

Revisiting the “cotton problem”
A comparative analysis of cotton reforms in Sub-Saharan
Africa

Claire Delpeuch¹

Anneleen Vandeplass²
&
Jo Swinnen²

¹Sciences Po Paris – Groupe d’Economie Mondiale (GEM)

²Katholieke Universiteit Leuven – Centre for Institutions & Economic Performance (LICOS)

West African 'White Gold'

- Crucial source of income both for rural populations and for national economies

- Rare African agricultural “success story” (Lele et al., 1989)
 - Production: x2 over the 1970s
 - Yields : 6.1 %/annum growth rate, compared 1.9 % over 1970s &1980s (Baffes, 2007)

- Considered to play a key role for development and poverty reduction in WCA (e.g. Badiane et al., 2002; USAID, 2004; Moseley, 2008)

Interlinked Transactions

- ❑ Producing cotton requires the use of various external inputs that most smallholders cannot afford without resorting to credit
- ❑ The credit market is almost non-existent in rural areas
- ❑ Production occurs mainly through interlinked transactions, also referred to as 'contract farming' or 'outgrower schemes'

Regulated Markets (*Filières*)

- ❑ The majority of the output is ginned by parastatal companies
- ❑ Competition between ginners remains inexistent or very limited
- ❑ Price regulation (until very recently only by the State)
- ❑ Prices are fixed pan-territorially and pan-seasonally

The 'Cotton Problem" (1)

- Many stakeholders believed that intensive cropping practices would not be feasible in the absence of state-supported integrated supply-chain with interlinked contracts (e.g. AFD, 2004)
 - To avoid side-selling
 - Relatively successful input provision schemes for cotton production, with positive residual effects on food crops through crop rotation

The 'Cotton Problem" (2)

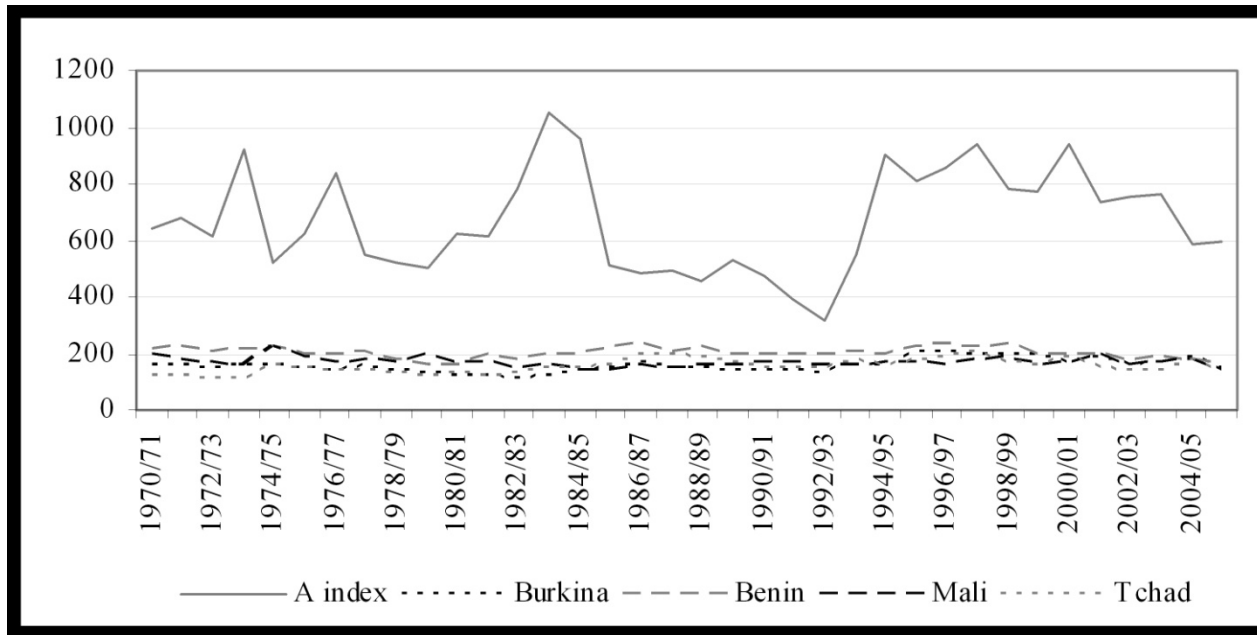
Still, this market organization model has been under attack of the WB and the IMF

- Main reason: distortions to production incentives (e.g. Baffes, 2007)
 - Excessive taxation
 - Unsustainable subsidies

- Additional reasons
 - Increasing inefficiencies in parastatal ginning (Tschirley et al. 2009)
 - Pan-territorial pricing schemes considered to be a poor rural development promotion tool (e.g. Baghdadli et al., 2007).

The 'Cotton Problem" (2)

A index and producer prices in the C4 (CFAf/kg, real 2000), 1971-2006



Source: producer prices and GDP deflators (Baffes, 2007), A index and MUV deflator (WB, 2008)

The 'Cotton Problem" (3)

- Reform choices have differed strongly between regions in Africa

- ESA cotton sectors were reformed under pressure from international donors in the early to mid 1990s

- Resistance to reform was much stronger in WCA
 - While private entry has been allowed to some extent in Benin, Burkina Faso and the Ivory Coast, liberalization can only be said to be *very* partially realized
 - Prices are still administratively fixed (despite adoptions of mechanisms which should relate its fixation to fluctuations of the world price)

- **Unwillingness to give up on rents or belief that reform would not be beneficial to farmers?**

Insights from reform experiences

- Comparative research (Tschirley et al., 2009) reveals:
 - Different market structures / local institutions resulted in very different reform experiences
 - No market sector type seems perform so well that it could be a reference
 - Concentrated sectors perform better in terms of input provision
 - Competitive sectors involve less budget pressure / are more efficient
 - The price effect is hard to disentangle: weak supply responses in many cases

Insights from reform experiences

- Attempts to explain the outcome of ESA reforms building on the New Institutional Economics literature
 - E. g. Dorward et al. 1998 ; Poulton et al. 2004 ; Poulton, 2006

- Identification of a trade-off between competition and coordination
 - High asset-specificity of the investments needed for cotton production
 - Weak enforcement mechanisms
 - Scope for strategic defaulting and underinvestment, notably, in input provision schemes

Formal approach

- What shall be expected from orthodox reforms in WCA?
- How can fierce resistance to reform be explained?

- Theoretical framework provided by Swinnen et al. (2009)
 - Characterize the effects of liberalization on contracting outcome/sustainability given different conditions of market structure and the nature of ownership
 - Context of imperfect markets, absent formal contract enforcement institutions, and prevalence of linkages between input and output markets

Results

- We argue that reforms are less attractive to farmers and governments in WCA today, as compared to ESA in the 1990s because of
 - the level of the world price
 - the level of government intervention
 - the degree of post-reform competition to be expected
 - the degree of perceived parastatal inefficiency in production and marketing processes

Outline

1. Introduction

- Motivation
- Literature
- Paper objective

2. The model

3. The effect of orthodox reforms

- Model predictions
- Lessons for WCA

4. Conclusion

The model

The farmer

- To produce one unit of cotton, the farmer needs
 - An amount of labour l
 - Opportunity cost of labour is \bar{l} (e.g. local food crops price if no other alternative)
 - Inputs of value k (e.g. seeds, fertilizers, pesticides, tools to adopt + intensive cropping techniques)
 - Not directly available to the farmer
 - The processor has better access to credit and/or inputs, such that he can provide them on credit

The Processor

- We normalize the interest rate to zero and set the processor's processing and marketing costs to be equal to the consumer's valuation of processing and marketing
 - The processor's opportunity cost of exporting cotton is \bar{k}

- Inefficient processors face extra processing & marketing costs denoted c .
 - E.g. excessive transport and storage costs (Kherallah et al. 2003),
 - E.g. uncompetitive sales strategies, management tools, and technology (Baffes, 2007) .
 - E. g. reflect the fact that parastatals have a record of serving as job providers to politicians needing to reward political support.

The Government

- We to account for government intervention in price setting, we introduce a parameter t , representing
 - a tax ($t \geq 0$)
 - a subsidy ($t \leq 0$).

- The size/nature of t remains exogenous, based on observed size/sign from data

Context

- Once ginned, the crop is entirely exported, as the local demand for raw cotton is extremely limited
- Cotton fibre is exported by the processor at price p , the exogenous world price for cotton
- Indivisible production function
- Fixed proportions production technology

Surplus sharing

□ We refer to the net value that is created if a contract is agreed and enforced as “surplus” and denote it as θ , with

$$\blacksquare \quad \theta = p - \bar{k} - \bar{l} - c - t \quad (1)$$

□ If a surplus is realised (i.e. $\theta > 0$), it is it is shared according to a simple Nash bargaining process, in which total payoffs are obtained by adding each agent’s outside option to his share of θ (Nash, 1953).

Defaulting opportunities

- We focus on the farmer's defaulting opportunities

- If the farmer accepts an offer for inputs / announced buying price, he can still decide ex-post
 - (i) Whether to use the inputs for cotton production
 - or default and obtain $\bar{l} + \bar{k}$
 - (ii) Whether to supply the cotton produced to the contracting party
 - Or "sidesell" and obtain the spot market price for cotton (γp)
 - γ reflects the d° of competition, but also e.g. the fact that alternative processors have a different reputation resulting in a different sales price)

- Reputation cost (φ)

The model

Respective payoffs

□ With no formal enforcement mechanisms, contract compliance can be ensured only by making the contract self-enforcing.

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

■ $\Pi = p - c - t - Y$ (3)

□ In turn, such a contract is feasible only if the world price satisfies the following condition:

■ $\max \{ \bar{l} + \beta\theta; \bar{l} + \bar{k} - \varphi ; \gamma p - \varphi \} + t + c$ (4)

Competition/coordination trade-off

- single-market channel systems are expected to
 - allow contracting at lower levels of the world cotton price
 - all the more that prices are supported in bad times
 - perform less well on producer pricing
 - all the more that inefficiencies / taxation are significant
 - expect at times of low world price, all the more that prices are supported

Liberalization

- New options to side-sell appear: $\partial \gamma / \partial R \geq 0$ (if no collusion)
- Improved contract options ex-ante: $\partial \bar{l} / \partial R \geq 0$.
- The farmer's reputation cost φ is likely to decrease: $\partial \varphi / \partial R \leq 0$
 - Coordination + costly (Zanardi, 2004)
 - + alternatives after defaulting (Hoff & Stiglitz, 1998)
- Price liberalization
 - In case the sector was taxed before reform, $\partial t / \partial R < 0$
 - In case the sector was subsidized before reform, $\partial t / \partial R > 0$.

Liberalization & Privatization

- Increased efficiency
 - Elimination of political interference
 - Quiet life hypothesis (Hick, 1935)

- Yet this is disputable
 - Economies of scale? (e.g. Guy et al., 2004)
 - Transaction costs? (e.g. Shervani et al., 2007)
 - Incentives for research? (e.g. Pray et al., 2005)
 - Anecdotal evidence

- $\partial c / \partial R$ to be defined empirically

Farmer returns

- Aggregate effect of orthodox reform on the farmer's returns, at the condition that contracts are sustained:

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

Contract sustainability

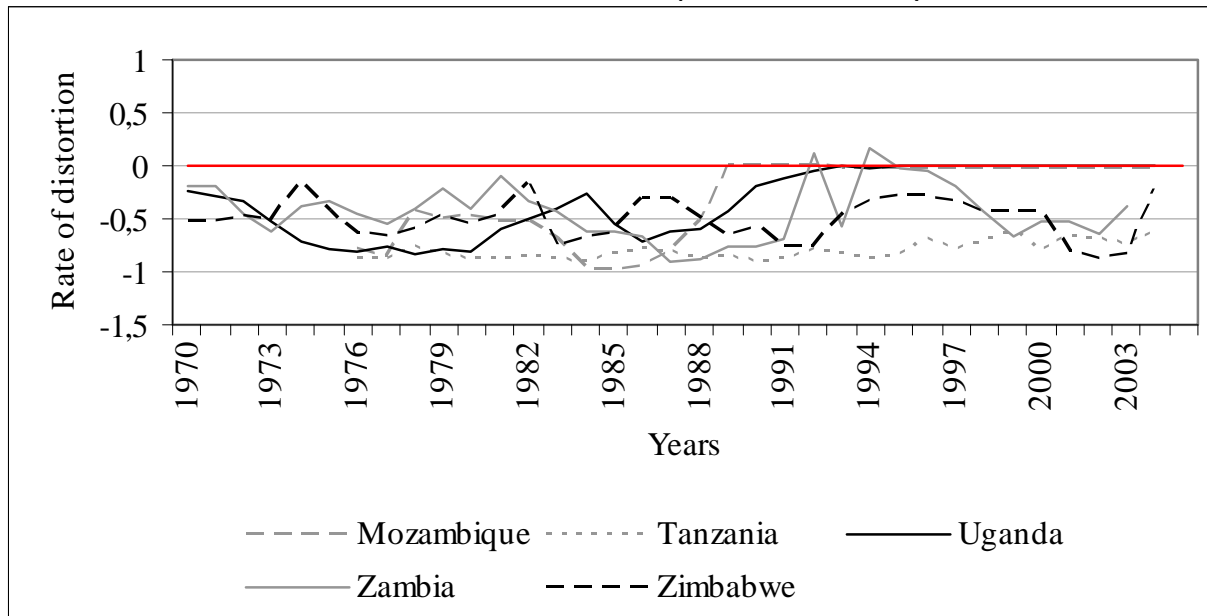
- Aggregate effect of orthodox reform on contract sustainability:

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

The level of the world price and government intervention (1)

- Overall, since the 1970s, significantly negative nominal rates of assistance

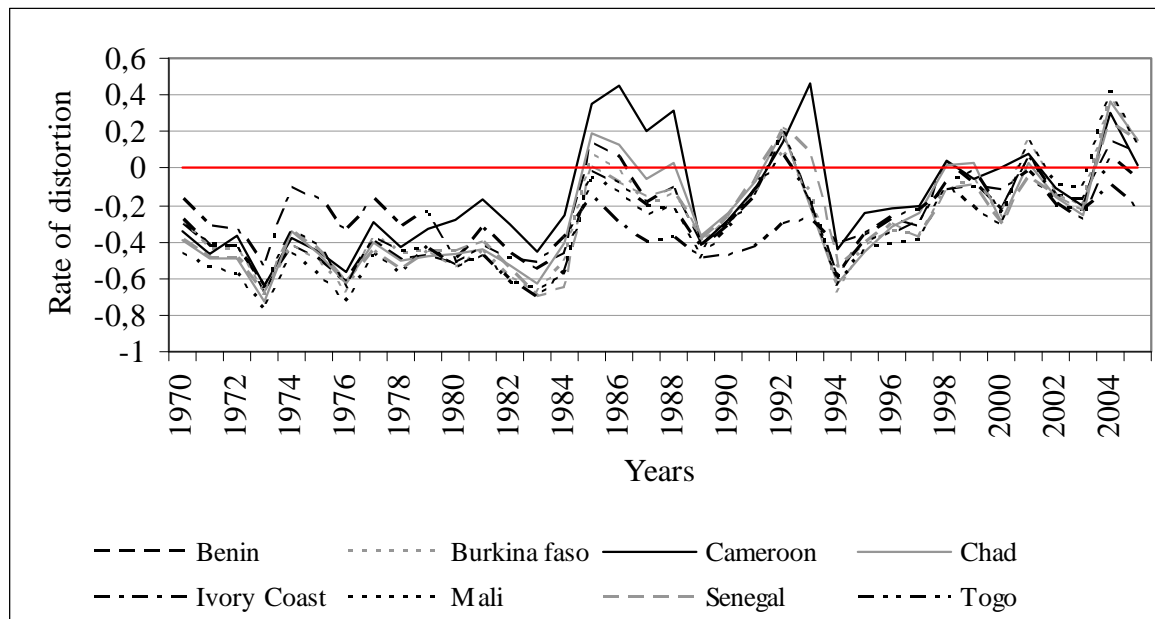
NRAs in ESA (1970-2005)



Source: Source: Anderson and Masters (2009)

The level of the world price and government intervention (1)

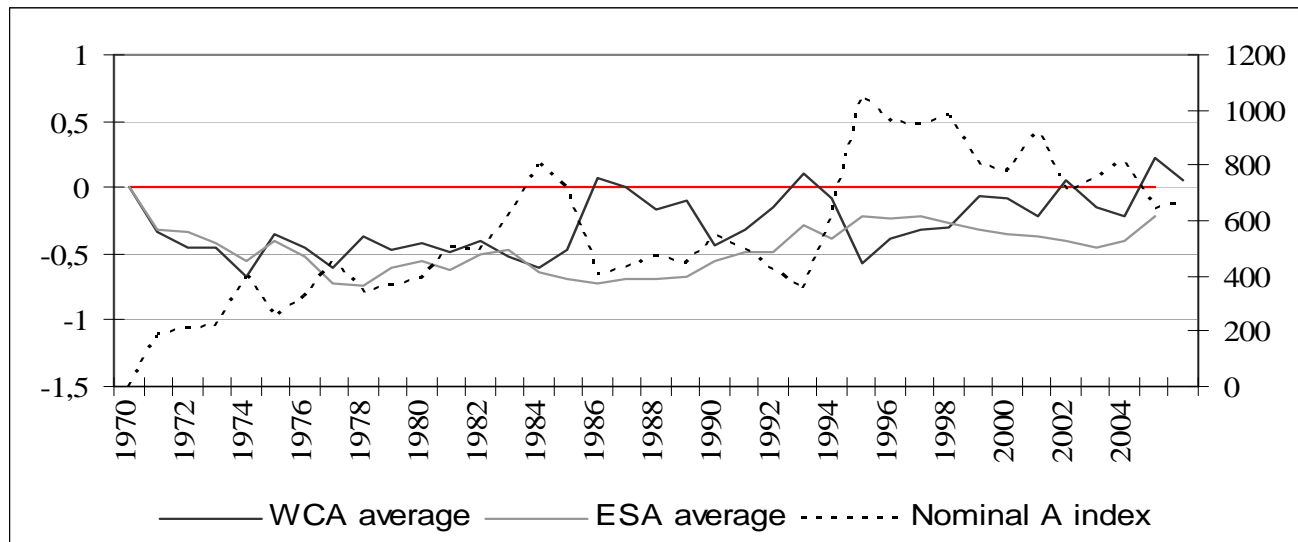
NRAs in WCA (1970-2005)



Source: Source: Anderson and Masters (2009)

The level of the world price and government intervention (2)

- ... Yet, very different patterns of government intervention in WCA today
- Average cotton NRAs in ESA & WCA (1970-2005)



Source: Source: Anderson and Masters (2009)

The level of post-reform competition (1)

- Empirical evidence that market structure after reform resembles market structure before reform
 - Cooperative structures (e.g. Tanzania & Uganda) → entry of many private actors & significant d^o of competition
 - Single-channel based marketing systems (e.g. Zambia & Zimbabwe) → relatively high d^o of concentration
 - Input supply systems have to a large extent been sustained
 - Limited price effects

The level of post-reform competition (2)

- In contrast with ESA, WCA farmers seem to have less alternative crops to switch to
 - The farmer's ex ante outside option is lower than in ESA
 - Cotton schemes could be sustained at lower levels of p
 - Producer prices for cotton in a market-based system might be lower in WCA than in ESA

Processing inefficiencies

- Empirical evidence that parastatals have historically been less inefficient in WCA than in ESA
 - Evidence of more investment in research, extension & development of infrastructure (Townsend, 1999)
 - Signs of decreasing efficiency in WCA (Tschirley et al., 2009)
 - But, enduring benefits of past investment

Overall impact on producer prices

- Removal of subsidies → negative impact on producer prices
- Expected limited degree of competition
 - Observed in Benin and Burkina Faso where privatization has occurred
 - Scarce opportunities for switching to other crops
- More moderate efficiency gains to be expected
 - especially as cotton sectors are not likely to become fully competitive
- More limited expectations in WCA today than ESA at the time of reform

Overall impact on contract sustainability

- Expected moderate increase in the level of competition
- Apparent scarcity of opportunities for farmers outside the cotton sector
- The scope for contract breakdown would widen only moderately

- However:
 - Removal of subsidies
 - Smaller capacity for efficiency gains
 - The size of input requirements, which, seem to be higher in WCA (at least compared to Tanzania (Tschirley et al., 2009) – remains to be checked

Findings & Recommendations

- Stylized contracting model to
 - Investigate the link between market structure, equity and efficiency in SSA cotton sectors
 - Analyze the potential consequences of orthodox reforms in WCA

- While pointing at the limitations of orthodox market reforms in the WCA context, we do not intend to minimize the need for change
 - Pressure on public budgets
 - Failure to bring about yield increases

Findings & Recommendations

- Shifting the objective of the cotton policy from maximal production to efficient production, orthodox reforms would likely have detrimental effects on cotton returns for many farmers in WCA

- However, the breakdown of inefficient contracts might ultimately be beneficial to the national economy
 - If freed resources can be used in alternative ways to support poor farmers in finding alternative sources of income
 - E. g. by improving opportunities for diversification
 - E. g. by designing more efficient (and better targeted) social safety nets.

Findings & Recommendations

- Whereas governments in WCA have historically presented cotton production promotion as one of the most efficient ways of pulling rural populations out of poverty
 - The outlook for cotton price recovery seems bleak (Babin, 2009).
 - Strong dependency on a single commodity
 - The link between cotton production and poverty reduction seems to become less clear ('Sikasso paradox', e.g. Delarue, 2009)

- While easier said than done, this suggests that the strong focus on cotton reforms, by donors and governments, could be put into perspective and more attention paid to designing reforms that create opportunities for farmers to move out of cotton production...

Further research

- Look into the determination of government intervention (t) (political economy)
- Understand how 'institutional innovations' such as 'farmer empowerment' or 'multi-stakeholder price-setting mechanisms' would affect contracting in a context of increasing privatization but limited competition

Thank you for your attention

claire.delpauch@sciences-po.org
www.gem.sciences-po.fr



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