the general level of prices in the economies of much of Southern Africa (Blackie 1987). Efforts to reduce the cost of procuring national food requirements could help increase disposable income in urban and grain-deficit rural areas and also promote competitiveness in labor-intensive non-farm sectors of the economy (Delgado 1992; Reardon, Delgado, and Matlon 1992).

Policy efforts to pass lower maize procurement costs along to farmers in grain-deficit areas may also induce dynamic changes in cropping patterns consistent with regional comparative advantage. Several farm-level analyses have concluded that cotton, groundnut and sunflower normally provide higher financial returns than grain crops in the semi-arid smallholder areas of Zimbabwe (World Bank 1991), yet these calculations are made on the basis of producer prices. For food-deficit smallholders, however, the opportunity cost of cash crop production is not the net returns to growing and selling food grains, but rather the cost of acquiring the grain foregone by cultivating cash crops, which is related to the acquisition price of maize rather than the producer price. Recent research results indicate that for grain-deficit farmers, the incentives to devote resources to cash crop production is negatively related to the consumer price of maize meal, which has been typically more than double the producer price of maize (Jayne 1994).<sup>10</sup> Policy efforts to promote broad based rural income growth through crop diversification and non-farm employment appear to be linked to efforts to reduce the cost of food in grain-deficit rural areas.

The trade-offs between domestic production incentives and food affordability may be relieved by measures to reduce food production and marketing costs and increase incomes. Over the long run, this requires sustained support for input and credit delivery systems, agricultural research and extension to generate and disseminate new technology, efficient product distribution and processing systems, and income generating activities. But all of these will be critically affected by policies on pricing, infrastructure, and technology, which, over time, alter income distribution and effective demand. As observed by Johnston and Mellor over three decades ago (1961),

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<sup>9</sup>See Staatz (1994) for a concise synthesis.

<sup>10</sup>This large price gap has an apparently longstanding history. In 1944, the Native Production and Trade Commission of Rhodesia (National Archives of Zimbabwe: ZBJ 1/1/1, 1944) reported that: "The Africans' complaint is not so much what they can sell maize at, but the great differences when they sell and buy. That is what they do not understand. If they got 6/ and it cost only 6/6 to buy a bag of meal it would be all right, but they do not understand why they have to pay 22/...for a bag of mealie meal."

economic growth is constrained by a skewed income distribution. The skewed distribution of assets and productive potential among the rural population in many African countries underscores the need for a clearer understanding of whether agricultural pricing and trade policies have relieved or exacerbated such inequalities, and how such policies may be designed in the future to stimulate broad-based rural income growth.

### **3.2. Rural Household Food Security**

Prior to reform, the controlled grain marketing systems in Eastern and Southern Africa featured a predominantly one-way flow of grain from rural to urban areas. Once sold by farmers to the marketing boards, grain was typically forwarded to large-scale industrial processors in urban areas (Bryceson 1993; Willemse et al 1993; Jayne and Chisvo 1991; Amani and Maro 1991). Regulatory barriers often prevented the grain, once in the hands of the marketing board, from being redistributed to traders or consumers in rural areas. Official prohibitions on intra-rural grain trade restricted the development of alternative marketing channels and caused most surplus grain production to be channeled through the official marketing system. While providing an assured market outlet for surplus grain producers, the state's one-way marketing system effectively siphoned grain supplies out of rural areas.

This system was based on the implicit assumption of rural grain self-sufficiency. On the surface, this assumption seemed plausible enough because grain sales normally rose rapidly in most smallholder areas where marketing board infrastructure was developed (Bryceson 1993; Rohrbach 1989). This provided some evidence of a "surplus," above a particular area's consumption requirements. However, considerable micro-level research had shown that grain deliveries to the marketing boards could not be mistaken for a "surplus" from a given region, over and above consumption requirements, since marketed output from a small segment of well-equipped farmers often masked considerable grain deficits among a large proportion of households in a particular area. Official restrictions on private trade and weak market infrastructure often made it easier for surplus farmers to sell to the Boards rather than their deficit neighbors several kilometers away. As mentioned above, household-level survey results in the 1980s revealed a pattern of skewed productive resources and grain production within smallholder areas (Kirsten and von Bach 1992; Rohrbach 1989, Hedden-Dunkhorst 1990; Jayne and Chisvo 1991; Sunga et al 1991; Low 1986; Stack and Chopak 1990; Amani and Maro 1991; Kandoole and Msukwa 1992; Staatz, Dioné, and Dembélé 1989; Christiansen and Kidd 1987). Even during normal rainfall years, many smallholder areas producing grain "surpluses" to the Boards are net grain deficit in the aggregate.

This marketing structure, in both Zimbabwe and Zambia prior to the reforms, created a circuitous and expensive flow of grain from rural areas to urban areas to be milled by high-cost urban millers, only to be transported back to rural areas for consumption by grain-deficit households. After locally-produced supplies were depleted, rural households had no legal means of acquiring grain from outside their "zone." The controls on inter-zone grain movement provided the industrial urban millers with a *de facto* monopoly on maize distribution into grain-

deficit areas. In Zimbabwe, the absence of direct intra-rural marketing channels — a result of policy controls to assure the dominance of the controlled marketing system — was shown to inflate consumer grain prices and reduce cash incomes among poor rural consumers by as much as 30% (Jayne and Chisvo 1991).

This information on farm household behavior in Zimbabwe heightened decision makers' awareness of food insecurity problems in the semi-arid areas, and how existing marketing controls had exacerbated these problems. In 1991, the Government of Zimbabwe partially relaxed these controls on maize movement and resale, and by 1993 had eliminated all controls on smallholder grain movement.

### **3.3. Urban Food Security**

As described above, controlled food marketing system in Southern and Eastern Africa were designed to ensure a consistent flow of maize meal to urban consumers at prices which were capable of being controlled and subsidized by government. Politicians have often contended that these countries pursued a "cheap food policy," indicated by the heavy direct and indirect subsidies put on industrial maize meal.<sup>11</sup>

Large subsidies on consumer food prices, however, do not necessarily imply that consumers are benefitting relative to a restructured marketing system. Regulations at certain stages of the system may impose additional marketing costs that overwhelm the effect of direct government subsidies. This section examines how the controlled maize marketing system in Zimbabwe (as well as much of Southern Africa) have had the unintended consequence of shifting consumer demand toward refined, more expensive and less nutritious maize meals and creating an environment in which subsequent market reform efforts would be more politically difficult and risky.

*Are Consumer Preferences Fixed?* Throughout Eastern and Southern Africa, adherence to a controlled marketing system has typically resulted in centralization and concentration of distribution activities. This has not only given rise to parastatal marketing boards, but also large-scale, concentrated grain milling industries. State maize procurement and milling are either vertically integrated in a single agency, or the state marketing board serves as a de facto procurement agent for several private large-scale milling firms.<sup>12</sup>

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<sup>11</sup>Indirect subsidies include marketing board operating deficits, financed by the treasury. In Kenya and Zimbabwe, the grain boards' actual operating costs normally exceed the margin between the controlled producer and selling price by 30% or more (see Jiriyengwa 1991; Mukumbu 1992).

<sup>12</sup>Current or recent examples of the former may be found in Tanzania and Malawi; examples of the latter, in Zimbabwe, Zambia, Kenya, and South Africa.

Major investments in urban industrial maize milling began in the 1950s in both Kenya and Zimbabwe, as urban populations rose dramatically after World War II. The grain marketing boards' practice of pan-territorial pricing and restrictions on private grain movement gave incentives for milling firms to invest in high-throughput roller mill technology, almost exclusively in urban areas. But the controls on private maize movement also had the effect of restricting grain access to traders, millers, and consumers in urban areas through informal channels. By restricting supplies, the controls also raised the price of the limited quantities of grain that were sold informally in these deficit areas. The main source of maize supplies in urban areas was therefore the state Maize Board, which sold maize only to registered buyers. Selling grain to a relatively small number of large-scale buyers had distinct advantages to the Government, because this reduced per unit transaction costs (compared to selling small amounts to numerous buyers) and, more importantly, facilitated the implementation and monitoring of price controls on maize meal. Therefore, the rise of a few large industrial maize processors to link downstream distribution activities into the official maize marketing system created a convenient and easily-managed system of supplying the urban population with staple food at prices easily controlled by the state.

The politically-determined official trading margins and milling margins were often insufficient to cover stated costs, requiring compensation from the Treasury.<sup>13</sup> This practice of selectively subsidizing the vertically-integrated marketing board/industrial milling system narrowed the margin within which non-registered (i.e., small-scale, non-European) traders and millers could operate, effectively suppressing their development (Mukumbu and Jayne 1994; Jayne and Rubey 1993). With these selective subsidies to augment the controls on informal maize movement, the subsequent pattern of maize milling investment was largely predetermined.

This policy environment had two important results: First, it restricted access to grain by urban consumers for hammer milling, and relatedly, it made refined roller-milled meal considerably more convenient, accessible and less expensive than the formerly widespread practice of obtaining maize from relatives in rural areas and milling it by hammer mill technology. Within a span of three decades, urban consumption of maize meal consumption switched almost entirely from whole meal to refined roller-milled meal. This shift entrenched policy makers' perceptions of the superiority of refined meal, and the legitimacy and appropriateness of the official marketing system that guaranteed its availability (Stewart 1977).

As demand patterns evolved with a policy environment that favored the development of roller mill technology, and suppressed the previously dominant system of informal hammer mills, the general public began to view consumer preferences for refined white maize meal as a phenomenon of urbanization, civilization, and technological progress, rather than a response to

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<sup>13</sup>Before 1993, the Government set milling margins based on information provided by the Commercial Millers Association, the official representative of the four large-scale roller milling firms.

policy.<sup>14</sup> The evidence is compelling that the particular policy responses taken to deal with the objective of food price control had altered consumer demand patterns and then entrenched the widespread perceptions of strong urban preferences for refined maize meal (Figure 1).

However, studies have shown in Kenya, Tanzania, and Zimbabwe that hammer mill technology has a higher labor-to-capital ratio, labor-to-output ratio, output-to-capital ratio, and output-per unit cost of maize meal produced than large-scale roller mill technology (Stewart 1977; Bagachwa 1992; Rubey 1993). This implies that hammer mill technology is more consistent with employment growth, conservation of scarce foreign exchange, and lower maize meal costs than industrial roller mill technology. These advantages must be considered against the fact that roller mill technology produces important by-products for the stockfeed and oil processing industries.

The controlled system was not viewed as a major problem, however, because of the conventional wisdom, built up by decades of advertising by commercial milling firms, that urban consumers strongly prefer the refined maize meals produced by industrial roller mills, and are not responsive to price differences between various types of maize meal. According to this view, the relative inefficiency of roller mill technology compared with hammer mill technology is largely irrelevant because of the perception that urban consumers would not accept hammer-milled whole meal. This perception had narrowed policy makers' view of the feasible set of food market reform options, especially those involving removal of subsidies on industrially-produced maize meal and efforts to develop competitive small-scale maize trading and milling networks in urban areas.

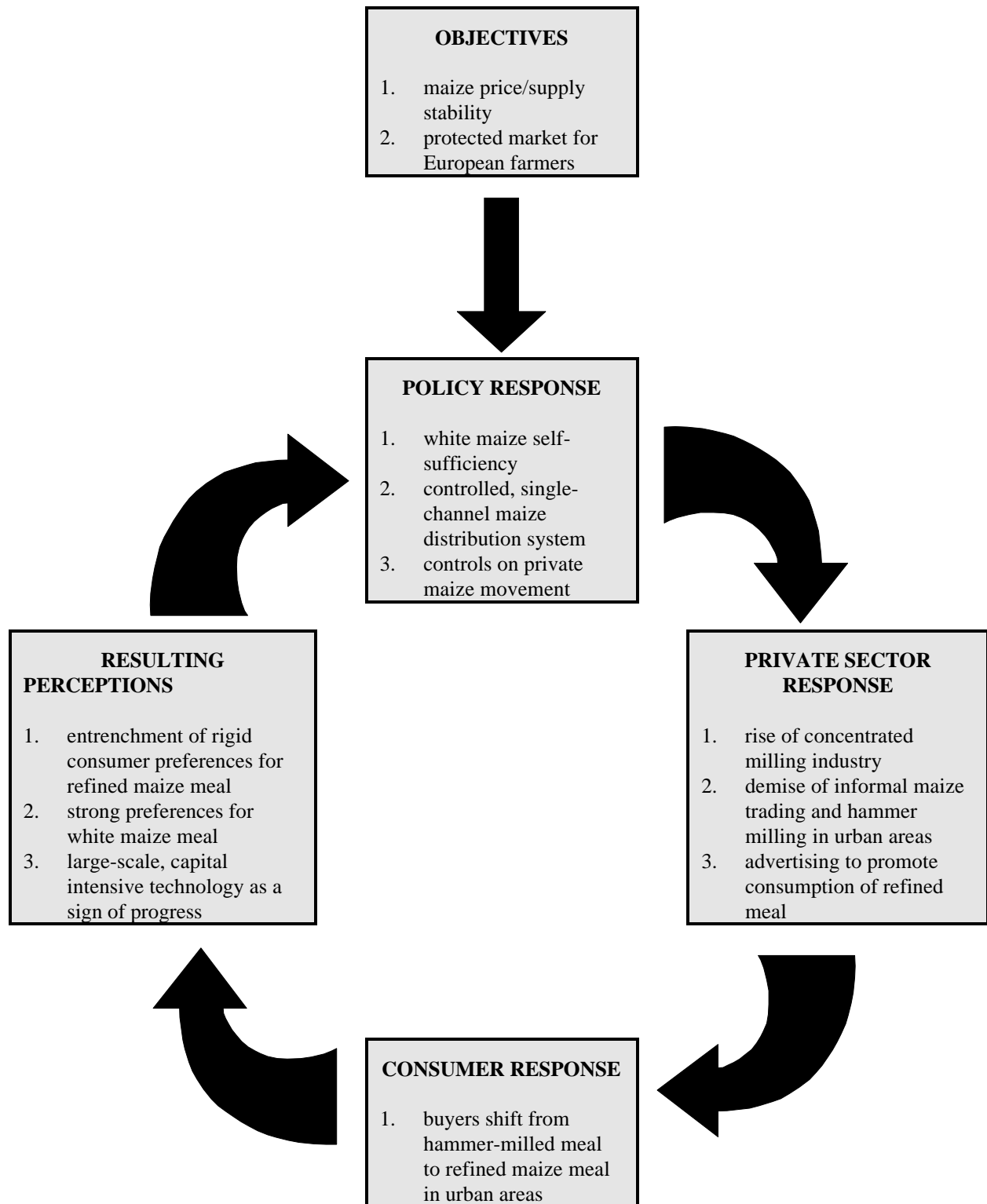
However, research in 1991 involving collaboration between the Ministry of Lands, Agriculture and Rural Resettlement, University of Zimbabwe and donors began to call into question the validity of these perceptions. Several surveys of urban and rural households indicated that about 40% and 46% of urban households would choose to purchase whole meal produced by hammer mills at a 12% and 18% price discount relative to the more refined roller meal — if it were available (Jayne et al, 1991; Jayne and Rubey 1993). The surveys also provided initial evidence that whole meal would be purchased in greater quantities by low-income consumers, if available).

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<sup>14</sup>For example, the Commercial Millers' Association in 1992 issued a statement in the major local newspaper that "straight-run meal is an unsophisticated, unrefined product which normally sells at a price lower than that for roller meal ... as this product has never been popular its demise is no great loss..." (advertisement in Harare Herald, February 11, 1994).

The hypothesis that roller milling firms were able to shape consumer preferences through advertising is supported by statements of large-scale millers themselves. Stewart (1977) quotes the general managers of two major sifted flour manufacturers in Kenya: "The sifted maize meal was something my Company pioneered in this country, and it has created a market for itself" (p. 213) and "...we have considerable advertising and pains and personal contacts and what-not to pick up a good market" (p. 213). These and related statements support Stewart's observation of "the inherent contradiction between taking consumers' preferences as the ultimate guide to production decisions and welfare, and spending money on determining these tastes" (p. 213).

**Figure 1. Interactions between Maize Sectoral Policies and Evolution of Maize Meal Consumption Patterns in Urban Zimbabwe, 1955-1980.**



Based also on a government study (MLAWD 1993) indicating greater receptiveness to hammer-milled meal in urban areas than previously perceived, the Government of Zimbabwe eliminated the subsidy on commercial roller meal in June 1993 and eliminated most of the controls on private maize movement in the country. The policy reforms allowed maize to be privately moved into urban areas to be milled by hammer mills. After June 1993, hammer-milled meal cost 60% to 70% the price of industrial roller meal — about the same price as roller meal before its subsidization was eliminated.

The initial effects have been dramatic. While the price of roller meal rose by 52% after June 1993, the effect on consumers was buffered by private movement of maize into urban areas, which has allowed households to avoid paying the trading margin of the GMB as well as the full cost of the milling margins of the large-scale industrial roller mills. Household survey analyses undertaken since the reforms have documented a large increase in urban consumption of hammer-milled meal, especially among low income groups (Rubey 1993; Sithole, Chisvo, and Jiriyengwa 1993). Table 3 indicates that immediately after the reforms, 32% of households in the lowest income quintile in the three largest urban areas of Zimbabwe were consuming hammer-milled meal, compared with 18% among the highest income quintile (Rubey 1993). These micro-level results are corroborated by national-level GMB data, indicating that the monthly GMB maize sales to the large-scale millers had fallen to 30% of their normal level, confirming a sizable shift in maize throughput from the large roller milling firms to the small-scale hammer mills.

However, we do not wish to underemphasize the taste and cooking attributes of sifted flour that at least some percentage of the urban population found preferable over whole meal. The removal of the germ and pericarp makes refined meal look whiter, last longer, and taste sweeter than whole meal. The preference for refined meal over whole meal — price being equal — has also been confirmed by recent household surveys in Zimbabwe, Zambia, and South Africa (Rubey 1993; Diskin and Sipula 1994; Mukumbu and Jayne 1994). However, what consumers preferred to buy under historical structural conditions of the market does not necessarily indicate what they would buy if the market accurately reflected the cost of production difference between the two types of meal. For several decades, the ability of urban consumers to make this choice has, to varying extents in Kenya, Zimbabwe, South Africa, and Zambia, been impeded by policy.

It is important to note that the rapid shift from roller meal to hammer milled meal has most likely been accentuated by a decline in real incomes of urban consumers since 1991. This is suggested by the survey findings in Zimbabwe and elsewhere that consumption of straight-run hammer milled maize meal tends to increase as incomes decline (Rubey 1993; Sithole, Chisvo, and Jiriyengwa 1993; Mukumbu and Jayne 1994).



**Table 3. Maize Meal Consumption by Type and by Income Quintile**

| Income Quintile         | Type of maize meal consumed<br>(percentage of households) |           |                |                  |
|-------------------------|---|-----------|----------------|------------------|
|                         | Super-<br>refined   | Mudzvurwa | Roller<br>meal | Straight-<br>run |
| Quintile 1 (bottom 20%) | 0   | 0         | 68             | 32               |
| Quintile 2              | 1   | 0         | 66             | 33               |
| Quintile 3              | 7   | *         | 69             | 25               |
| Quintile 4              | 6   | *         | 73             | 21               |
| Quintile 5 (top 20%)    | 13  | 0         | 70             | 18               |
| All consumers           | 5   | 1         | 67             | 27               |

\* less than one-half of one percent

Source: Rubey 1993

The 1993 Zimbabwean experience with market reform indicates that subsidies are not always required to ensure that low-income consumers have access to an inexpensive supply of staple food. Similar lessons have been documented in Zambia and Kenya by Diskin and Sipula (1994) and Mukumbu and Jayne (1994). Market reform can lead to the expansion of lower cost marketing channels and permit urban households to procure household food requirements at lower cost than in a subsidized official system.

Finally, we note that the speed with which refined maize meal became the "traditional" staple food of Southern African urbanites, along with the more general observations that, over the 20th century, maize flour has supplanted millet flour as the basic staple, and wheat bread has, more recently, begun to supplant maize flour, merits reconsideration as to whether consumer preferences should be treated as endogenous outcomes of an economic system rather than the result of exogenous forces that impinge from outside. This suggests the importance of *ex ante* analysis that informs decision makers how preferences may change with policy, instead of implicitly taking preferences as given and formulating food policies around prevailing consumption patterns.

### **3.4. The Role of Yellow Maize**

Since its introduction to Eastern and Southern Africa by the Portuguese, maize for human consumption has traditionally been of white varieties. Yellow maize is hardly grown by smallholders in the region. In Zimbabwe, smallholder production of yellow maize is restricted

by law.<sup>15</sup> Yellow maize is grown by commercial farmers, but it is almost exclusively destined for livestock feed. Because Eastern and Southern Africans have historically consumed yellow maize only as imports during poor harvests, yellow maize has become indicative of a national policy failure. In Zimbabwe, government officials and industrial millers have discouraged the availability of yellow maize and maize meal for people to buy during normal years, contending that consumers would strongly resist eating meals from yellow maize. If this view is accepted, then efforts to increase the availability of yellow maize meal on the market are pointless since there will be virtually no demand.

One could rightly question what virtue there would be in a partial shift in maize meal consumption patterns from white to yellow meal. Three points are important in this regard:

1. Local yellow maize varieties, in much of Southern Africa, tend to have 15-20% greater yields than white maize, for virtually identical production costs (CSO 1989, CFU 1993; Howard 1994). In Zimbabwe, yellow maize yields on commercial farms has averaged 4.77 tonnes/hectare between 1986/97 and 1991/92, compared with 4.08 tonnes/hectare for white maize. Not surprisingly, commercial farmers had substantially increased the proportion of maize hectareage devoted to yellow maize over this period (MLAWD 1993). The productivity advantage of yellow maize means that greater aggregate output could be generated from a given bundle of inputs. It is uncertain for how long this productivity advantage will continue, as the future release of new white and yellow varieties will create periodic changes in relative yield potentials in different agro-ecological environments. However, to the extent that yellow maize varieties do permit some yield advantages per unit of input, its cultivation would exert downward pressure on maize prices, to the benefit of national and household food security, without jeopardizing production incentives. The appropriate ratio of yellow/white production could be determined in the market by consumer preferences and production costs.
2. Yellow maize is widely traded on world markets, benefits from a well-functioning international commodity exchange, and typically costs 10% to 20% less than the limited international supplies of white maize. This provides Zimbabwe with a wider range of buying and risk-management options to procure needed supplies in the event of domestic production shortfalls.
3. Reluctance to make yellow maize accessible to consumers, except during droughts, tends to put pressure on governments to hold large and costly stockpiles of white maize, which drives up marketing costs and ultimately penalizes both producers and consumers.

Despite the conventional perception that yellow maize is a poor substitute in consumption for white maize, evidence is accumulating within the Southern Africa region that, while almost all consumers in all countries surveyed prefer the attributes of white maize meal, the demand for

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<sup>15</sup>This is because of fears that white and yellow maize grown in close proximity in smallholder areas might cross-pollenate and taint the GMB's maize intake.

yellow maize at a moderate price discount relative to white maize may be substantial. In Maputo, the capital of Mozambique, yellow and white maize have both been available in local markets for the past four years (except during the 1992 drought). Because the market price of yellow maize has typically been 20-30% less than white maize, yellow maize meal has become the dominant form of maize consumption (MOA/MSU 1993; Dorosh, Ninno, and Sahn 1994). This may be a short-lived phenomenon if the importation of yellow maize is curtailed without the introduction of a viable seed production and delivery system to provide farmers with a choice.

In Zimbabwe, consumer surveys conducted by Rubey in 1993 indicated that about 10% of urban consumers actually prefer the taste of yellow maize meal, and would buy it if available at the same price as white maize meal.<sup>16</sup> The production cost advantage of yellow maize, in conjunction with the general preference for white maize meal, implies that yellow maize would be priced below white maize in a competitive market situation. Sithole, Chisvo, and Jiniyengwa (1993) found that 22.5% of urban consumers currently buying and milling white maize would switch to yellow maize sold at a 15% price discount. Rubey found that at a 26% price discount, 62% of urban households in the lowest-income quintile stated that they would switch to yellow maize, compared with 39% in the highest income quintile (Table 4). Diskin and Sipula (1994) obtained similar results in Zambia.

In South Africa, a country where yellow and white maize meal has frequently been blended, a survey of 275 urban consumers by the Maize Board (1993) indicated that 53% of the respondents did not perceive a difference in taste between yellow and white maize meal. Of those that did, about 8% considered yellow meal to be tastier. However, most consumers indicated that they would prefer to buy white maize meal unless there were a significant price discount on yellow meal.

While the foregoing findings are largely hypothetical (except in Mozambique), and need to be substantiated by further analysis before a clearer picture can emerge, they do raise the question as to whether barriers inhibiting consumers' access to yellow maize are preventing potential gains in food security and productivity. The perceived preference for white maize has served to mold government policy in favor of white maize self-sufficiency (since the world market for white maize is very thin). As discussed above, a white maize self-sufficiency orientation has put upward pressure on maize producer prices and higher marketing costs associated with white maize stockpiling in Zimbabwe. Rather than relying on a white maize self-sufficiency policy at any cost, governments might be able to reduce the cost of food available to consumers, reduce marketing costs, and improve farm productivity by allowing yellow maize production, consumption, and price levels to be determined by supply and demand conditions.

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<sup>16</sup>Interestingly, 63% of these respondents stated that they would not have wanted yellow maize a year earlier. "The drought-induced or 'forced' consumption of yellow maize during the 1992/93 drought apparently resulted in a change in preferences for a small proportion of the population" (Rubey 1993, p.23).

**Table 4. Percent of Consumers Stating that They Would Switch from White Roller Meal to Yellow Roller Meal at a Specified Price, by Income Quintile, in a "Dual-Option Simulation."**

| Income Quintile         | Percentage of households that would switch to yellow roller meal given |                           |
|-------------------------|--|---------------------------|
|                         | \$15.10<br>(13% discount)  | \$12.82<br>(26% discount) |
| Quintile 1 (bottom 20%) | 32 percent   | 62 percent                |
| Quintile 2              | 19 percent   | 44 percent                |
| Quintile 3              | 25 percent   | 58 percent                |
| Quintile 4              | 20 percent   | 46 percent                |
| Quintile 5 (top 20%)    | 20 percent   | 39 percent                |
| All consumers           | 23 percent   | 50 percent                |

Source: Rubey 1993.

Furthermore, when political decisions are made, in response to drought for example, to subsidize the price of maize meal offered to poor consumers, then a selective subsidy on yellow maize (or yellow meal) would be less costly than the historical practice, in several countries, of untargeted subsidies on white roller meal. Given the limitations of administratively targeted schemes, "self-targeting" mechanisms are particularly attractive. A "self-targeted" subsidy is a subsidy on a food that is primarily consumed by the poor. As incomes rise, consumers tend to consume less of these foods. Self-targeted subsidies have the potential to reach the food insecure with minimal leakage and without complicated administrative requirements.

However, a latent demand for yellow maize would not necessarily be felt upstream by millers, traders and farmers because of information barriers caused by historical policies against yellow maize consumption. Millers and traders perceive little demand for yellow maize meal because little is being consumed. But little yellow maize meal is produced because millers and traders perceive little consumer demand for it. If information barriers do exist, state action may be required to redress this aspect of market failure.

It is important to note that the purpose of this section is not to advocate the use of yellow maize as an end in itself, but rather to identify strategies to (a) capture the benefits of yellow maize's potentially higher productivity compared to existing white maize varieties, and yellow maize's

lower cost on world markets relative to white maize; (b) reduce the needed size of domestic maize stockpiles, thus reducing state marketing costs; (c) promote a self-sustaining targeting policy to protect vulnerable groups from the effects of sharply increased maize meal prices; and (d) increase countries' options for using the world market, including mechanisms to reduce the cost of imported maize, since yellow maize is normally less expensive and more readily available than white maize.

### **3.5. Government Budget Deficits Associated with Marketing Board Operations**

Parastatal reform is a critical, but poorly understood, component of food market reform. In Zimbabwe, Tanzania, Malawi, and Kenya, market reform has been associated with increased marketing board budget deficits. After the decontrol of private maize trading in Zimbabwe in 1993, the Grain Marketing Board (GMB) accumulated a trading deficit in eight months equal to 2.8 percent of GNP.

In Zimbabwe's case, there are three fundamental reasons for the massive deficits associated with market reform:

1. The GMB's fixed buying and selling prices were high relative to prices in informal trading channels. The GMB, as residual buyer, was forced to buy large volumes of maize from farmers, while its *de facto* vertical integration with relatively uncompetitive large-scale milling firms depressed demand for GMB grain. As a result, GMB accumulated a large and costly maize stockpile — a direct consequence of the GMB's fixed prices that were not capable of being adjusted in response to prevailing market conditions.
2. High interest rates, coinciding with (and partially caused by) large GMB borrowing requirements;
3. A GMB trading margin of only Z\$170 per tonne, which is insufficient to cover operating costs of most of its depots in communal areas. GMB prices are currently "pan-territorial," i.e., uniform producer and consumer prices apply at all depots, regardless of transport costs. This policy cross-subsidizes smallholder maize sellers in remote areas facing high transport costs at the expense of commercial farmers close to Harare. Since 1980, the pan-territorial GMB margin has typically been insufficient to cover marketing costs of remote smallholder depots, but has been more than sufficient to cover marketing costs of depots in commercial farming areas. In short, GMB operations in most commercial farming areas generates profits that partially offset its losses in remote communal areas. But after legalization of private trade, the GMB has lost some of its market share in its profitable trading areas (GMB 1991).

The experiences of Zimbabwe and other Southern Africa states have important implications for the design of food market reform in South Africa. A commitment to encourage the development of private food marketing channels will require adaptation in marketing board price setting. The

basic solution to this dilemma is to either abolish the food marketing board altogether, as in Zambia and Mozambique, or implement a more flexible pricing strategy that allows the marketing board to respond to, or influence at the margin, prevailing prices in private trading channels (Masters and Nuppenau 1993). Governments can, of course, continue to set prices through the marketing board, but these prices can be made irrelevant to some degree if not in line with market prices, as private traders begin to bypass the marketing board, setting their own prices according to market conditions. This would also require that marketing board prices differ both spatially (because of different market conditions in different regions) and temporally (because of seasonal storage costs). Throughout Africa, when prices have diverged significantly with prevailing market conditions, the marketing board has accumulated massive trading losses (Steffen 1994; Bryceson 1993; Kaluwa 1992; Lele and Candler 1984). In South Africa's case, a commitment to encourage private maize trade would require the Maize Board's maize selling price to be flexibly adjusted throughout the year, rather than the current practice of being fixed for the whole year.

## **4. DOMESTIC MARKET REFORM AND REGIONAL TRADE: EMERGING IMPLICATIONS**

We now compare costs of maize production and marketing in Zimbabwe and South Africa as an indicator of the potential direction of trade that might result from a less regulated external trading environment.<sup>17</sup> We preface these comparisons by pointing out that the demand patterns and technology on which comparative prices and potential trade flows are based may be greatly influenced by the decision to liberalize domestic food markets or not. This leads to an assessment of the potential distribution of benefits and losses resulting from various permutations of external and domestic market environments.

### **4.1. Interactions Between Regional Comparative Advantage and Domestic Trading Environment**

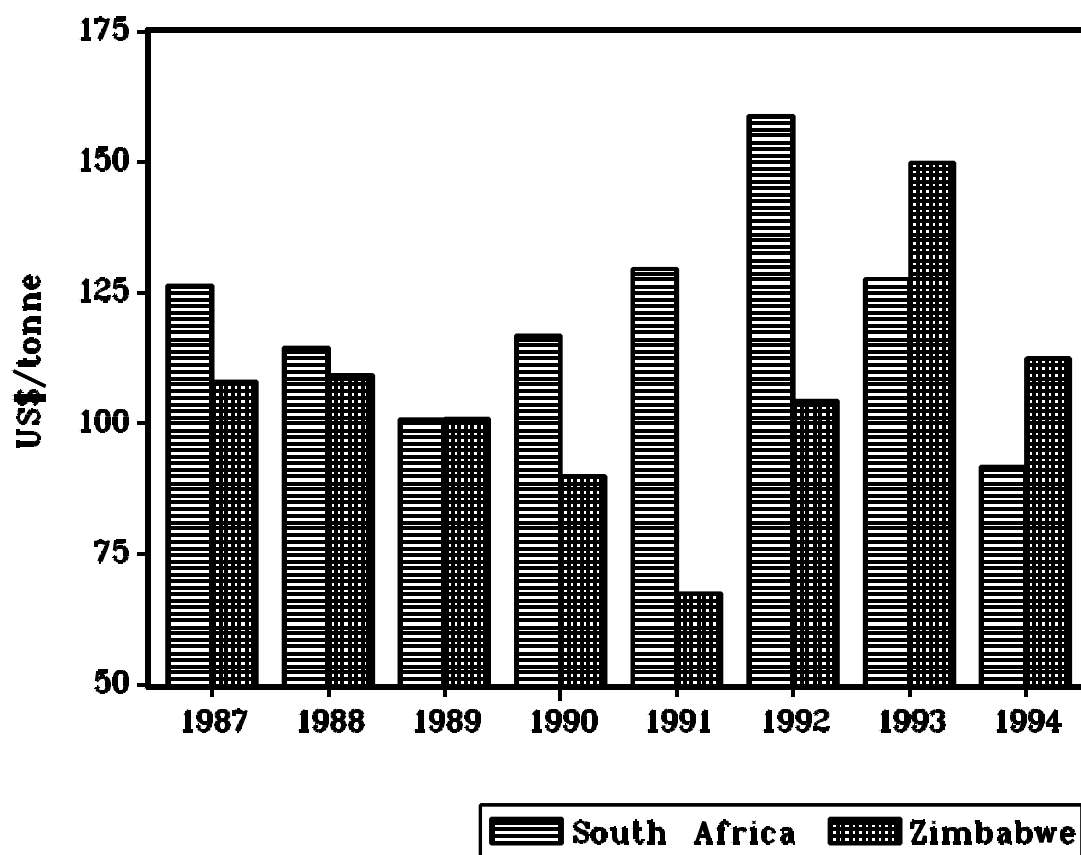
Much attention has been devoted to anticipating the flow of agricultural trade in Southern Africa that might occur under regional comparative advantage (van Rooyen et al 1994; Kingsbury 1989; Koester 1986). The concept of comparative advantage involves many factors: consumer preferences, technology, factor endowments, transactions costs, scale economies, etc. But many of these factors, as shown above with respect to technology and consumer preferences, are somewhat policy-driven. Maize policy throughout Eastern and Southern Africa has greatly influenced the articulation of demand and the pattern of technology investment within the maize subsector. Food market reform, to the extent that it alters relative prices and the incentives to adopt new technology, may thus affect demand patterns, factor intensities in production and marketing, and food system productivity on which regional comparative advantage is largely based.<sup>18</sup>

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<sup>17</sup>A more comprehensive assessment must also include Zambia, Mozambique and the rest of the Southern Africa countries. However, as the largest two traders of white maize, conditions in Zimbabwe and South Africa will undoubtedly influence trading incentives throughout the region.

<sup>18</sup>It is sometimes argued that comparative advantage is revealed when the effects of government policy are removed, leaving trade flows to reflect the workings of "free" markets. This is an abstract and theoretical notion, however, since all market-based economies depend on publicly-accepted rules (i.e. regulations) in order to function (Bromley 1993, Samuels 1992). Without such rules, transaction costs of exchange become so high that markets break down. A given set of market rules will create a particular pattern of income distribution, effective demand, and market prices. A different set of market rules would result in another pattern of effective demand, and prices (Schmid 1992). There are a variety of competitive equilibria and economic prices that could flow from a given "free market" depending on the rules structuring trade within that market. So, in attempting to determine comparative advantage, which set of regulations should be considered to reflect the true "market" price? For example, should laws against child labor and slavery be considered market distortions that alter the shadow value of labor? Should an absence of these laws be construed as an absence of political influence over the market? Clearly, states implement policy both by what they do and what they do not do (Seidman 1974). Speaking of the United States in the 20th Century, Carl Auerbach has asked: "Shall we say, then, that when the state chooses not to exercise its power to prohibit racial discrimination, it is sanctioning such discrimination and such inaction constitutes state action subject to constitutional commands?" Analogously, an absence of marketing boards and

Figure 2. Maize Producer Prices in South Africa and Zimbabwe, 1987/88-1994/95



Source: Jayne and van Zyl (1994)

Figure 2 presents trends in white maize producer prices in South Africa and Zimbabwe, denominated in US\$ at official exchange rates.<sup>19</sup> Note that, since 1987, producer prices in South Africa have been determined as a function of domestic and export market conditions. Since 1992, relatively good harvests and surplus production that was exported at a financial loss has caused producer prices to decline substantially toward export parity levels. It is anticipated that maize producer prices will continue to remain close to export parity because (a) substantial surpluses still exist that typically are exported at a loss; (b) the new government is likely to give

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controlled prices in food markets could not imply that government influence over market activity is absent.

<sup>19</sup>Official exchange rates are used to examine potential trading incentives under the prevailing macroeconomic policy regimes in the two countries. It would be fruitful to also analyze trading incentives under a less regulated exchange rate regime in South Africa.



increased emphasis to urban consumer interests; and (c) pressures are growing from within the stockfeed industry for trade deregulation to allow consumers to procure cheaper maize from the world market.

Zimbabwean producer prices, on the other hand, have increased sharply since the 1992 drought to restore domestic production incentives. For the past two years, Zimbabwean producer prices have moved above those in South Africa. While it is difficult to predict how government-determined producer prices in Zimbabwe will evolve in the future, econometric analysis indicates a close relationship between the current year's endstock level (held by the GMB) and next year's inflation-adjusted producer price (Jayne and Rubey 1993).

Moving down the food system, there are at least two relevant margins in the official marketing channel: The first is the gap between the selling price and the producer price (which accrues to the marketing board), and the second is the gap between the retail price of meal and the selling price (which accrues to millers and distributors). The formulae used to calculate these margins were:

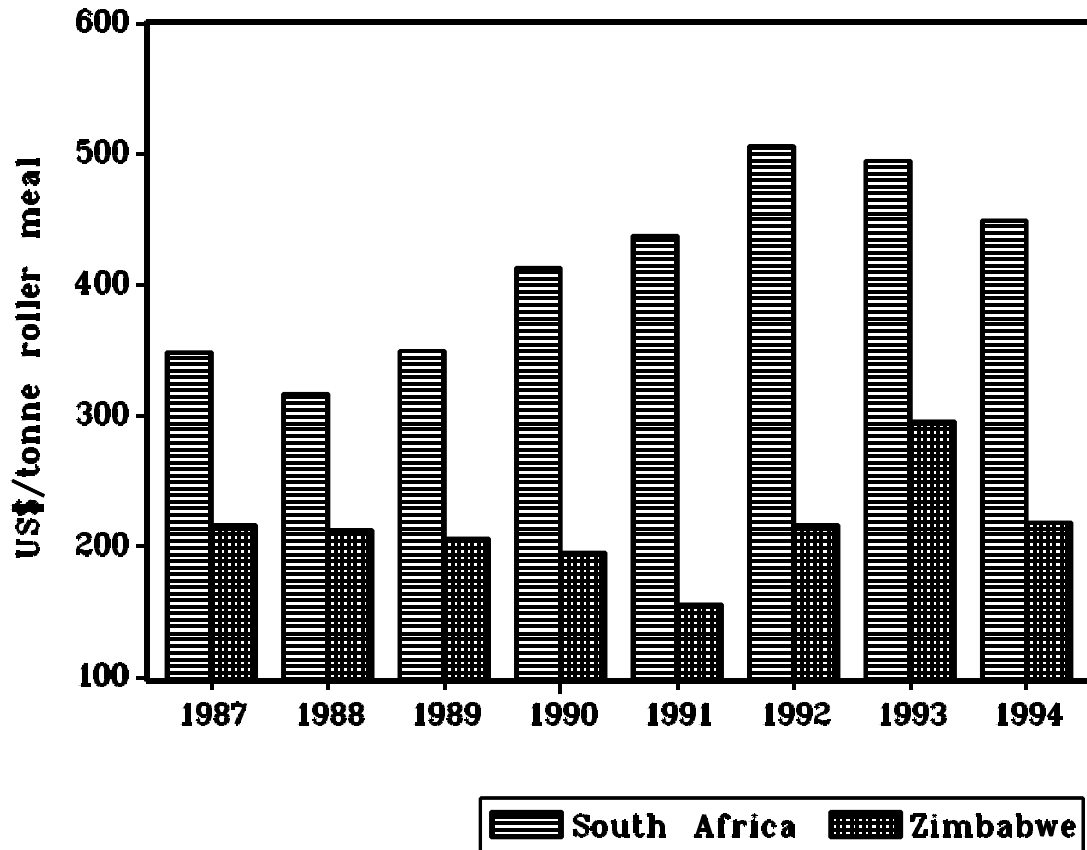
**Marketing Board margin:**  $PS - PP + SI$

**Miller/distributor margin:**  $PMM/z - PS + (z-1)/z*PB + S2$

where  $PS$  is the selling price (price at which millers buy maize grain from the Board);  $PP$  is the producer price, and  $SI$  is the subsidy per tonne of maize handled by the Board.  $PMM$  is the retail price of maize meal;  $z$  is the average extraction rate (i.e., tonnes of grain required to manufacture one tonne of meal);  $PB$  is the value of maize by-product; and  $S2$  is the direct subsidy given to millers, if applicable. Both margins are expressed in terms of tonnes of grain handled.

These margins were added to the producer prices presented in Figure 2 to derive total costs of maize meal in South Africa and Zimbabwe (Figure 3). Despite an unclear picture with regard to relative farm production costs in the two countries, cost comparisons at the retail level are very stark. South African consumers and taxpayers paid about twice as much on average, over the 1987-1994 period, for commercial sifted maize meal (85% extraction rate, converted to US dollars at official exchange rates) than their Zimbabwean counterparts. The divergence in maize meal costs has become even more enormous since 1993, when the decontrol of private grain trade into urban areas in Zimbabwe has created a rapid expansion of small-scale hammer mills and consequent lower retail consumer costs (for those consumers relying on these mills) than those shown in Figure 3. The differences in retail maize meal prices substantially outweigh differences in transport costs between Harare and a number of major urban areas in South Africa (Jayne and van Zyl 1994).

Figure 3. Retail Maize Meal Prices in South Africa and Zimbabwe, 1987/88-1994/95



Source: Jayne and van Zyl (1994).

These cost comparisons suggest that, while the direction of trade in maize grain would be somewhat ambiguous, there would be clear incentives for maize meal (especially maize meal produced by relatively efficient small-scale mills) to flow from Zimbabwe to South Africa under (a) the existing domestic maize marketing system in South Africa, and (b) a liberalized regional trade environment. However, numerous factors need to be assessed in detail before these results may be considered feasible or useful for policy purposes. Analysis is currently examining in more detail the potential magnitude of grain and grain meal trade that might occur under regional trade liberalization within the Southern Africa region under a variety of domestic marketing policy environments, as well as the potential constraints involved (Jayne and van Zyl 1994).

The foregoing does suggest that the welfare of maize farmers in South Africa is critically tied to the efficiency of its distribution and processing industries — embodied in the margin between the producer price of maize grain and the retail price of maize meal. This discussion does not preclude the possibility that the South African maize processing, wholesaling, and retailing

industries are efficient, in that firms within these industries earn only normal profits on their investments. Yet these margins are high compared to those in neighboring countries. Under unregulated regional trade, the relatively high marketing margins in South Africa are likely to depress the demand for South African maize as consumers begin to acquire maize meal more cheaply from foreign sources. This assessment, however, may change, perhaps substantially, if domestic market reform in South Africa were able to reduce maize marketing costs and retail prices of maize meal for the majority of South African consumers by the time that restrictions on private cross-border trade were eliminated.

The future evolution of maize production costs and competitiveness in South Africa are further obscured by potential land redistribution in South Africa. Binswanger and Deninger (1993) argue that small farms are more efficient than larger farms, suggesting that land redistribution might reduce average production costs in South Africa. But the broader effects of potential land redistribution on total production levels and costs are generally regarded as unclear, but which may have important implications for the direction and magnitude of maize trade under regional trade liberalization.

The outcome of domestic food market reform in South Africa is likely to have important implications for farmers and consumers in Zimbabwe also. If regional trade liberalization proceeds without domestic food market reform in South Africa, maize meal exports from Zimbabwe may exert upward pressure on food prices in Zimbabwe, benefitting commercial farmers, millers, and smallholders capable of producing a marketed surplus, while potentially bidding up food prices for urban and rural maize consumers. The possible gainers and losers resulting from alternative permutations of domestic food trading environments in South Africa and regional trading environments are presented in Table 5.

**Table 5. Anticipated Distributional Effects of Alternative External and Internal Trading Environments in South Africa.**

| DOMESTIC TRADING ENVIRONMENT IN SOUTH AFRICA |   |   |
|--|---|---|
|  | Maintenance of existing controlled marketing system   | Deregulated Private Trade   |
| EXTERNAL TRADING ENVIRONMENT                 | <p>Maintenance of controls and/or tariffs on cross-border trade</p> <p style="text-align: center;"><b>Scenario A</b></p> <p>Existing situation, against which the distributional effects of Scenarios B, C, and D are evaluated.</p>  | <p style="text-align: center;"><b>Scenario B</b></p> <p style="text-align: center;"><b>South Africa</b></p> <p>Gainers: urban and rural consumers of maize meal.<br/>Losers: maize farmers in relatively remote and unproductive regions; large-scale commercial millers</p> <p style="text-align: center;"><b>Zimbabwe</b></p> <p>Gainers: none relative to Scenario A<br/>Losers: none relative to Scenario A</p>   |
|  | <p>Deregulated private cross-border trade</p> <p style="text-align: center;"><b>Scenario C</b></p> <p style="text-align: center;"><b>South Africa</b></p> <p>Gainers: urban and rural purchasers of maize meal.<br/>Losers: large-scale commercial millers; maize farmers and cooperatives</p> <p style="text-align: center;"><b>Zimbabwe</b></p> <p>Gainers: commercial farmers; smallholder sellers of maize; large-scale milling firms; small-scale milling firms (potentially).<br/>Losers: urban and rural purchasers of maize meal (potentially).</p> | <p style="text-align: center;"><b>Scenario D</b></p> <p style="text-align: center;"><b>South Africa</b></p> <p>Gainers: urban and rural purchasers of maize meal; small-scale millers; animal feeders; consumers of animal products.<br/>Losers: large-scale commercial millers; maize farmers and cooperatives in relatively remote and unproductive regions.</p> <p style="text-align: center;"><b>Zimbabwe</b></p> <p>Gainers and losers: depends on evolution of relative maize production and marketing costs between South Africa and Zimbabwe.</p> |

## 5. CONCLUSIONS

Writing in 1987, Paul Mosley posed the following question about the Zimbabwean maize sector:

"...the system of food marketing handed over in 1980 to the independent government of Zimbabwe reflects, more than anything else, the needs of distressed white producers during the depression of fifty years previously. It remains to be seen whether that Government will now move towards a policy which favors consumers a little more or whether it will, like its Kenyan counterpart, preserve the colonial system in the interests of the new generation of African commercial farmers" (p. 215).

The experiences with food system reform in much of Southern and Eastern Africa since the time of Mosley's writing, suggest that a delicate balancing act is being pursued. The interests of elite and politically influential black commercial farmers, like the influential white farmers in former governments, continue to be expressed in the form of relatively high farm prices, which in turn impose a burden on the low-income majority. This burden has been mitigated, to some extent, by the dynamic effects of higher farm prices on agricultural wage employment and growth linkages between farm and non-farm sectors. The magnitude of these growth linkages remains a major unknown. Consumers have, in almost all cases, clearly benefitted from the recent food market reforms, through the reduction of costs within the marketing system. In the recent wave of structural adjustment policies, in which subsidies on consumer food staples were often eliminated, the reduction of costs through food system reform can be considered as an important market-based safety-net for low-income consumers. At the same time, the reforms have typically lurches the state food marketing boards into financial crisis, as their pricing operations and overall mandate were not sufficiently adjusted to deal with the surge of competition from private trading channels.

The broader agricultural policy issues highlighted by the market reform experiments in Southern Africa concern how to restructure agricultural programs and farmer support organizations during a period of declining public budgets under structural adjustment, to fit the needs of the much expanded constituency. There is currently pressure to abolish particular state organizations and functions when, by default, it can no longer sustain the costs under the existing formulation of its agricultural support programs. The key question is how to redesign such organizations and programs to fit the needs of a much larger clientele in a cost-effective and sustainable way. Zimbabwe's difficulties in "scaling-up," — i.e., managing the transition from a well-organized public research and market infrastructure system that fit the needs of a few thousand commercial farmers under Southern Rhodesia, to a system that continues to do so, but also meets the needs of millions of smallholder households and urban consumers — has clear implications for South Africa.

Some specific lessons from the market reform experiences in Southern Africa are that:

1. While the commitment to food price stabilization and associated controls on food marketing systems have been an understandable outgrowth of the unique conditions of Eastern and

Southern Africa, these policies have imposed heavy costs on producers, consumers and/or the treasury. The development of decentralized maize marketing networks in Zimbabwe, facilitated by the policy reforms of 1993, has already measurably reduced food marketing margins and consumer prices and has stimulated private sector investment (Sithole, Chisvo, and Jiriyengwa 1993; Rubey 1993; Mukumbu 1992).

2. Partial food market reform in Zimbabwe, Tanzania, Malawi, and Kenya has been associated with increased marketing board budget deficits. The marketing boards' financial crises primarily reflected governments' view that they could continue to mandate their food marketing boards to buy and sell at fixed prices throughout the year irrespective of market conditions in the nascent private trading channels legalized through market reform. While market reform, as it has been implemented in these countries, has exacerbated marketing board deficits, this result is clearly not inevitable if reform were accompanied by a more flexible marketing board pricing policy, which responded to changes in private trading conditions. The experiences of these countries have important implications for the design of food market reform in South Africa.
3. Consumer subsidies on refined maize meal in Kenya and Zimbabwe have not necessarily promoted food security, because they (and associated controls on maize marketing) have entrenched a relatively high-cost marketing system and impeded the development of lower-cost channels from developing. Regulations or inefficiencies at certain stages of the system may impose redundant marketing costs that overwhelm the effects of direct government subsidies. Findings from both Kenya and Zimbabwe indicate that the subsidy on sifted flour during 1993 was approximately equal to the difference in milling margins between the large-scale roller milling firms and informal hammer mills (Mukumbu and Jayne 1994; Rubey 1993; Sithole, Chisvo, and Jiriyenga 1993).
4. In the case of Zimbabwe and Kenya, elimination of restrictions on private grain movement in 1993 had immediately increased the availability of less expensive and more nutritious maize meal to urban consumers through the small-scale milling sector, simultaneously reducing the need for huge budget outlays on high-cost industrial roller meal and expanding market opportunities for maize producers. These potential gains have been neglected in other countries in the region because of widespread perceptions that food consumption behavior is largely fixed and unresponsive to changes in relative prices or a widened range of choices. Consumer surveys in Zimbabwe, Kenya, and Zambia call into question the validity of these perceptions, especially in an environment where real urban wages have declined and food prices have risen dramatically. In many countries, maize meal consumption patterns now appear to be largely a manifestation of government policy over the decades. While consumption of the more costly sifted flour is partially determined by attributes of the product itself, its perceived popularity had been exaggerated by decades of controls on maize marketing, which had restricted consumers' access to the less expensive, whole maize meal through informal trading and milling networks, and by large subsidies on sifted meal. Easing the trade-offs between affordable consumer prices, producer incentives, and treasury costs often requires some form of food market liberalization that expands

consumers' choices and captures potential gains from self-targeting. This contrasts markedly with the historical approach in East and Southern Africa of heavily subsidizing the more refined food products and blocking consumers' access to potentially lower-cost options.

4. Consumption of whole maize meal in Kenya, Zambia, and Zimbabwe appears to be negatively related to household income, while refined meal is positively related to income (Mukumbu and Jayne 1994; Rubey 1993; Diskin and Sipula 1994). These findings indicate that subsidies on sifted flour were captured primarily by high income consumers. These findings also suggest that whole maize meal is to some extent self-targeting, i.e. it would be the product of choice for many low-income households.
5. Hammer mill technology has a higher labor-to-capital ratio, labor-to-output ratio, output-to-capital ratio, and output-per unit cost of maize meal produced than large-scale roller mill technology (Stewart 1977; Bagachwa 1992; Rubey 1993). This implies that hammer mill technology is more consistent with employment growth, conservation of scarce foreign exchange, and lower maize meal costs than industrial roller mill technology. These advantages must be considered against the fact that roller mill technology produces important by-products for the stockfeed and oil processing industries.
6. We stress the importance of *ex ante* analysis that informs decision makers regarding how preferences may change with policy, instead of implicitly taking preferences as given and formulating food policies around prevailing consumption patterns. When given a wider range of products differentiated by price, consumer choices may be more flexible than supposed by conventional wisdom. Improved knowledge of consumer behavior can widen policy makers' perceptions of feasible options to protect vulnerable groups and increase receptivity to sustaining the recent food policy reforms in Africa. A corollary of this is that policy makers may feel less compelled to reimpose controls at a later stage.
7. The process of undertaking research may be as important as the research findings themselves. There will always be entrenched interests in maintaining status quo policies. These groups will typically attempt to mobilize support against policy reform. Donor pressure, while often useful and effective, can also be branded as interference and be used to direct public opinion against socially useful reform. However, strong local analytical units often have greater local acceptance, and can serve to make the effects of policy reform more credible and transparent to policy makers and the public at large. Therefore, the research process may have a greater impact when driven by locally-based analysis and dissemination of findings.

Finally, we highlight several important implications of food market reform for regional trade in Southern Africa:

1. The future magnitude and direction of maize trade under a less controlled external trading environment will depend greatly on the resulting structure of the domestic maize pricing, distribution and processing system in South Africa, and on the reforms already initiated in Zimbabwe. The reforms in Zimbabwe, for example, have substantially altered the relative costs of maize meal between the two countries.
2. The beneficiaries and losers of domestic food market reform in South Africa will differ depending on whether or not external private trading restrictions are relaxed as well. If private cross-border trade is not restricted or taxed, the primary beneficiaries are likely to be consumers of maize meal and livestock products in South Africa, South Africa producers close to major urban centers, and white maize producers in Zimbabwe. The major losers will be farmers facing high transport costs to demand centers in South Africa, and large-scale commercial millers. If domestic food market reform proceeds in South Africa without external trade liberalization, there will be a relative shift in income from consumers of maize meal and livestock producers to maize farmers in South Africa.
3. Just as consumer welfare is tied to the efficiency of the farm sector, the welfare of South African white maize farmers is indirectly yet intimately tied to the efficiency of South Africa's maize distribution and processing system. A lack of productivity growth/cost reduction in South Africa's maize marketing system is likely to depress both maize output and farm prices in South Africa under a less regulated external trading environment.
4. The foregoing indicates that domestic food market reform in South Africa — as a means to reduce the margin between farm gate prices and retail maize meal prices — will be a critical prerequisite to enable South African maize growers to flourish within a less regulated external trading environment. This conclusion has important implications, not only for commercial farmers, but also for the development of a black smallholder farming sector in South Africa.



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