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Seed Cotton Market Structure and Cotton Sector Performance: Many Lessons but No Fixed Prescriptions

By Valerie Kelly and David Tschirley*

This Policy Brief summarizes evidence reported in a recent study on the links between seed cotton market structures and selected cotton sector performance indicators in nine African countries (Tschirley et al. 2008). The purpose of the study is to contribute to better design and implementation of cotton sector reforms by building a reliable, broad assessment of cotton sector performance from detailed empirical information collected and analyzed by independent researchers and cotton sector experts.

INTRODUCTION: The African continent offers a wide diversity of approaches to cotton sector organization. This has led to recurrent debates about the relative strengths and weaknesses of different forms of organization. Experience has shown that the structure of the markets in which farmers sell their seed cotton has a strong influence on how other activities in the sector are organized (e.g., input supply, credit, export marketing) and how well the entire sector performs. Many factors can differentiate seed cotton markets, but the most important are:

- Number of actors: competitive systems have many actors, oligopolistic systems just a few, and monopolistic systems just one.
- Degree of vertical integration: the greater the number of different functions a single firm performs (e.g., input supply, ginning, exporting), the more vertically integrated that firm is.
- Degree of government involvement: this can range from direct ownership and management of the cotton company to nothing more than providing a favorable business environment.

As we will see in the discussion below, there is often a pattern in the way that these organizational characteristics are grouped together. For example, vertical integration (which can significantly reduce transaction costs involved in moving goods and services from producers to consumers) is difficult to maintain in a competitive market with many actors. Consequently, we tend to find vertical integration associated primarily with monopolies, to a lesser but still strong degree with oligopolies, and hardly at all with competitively structured systems. While vertical integration facilitates good performance in some dimensions, it can undermine it in others; in other words, there are tradeoffs in performance associated with particular structural choices. These tradeoffs need to be understood and evaluated during any cotton sector reform process. The objective of this brief is to describe some of these trade offs, noting from the start that there is no “ideal” cotton sector structure—this is perhaps the most important finding reported in this brief.

* Kelly is Associate Professor International Development and Tschirley is Professor International Development in the Department of Agricultural, Food, and Resource Economics at Michigan State University. This Policy Brief was produced for review by the United States Agency for International Development under the WACIP project funded by USAID. The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

The four most common seed cotton marketing structures in Africa are:

- national monopolies,
- local monopolies,
- concentrated market-based sectors, and
- competitive market-based sectors.

DISTINGUISHING CHARACTERISTICS OF AFRICAN SEED COTTON MARKETS: Of the four dominant market structures in Africa, two are forms of monopoly that allow for seed cotton prices to be determined administratively, with varying degrees of correspondence to prevailing world market prices.

National monopolies are best characterized by the West and Central African (WCA) *filière intégrée* model which has a single public ginning company with exclusive rights to purchase seed cotton, producer prices that are announced at planting and fixed over time and space, intensive input use supported by vertically integrated input credit and output markets that ensure credit repayment, direct cotton sector investments in feeder roads, adult literacy, research and extension, and a stabilization fund. Mali, Cameroon, Senegal and Chad continue to operate national monopolies, although government has a more limited role in Cameroon and Senegal (where cotton is a less strategic economic sector) than in Mali and Chad.¹ Although Benin started out as a national monopoly, it began transitioning to a hybrid system in 1999. At present, the parastatal SONAPRA manages 50% of the seed cotton market with approximately ten other local firms sharing the rest in an environment of strong government involvement that limits competition by setting prices and assigning purchasing quotas to each firm.

Local monopolies are best characterized by the concession system in Mozambique, with the cotton sector divided into multiple geographic areas in which government grants a monopoly position to a single firm. In Mozambique, a national minimum price is announced shortly before harvest. Firms are protected against side-selling (which if left unchecked would destabilize input credit systems) through enforcement of the regional monopoly. Côte d'Ivoire and Burkina Faso broke their national monopolies into regional monopolies and Mali is moving in this direction. Price mechanisms in the local monopolies of WCA differ from

the Mozambique model, in that they have retained the traditional system of announcing prices at planting time, with a premium paid at a later date if the income of the ginning/export firm exceeds anticipated margins. Farmers' organizations are now involved in price negotiations in WCA, but have until recently played a very minor role in Mozambique where the cotton companies have historically set prices in consultation only with government. Also, the WCA *filière intégrée* systems have continued efforts to maintain stabilization funds. Most of these funds were depleted during the recent past due to cost inefficiency and maintenance of high producer prices in the face of extended periods of low world prices; but efforts are underway to rebuild them.²

The other two dominant models are market-based structures where prices are determined predominantly by market forces and allowed to change over space and time during a single season.

Concentrated, market-based sectors were best represented, until recent times, by Zambia and Zimbabwe, where one or two large companies compete for the purchase of seed cotton with a few much smaller firms. Although prices are determined in the market and may vary by location, a dominant firm acts as a price-leader announcing indicative (but not legally binding) prices at planting. Prices can change during the season (more common in Zimbabwe than in Zambia). Although the possibility of prices changing forces farmers to bear some market risk, the exporting firms reduce the need to change prices through the use of forward selling and futures markets. There are no stabilization funds for the concentrated markets. The larger ginners in concentrated markets tend to be vertically integrated into farmer support services; this service provision is weaker for the small ginners.

Competitive, market-based sectors are best illustrated by the current Tanzania model, characterized by many competing firms (of which a few are farmer cooperatives); none have a dominant position. There is some limited vertical integration as most seed cotton purchasers own the gins they operate. Gins used in Tanzania have historically been roller gins, which do not exhibit significant economies of scale—a contributing factor to the evolution of a more competitively structured sector. Prices are determined by the

¹ In August 2008, Mali passed legislation to privatize the sector, but this has not yet been implemented.

² Burkina, has announced the establishment of a new stabilization fund to become operational with the 2009/2010 production season.

market and vary over space and time; there is no stabilization fund to protect ginners or producers against price risks and firms provide farmer support services rarely if at all.³

WHAT IS THE EMPIRICAL EVIDENCE ON PERFORMANCE?

Performance is multi-dimensional, yet there are nine performance criteria that are most critical for assessing overall cotton sector performance. These criteria and the indicators (shown in parentheses) used to measure them are listed below:

- *Producer price levels* (producer price as a share of the export price); a higher share is considered a sign of a “farmer-friendly” sector that will stimulate increased production and farm incomes;
- The level of *net farm returns* (net returns per day of family labor); higher net returns signal a favorable cost/price environment for farmers;
- How well *input supply and credit* systems function (percent of cotton farmers receiving credit and the repayment rate); access to inputs and sustainable credit systems contribute to increased yields;
- *Research investments* (number of new varieties released and adopted during the past ten years); research contributes to yield-increasing or cost-reducing production techniques;
- *Cotton yields* (mean yield over 5 years and yield trends over 10 years); yields are a function of input supply as well as research, extension, and other farmer support services;
- The *quality of the cotton lint* produced by ginners (estimated average realized premium over Index A world price); quality determines the price obtained in world markets and ultimately the price that can be offered to farmers;
- The *cost-efficiency* of post-farm operations (cost of moving and processing a kilogram of lint from farm gate to the point of being loaded on a truck for export); this determines what share of world market prices can be offered to farmers;
- The amount of *value added* contributed by the sector to the overall economy (total cotton value added per capita); a measure of how much the sector contributes to overall economic growth and job creation; and
- The *macroeconomic impacts* of the sector (net budgetary contribution per capita calculated as taxes paid minus transfers received plus shareholder returns).

³The Ugandan system was also built on roller gins and was competitively structured until 2000, when government and ginners decided to convert it to a hybrid system based on zoning that is similar to a local monopoly.

Using these nine criteria, researchers evaluated and ranked the performance of the four structural models described above.⁴ Key findings are summarized in Table 1 (page 6) and described in the following paragraphs.

NATIONAL MONOPOLIES: (Mali and Cameroon) have not yet undertaken major structural reforms such as privatization of ginning. On the other hand, they have increased producer roles and responsibilities for input distribution and seed cotton assembly, which means a larger share of export profits for farmers. Governments have also held cotton companies responsible for meeting production and performance goals through management contracts; but the contract system has failed to resolve many of the problems. The national monopolies have good performance relative to other structural models in input credit provision (largely because the single buyer in the seed cotton market is able to ensure credit repayment) and yields (generally a reflection of the system’s ability to supply inputs and extension services and promote animal traction among a large share of farmers). Absolute yields for national monopolies have, however, been declining as farmers move toward more extensive production practices using lower levels of purchased inputs and cultivating more land. The picture on net returns has been variable over time. Poor net returns in the early post-devaluation period—where the benefits of the devaluation and rising market prices were not passed through to farmers—were a major bone of contention in Mali that led to production boycotts. More recently, however, prices in both Mali and Cameroon have been well above what can be justified by world market prices, contributing to high net returns at the farm level. These recent net returns cannot be viewed as a sustainable strength, given that they have depleted the price stabilization fund in both Mali and Cameroon and required a government bail out in Mali. A particularly weak area of performance is the post-harvest transport, handling, and processing, which is not cost-efficient compared to other structural models (see Figure 1, page 6). Macroeconomic contribution has been acceptable on average, but variable from year to year, depending on whether the sector requires government support payments or produces tax revenues. At present, for

⁴ Indicators used in this study are not without their critics. For example, lint quality is used as an indicator of ginning performance but is also a function of cotton varieties and production conditions (which vary across countries) and the introduction of a larger number of varieties during a ten-year period could signal poor research performance (i.e., a need to replace non-performing varieties) rather than successful research investments.

example, the Malian system is dealing with large and negative macroeconomic impacts, but has experienced many years of positive impacts in the past. National monopoly performance is variable with respect to producer prices, lint quality, research, and value added.

The picture for **local monopolies** (Mozambique and Burkina Faso) is variable, due primarily to the vastly differing histories of the two countries: Burkina has only recently emerged from its national monopoly system. The ex-parastatal still had 85% of the market as of 2007, so in many respects it resembles the national monopoly that it was a short time ago. Because of these differences, we report separately on each of these countries in the table. Mozambique shows no areas of best performance and two areas—producer prices and farm returns—with poorest performance. Input credit supply in Mozambique is acceptable, though inferior to that in Burkina Faso. Credit repayment in Mozambique varies from 60% to 90%, with the lowest rates occurring in zones where new firms are poorly regulated by government, making it possible for side-selling to take place during some years. Burkina exhibits a strong input credit system with 95% repayment based on the *filière intégrée* approach that is now applied within the local monopoly system. Based on strong input credit and other carryovers from its national monopoly system, it also performs very well on farm yields and value added; like the national monopolies, though, its high farm returns are not fully sustainable due to unrealistically high farm prices. Macroeconomic impact is acceptable for Mozambique, in large part because government is collecting taxes and not getting involved in bailouts. In Burkina Faso, however, large sectoral deficits in recent years have created major budgetary problems. Producer prices are extremely low in Mozambique due to poor regulation of the sector but relatively high in Burkina where producer organizations have been able to negotiate what many consider unsustainably high prices.

The **concentrated market-based systems** (Zambia and Zimbabwe) show the best overall picture: best performance in lint quality, macroeconomic impact, and value added, acceptable on several other indicators, and poorest on none. These countries' performance on value added is superior to Tanzania's competitive sector but below Burkina's best performance. Good performance on lint quality (see Figure 2, page 6) stems from two factors: the ability of firms to pay more for better quality, and the ability of the dominant firms to develop relatively stable relationships with farmers willing to produce high

quality cotton. Both these abilities emerge from the modest risk of credit default (compared to competitively structured systems). The concentrated systems also perform acceptably for input and credit supply, post-farm cost efficiency, farm yields, and farm returns. There is evidence, however, of a weakness in these systems because they can evolve into competitive systems with many small, under-capitalized actors before the institutions for managing input supply and credit have developed in the general economy. When this happens, the performance of the input/credit system deteriorates due to side-selling and reduced repayment rates, as illustrated by Zimbabwe where between 2002 and 2006, the number of firms expanded from 3 or 4 to over 15 and repayment rates declined significantly. Zambia overcame similar problems in the late 1990s when the lead firms refined their service provision and credit recovery approach (including educating farmers about the benefits of remaining loyal); but side selling and credit defaults were on the rise again in 2006. Results are variable over time for producer prices and research. Producer prices as a share of export price in both Zambia and Zimbabwe were second only to Tanzania and Uganda during the 1995-2000 period, but were lower than those of all other countries except Mozambique from 2000 to 2005.

Competitive Systems: (Tanzania and, prior to 2000, Uganda) are subject to weak performance in input supply and credit, farm yields, and lint quality (all functions that benefit from vertical or horizontal coordination that is not adequately developed in competitive systems). Input credit supply is particularly weak in competitive systems because those supplying such services are unable to ensure repayment when farmers decide to sell their output to competitors who have not provided credit. By contrast, these systems do well in prices offered to producers and cost-efficiency in post-harvest operations. From 1995-2005 farmers in Uganda and Tanzania consistently received 68-70% of the export price with little inter-annual variation; this was the highest average share of the export price realized by countries in the study.

DOES PAST EXPERIENCE PROVIDE GUIDANCE FOR IMPROVING REFORM OUTCOMES AND STRATEGIES? Yes, but it does not provide fixed prescriptions! Experience shows that (1) there is no single prescription for successful cotton sector organization; (2) the search for improved performance should be based on a dynamic view of structure that permits change over time; and (3) different seed cotton market structures

impose different sets of challenges that can often be predicted and addressed during the reform process.

The primary needs in countries with national monopolies (much of Francophone WCA) include developing safeguards against political influence, improving transparency in operations and budgetary matters, and increasing post-harvest cost efficiency. Cameroon appears to have separated the government interests from the economic interests of the sector more effectively than other countries, offering an example to study. In the absence of such separation, more drastic structural reform may be needed. The danger with such reform is that it could result in a rapid transition to a concentrated market-based system without appropriate safeguards to limit new entrants to firms willing and able to invest in farmer support programs and pass benefits of devaluations and quality improvements through to farmers; this could lead to the post-2000 situation in Zimbabwe and Zambia where the rise of many small actors has jeopardized input credit systems. Gradually transitioning to a concentrated system via local monopolies may provide the time needed for building supporting institutions for credit and contract enforcement. Reducing post-farm costs could be done without transitioning to a fully competitive system if the national monopoly increased private-sector involvement and price competition in handling, transport, ginning, and processing of cotton seed and oil by-products.

If one is already in a **competitive system**, extra attention needs to be given to developing institutions and coordinating mechanisms to support input credit as well as to provide incentives for the production of higher quality lint. This includes strengthening of regulatory bodies charged with monitoring ginner and producer behavior as well as incentives that encourage investments in more productive technologies (fertilizers, appropriate varieties, high volume instrument equipment). While government has a role to play in research and regulation, professional associations (ginners, producers, traders) need to be involved in determining the needs and providing some self-monitoring. Successful development of joint public-private programs to improve the weak links (particularly input supply and credit) could contribute to increased productivity for the entire sector.

In Africa's current institutional and market setting, competitively structured systems are unlikely to support productivity growth and poverty reduction. Promotion of a competitive seed cotton market makes sense only when there has been progress in

developing national input supply and credit systems and an adequate regulatory framework.

Drawing firm conclusions about the performance and role of local monopolies is difficult given that the two examples presented differ as a result of historical circumstances. Analysts suggest that the model be used as a stepping stone from national monopoly to one of the more market-based structures rather than as a durable arrangement. This requires developing a transition plan to advance beyond the local monopoly at the time the local monopolies are established. In the absence of a transition plan, the sector may tend to stagnate and fail to realize its potential. In the short-run, the success of a local monopoly will depend on clear rules for the initial allocation of concessions as well as for evaluation and re-issuance of subsequent concessions, successful regulation in terms of price setting rules, and capacity building among key actors (farmers, input suppliers, and government personnel managing the concession grants). The Mozambique government has recently evaluated the concession model and decided to terminate and re-negotiate all existing concessions, for periods of five to ten years, with a view to eventual liberalization of the sector.

Evidence suggests that the **concentrated market-based structure** has outperformed other structures in the recent past. To diminish the risk of a rapid transition to a highly competitive sector characterized by weak input supply and credit and poor lint quality, special attention needs to be given to licensing rules that specify capabilities and conduct of firms wishing to enter the sector. At the same time, stakeholders should be pursuing complementary programs to develop national input and credit markets and lint quality monitoring systems. There is also a need to monitor prices and ensure that all actors in the sector are receiving an equitable return on their efforts. Strengthening producer organizations and their bargaining skills is usually a more effective long-term strategy for ensuring an equitable distribution of benefits than instituting government price setting regulations and building a costly bureaucracy.

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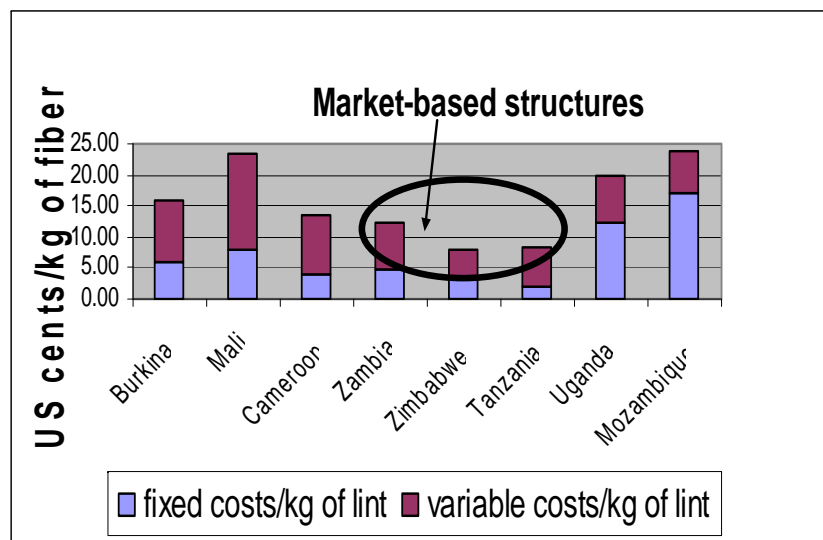
Table 1. Comparison of Performance Results for Four Predominant Seed Cotton Market Structures in Africa

| Market structure | Countries covered | Performance Criteria | | | | | | | | |
|-------------------|-------------------|----------------------|------------------------|---------------------------|---------------------|---------------------------|---------------------------|----------------------|---------------------------|---|
| | | Producer price | Net farm returns | Input credit and supply | Research investment | Farm yields | Lint Quality | Post-farm efficiency | Value added per capita | Macroeconomic (Budgetary contribution per capita) |
| Competitive | Tanzania | Best | Acceptable | Poorest | Variable | Poorest | Poorest | Best | Acceptable | Acceptable |
| Concentrated | Zambia | Variable over time | Acceptable | Acceptable | Variable | Acceptable | Best | Acceptable | Very good | Best |
| | Zimbabwe | | | | | | | | | |
| Local monopoly | Mozambique | Poorest | Poorest | Variable across companies | Poorest | Variable across companies | Variable across companies | Variable | Poorest | Acceptable |
| | Burkina Faso | Variable over time | Best but unsustainable | Best | Variable over time | Best | Acceptable | Poorest | Best | Variable over time |
| National monopoly | Mali | Variable over time | Best but unsustainable | Best | Variable over time | Best | Variable across countries | Poorest | Variable across countries | Variable over time |
| | Cameroon | | | | | | | | | |

Source: Compiled by authors from study results reported in Tschirley et al. forthcoming.

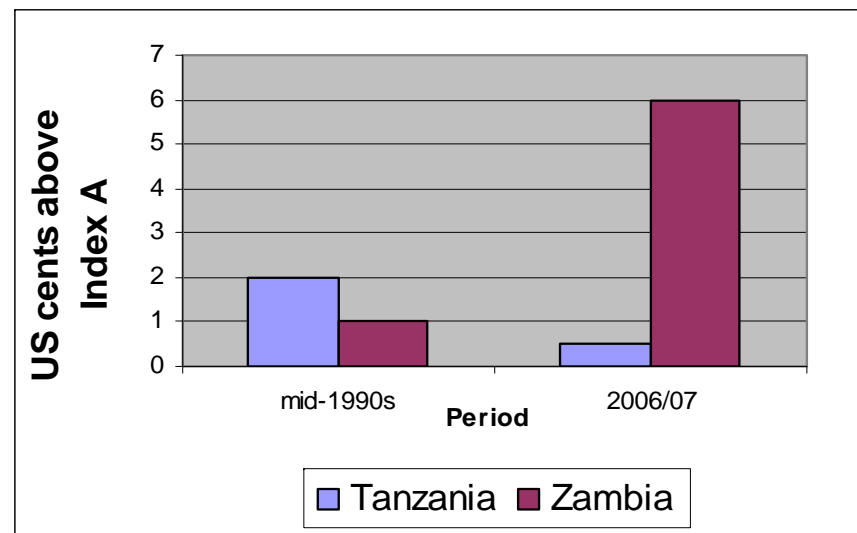
Note: Because the two examples of local monopolies have very different performance results due to their different historical situations, we show the results for each individual country rather than combining them.

Figure 1: Cross-country Comparisons of Ginning Costs



Source: Company accounts (WCA), WB project interviews ESA

Figure 2. Evolution of Lint Quality Premiums for Tanzania and Zambia



Source: Gerald Estur, Quality Survey, World Bank 2007