

REVISITING THE "COTTON PROBLEM"

A Comparative Analysis of Cotton Reforms in Sub-Saharan Africa

Abstract

The cotton sector has been amongst the most regulated in Africa, and still is to a large extent in West and Central Africa (WCA), despite repeated reform recommendations by international donors. On the other hand, orthodox reforms in East and Southern Africa (ESA) have not always yielded the expected results. This paper uses a stylized contracting model to investigate the link between market structure and equity and efficiency in sub-Saharan African cotton sectors and analyze the potential consequences of orthodox reforms in WCA. We argue that the level of the world price and of government intervention, the degree of post-reform competition, as well as the degree of parastatal inefficiency, all contribute to making reforms less attractive (but not less pressing) to farmers and governments in WCA today, as compared to ESA in the 1990s. We illustrate our arguments with empirical observations on the performance of cotton sectors across sub-Saharan Africa (SSA).

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Introduction

Context

African 'White Gold'

Cotton is a crucial source of income for rural populations & national economies, considered to be key for development (e.g. Moseley, 2008)

Credit Constraint & Interlinked Transactions

The required inputs being often unaffordable to farmers, processors provide them on credit & recover their value at purchase

Regulated Markets: 'Single-channel Systems'

Traditionally in all SSA: ginning by parastatals; very limited competition; price regulation (until very recently only by the State)

The 'Cotton Problem'

The key advantage of regulation is the prevention of "side-selling". International donors however advocated reforms as price setting distorted production incentives & parastatals found to be inefficient

Yet, very different reform choices across regions in Africa:

- In ESA: strong privatization & liberalization in early to mid 1990s
- In WCA: limited privatization, very partial liberalization & fixed prices

Motivation

Revisiting the 'Cotton Problem'

Does the resistance to reform cotton sectors in WCA reflect unwillingness to give up on rents or beliefs that they would not benefit farmers? What shall be expected from such reforms in WCA?

Insights from the Literature

- Comparative research (Tschirley et al., 2009) reveals that different market structures & institutions result in different reform experiences.
- Theoretical work (e.g. Poulton et al. 2004) shows that the high asset-specificity of the investments needed for cotton production & weak enforcement mechanisms result in scope for strategic defaulting & underinvestment, notably, in input schemes.
- description of a trade-off between cooperation and competition.

Paper Objective

Attempt to go one step further by assessing the expected effects of reform in a formal framework provided by Swinnen et al. (2009)

The Model

The Farmer

To produce one unit of cotton, the farmer needs:

- An amount of labor l (with opportunity cost l , e.g. food crop price)
- Inputs of value k , supposedly unavailable to the farmer unless through credit by the processor who has better access to credit &/or inputs

The Processor

The processor's opportunity cost of exporting cotton is \bar{k} . Inefficient processors face extra costs c (e.g. excessive storage & transport costs; uncompetitive sales strategies; political interference)

The Government

Price setting is accounted for with parameter t : a tax ($t \geq 0$) or a subsidy ($t \leq 0$). The size/sign of t remains exogenous, based on data observation

Context

Processed cotton is exported at price p , the exogenous world price
 Indivisible production function; fixed proportions production technology

Surplus Sharing

Net value created if a contract is agreed and enforced (θ):

$$\theta = p - l - k - c - t \quad (1)$$

The surplus is shared according to a Nash bargaining process (Nash, 1953)

Defaulting opportunities

As no formal enforcement, contract can be enforced only if self-enforcing.

The farmer can default on contract obligations in 2 ways:

- (i) By not using inputs for cotton production & obtain $l + \bar{k}$
- (ii) By not supplying the cotton produced to the contracting party but "side-sell" & obtain the spot market price for cotton γp

[γ reflects the d° of competition & e.g. processor differentiation]

In both cases, the farmer incurs a reputation cost (ϕ)

Respective payoffs (farmer; processor):

$$Y = \max\{l + \beta \theta; l + \bar{k} - \phi; \gamma p - \phi\} \quad (2)$$

$$\Pi = p - c - t - Y \quad (3)$$

Contract sustainability given by:

$$p \geq p_{min} = \max\{l + \beta \theta; l + \bar{k} - \phi; \gamma p - \phi\} + \bar{k} + t + c \quad (4)$$

The Effects of Orthodox Reforms

Model Predictions

New options to side-sell: $\partial \gamma / \partial R \geq 0$ (if no collusion).

Improved contract options ex-ante: $\partial l / \partial R \geq 0$.

Decreased reputation cost (ϕ) as coordination becomes + costly & + alternative buyers remain after defaulting: $\partial \phi / \partial R \leq 0$

Price liberalization: $\partial t / \partial R < 0$ (if sector taxed before reform) & $\partial t / \partial R > 0$ (if sector was subsidized before reform)

Undetermined effect on efficiency: improvement thanks to the elimination of political interference & quiet life hypothesis BUT worsening if loss of economies of scale & incentives for research; increased transaction costs $\rightarrow \partial c / \partial R$ to be defined empirically

Overall effect on farmers' returns (building on equation 2):

$$\frac{\partial Y}{\partial R} = \frac{\partial Y}{\partial \gamma} \frac{\partial \gamma}{\partial R} + \frac{\partial Y}{\partial l} \frac{\partial l}{\partial R} + \frac{\partial Y}{\partial \phi} \frac{\partial \phi}{\partial R} + \frac{\partial Y}{\partial c} \frac{\partial c}{\partial R} + \frac{\partial Y}{\partial t} \frac{\partial t}{\partial R} \quad (5)$$

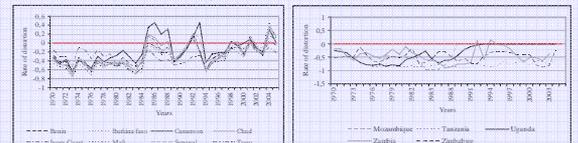
Overall effect on contract sustainability (building on equation 3):

$$\frac{\partial p_{min}}{\partial R} = \frac{\partial p_{min}}{\partial \gamma} \frac{\partial \gamma}{\partial R} + \frac{\partial p_{min}}{\partial l} \frac{\partial l}{\partial R} + \frac{\partial p_{min}}{\partial \phi} \frac{\partial \phi}{\partial R} + \frac{\partial p_{min}}{\partial c} \frac{\partial c}{\partial R} + \frac{\partial p_{min}}{\partial t} \frac{\partial t}{\partial R} \quad (6)$$

Empirical lessons

Subsidization in WCA today vs taxation in ESA at the time of reform

→ Limited price effect & greater risk of contract breakdown expected



NRAs in WCA (left) & ESA (right) 1970-2005 (Source: Baffes, 2009)

Market structure after reform: empirical evidence that it resembles market structure before reform (Tschirley et al., 2009)

As in Zambia & Zimbabwe, concentration will likely remain high.

→ Smaller risk of contract breakdown but limited price effect expected

Ex-ante outside options

In contrast with ESA, less crops to switch to in WCA

→ Smaller risk of contract breakdown but limited price effect expected

Efficiency

Evidence of better parastatal efficiency in WCA as + investment in research, extension & infrastructure (Townsend, 1999)

→ More limited gains in efficiency expected

→ Limited price effects & greater contract breakdown to be feared

Conclusion

We argue that reforms are less attractive to farmers and governments in WCA today, as compared to ESA in the 1990s because of more limited expected gains for producers & greater potential for contract breakdown.

The breakdown of inefficient contracts might however be beneficial if freed resources can be used in alternative ways to support poor farmers in finding alternative sources of income...

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