LICOS Discussion Paper Series

Discussion Paper 290/2011

Revisiting the "cotton problem": A comparative analysis of cotton reforms in sub-Saharan Africa

Claire Delpeuch, Anneleen Vandeplas and Johan F.M.Swinnen

Katholieke Universiteit Leuven

LICOS Centre for Institutions and Economic Performance
Waaistraat 6 – mailbox 3511
3000 Leuven

BELGIUM

TEL:+32-(0)16 32 65 98
FAX:+32-(0)16 32 65 99
http://www.econ.kuleuven.be/licos

REVISITING THE "COTTON PROBLEM":

A COMPARATIVE ANALYSIS OF COTTON REFORMS IN SUB-SAHARAN AFRICA

Claire Delpeuch
Groupe d'Economie Mondiale (GEM), Sciences Po Paris, France
Claire.Delpeuch@sciences-po.org

Anneleen Vandeplas
LICOS - Centre for Institutions & Economic Performance, Katholieke Universiteit Leuven, Belgium
Anneleen.Vandeplas@econ.kuleuven.be

Johan F. M. Swinnen
LICOS - Centre for Institutions & Economic Performance, Katholieke Universiteit Leuven, Belgium
Jo.Swinnen@econ.kuleuven.be

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 stylised contracting model to investigate the link between market structure and equity and efficiency in sub-Saharan cotton sectors; explain the outcomes of reforms in ESA; and analyze the potential consequences of orthodox reforms in WCA. We argue that the level of the world price and of government intervention, the nature of pre-reform institutional organisation, as well as the degree of parastatal inefficiency, all contribute to making reforms less attractive 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.

JEL codes: Q12, L33, O12
Keywords Sub-Saharan Africa, cotton reforms, self-enforcing contracts

1. Introduction

Cotton is sometimes referred to as African 'white gold' (Moseley, 2008). It represents a crucial source of income in large parts of sub-Saharan Africa (SSA), both for rural populations and for national economies.[1] Due to widespread smallholder involvement, cotton is moreover considered to play a key role in development and poverty reduction (e.g. Minot and Daniels, 2002; Badiane *et al.*, 2002; Mosely and Gray, 2008).

Performance has been particularly impressive in West and Central Africa (WCA) and described as a unique success-story in the literature (e.g. Lele *et al.*, 1989): yields increased more than three-fold on average since the 1960s (Table 1 and Figure 1).

Combined with considerable expansion of the area under cultivation, this resulted in dramatic production growth: on average, cotton production increased more than twenty-fold over the past fifty years (Table 2, Figure 2). In East and Southern Africa (ESA), performance has been less impressive at the regional level (Figures 1 and 2). However, in some countries, notably in Zambia, production has increased considerably, at a pace comparable to those observed in WCA (Table 2). Between 1980 and 2000, Africa's share of world cotton trade rose by 30 percent, while its average share of total world agricultural trade fell by 50 percent during the same period (Boughton *et al.*, 2003).

Historically, two key characteristics can be attributed to cotton production in SSA. First, vertical coordination has been widely promoted in SSA cotton supply chains. Indeed, the production of cotton is relatively input-intensive. As small farmers often do not have access to credit or inputs by themselves due to market imperfections, production has occurred almost exclusively through interlinked transactions, whereby cotton gins engage in input provision on credit in return for supplies of primary produce. Second, for cotton has been a major export cash crop for decades, it offered scope for taxation and collection of government revenue. As argued by Bates (1981), at the time of independence, the common view of many African governments was that the fastest road to economic growth was using agricultural surplus to support industrial development. The agricultural sector is also known for having been widely used as a source of rent distribution by neo-patrimonial elites (van de Walle, 2001).

[1] According to Tschirley et al. (2009), in SSA, cotton is the main source of cash revenue for more than two million poor rural household and a major source of foreign exchange for over fifteen countries. In West and Central Africa (WCA), the cotton sector in certain cases accounts for up to 10 percent of the gross domestic product, 10 percent of total merchandise exports, and over 60 percent of total agricultural exports. Moreover, it is the largest employer in countries such as Burkina Faso, Chad or Mali (Townsend, 2006).

The combination of these characteristics has historically resulted in strong government intervention in SSA cotton supply chains, not only at the level of output procurement, but also of input provision, price setting, restriction of private competition, and investment in infrastructure and agricultural research. In WCA, parastatals have been in place since colonial times (in particular the 1950s). In ESA, state control of cotton supply chains rapidly intensified in the 1970s, after independence, through the nationalisation of cotton gins and the creation of marketing boards (Delpeuch and Leblois, 2011).

State control of cotton markets has however been under pressure from international donors to reduce government intervention in the cotton supply chains since the early 1980s (Berg, 1981) and increasingly after the cotton price collapse of the end of the 1980s. The main reason behind calls for reform was the fact that price setting mechanisms do not allow producer prices to reflect world prices and thus distort production incentives. More specifically, state monopolies have traditionally been criticised for depressing farm gate prices. Conversely, in recent years, parastatals in WCA have been considered to subsidise producers to an extent that is generally agreed to be unsustainable from a budgetary point of view (Baffes, 2009a). In addition, inefficiencies in parastatal ginning have increasingly been a concern in ESA in the post-independence period. In some countries, such as Uganda, the cotton sector almost collapsed. Inefficiencies have also more recently become an issue in WCA (Tschirley *et al.* 2009). Finally, pan-territorial pricing schemes were considered to be ineffective in promoting rural development (Baghdadli *et al.*, 2007). These factors, in combination with the strong dependence of millions of poor rural households on cotton which complicates reform, have been referred to as "the Cotton Problem" (Baffes, 2005).

Responses to pressure from international donors and reform choices have differed strongly between regions in Africa. In ESA, cotton sectors were significantly reformed: Tanzania, Uganda, Zambia and Zimbabwe all privatised ginneries, liberalised prices and introduced competition in the mid-1990s. In WCA, resistance to reforms has been stronger.[2] Many stakeholders in this region believe that intensive cropping practices would not be feasible in the absence of state-supported integrated supply-chains with interlinked contracts. Past experience has indeed shown that state control of cotton supply chains has been much more successful in enforcing these contracts, by legally banning competition. In addition,

[2] The geographical distinction between ESA and WCA in fact reflects more political/historical cleavages (Delpeuch and Leblois, 2011). For the purpose of this paper, however, we build on this useful distinction and restrict our country sample to a set of eight emblematic countries (four in each region).

price stabilization is seen as a necessary instrument for risk mitigation and spatial redistribution (Araujo Bonjean *et al.*, 2001). While private entry has been allowed to some extent in Benin and Burkina Faso, in practice, markets remain strongly regulated. In Chad and Mali, markets remain both publicly-owned and monopolistic. In all four countries, the government still intervenes in price-setting.

These differences in resistance to reform may reflect the unwillingness of certain stakeholders in the processing sector or in the government to give up on rents, or a belief that reform would not be beneficial to farmers. This paper aims to contribute to the general understanding of the potential implications of liberalisation of WCA cotton markets by unravelling the implications of reforms in ESA and identifying the differences in pre-liberalisation conditions between these two regions.

Considerable empirical work has already been done in this field by a.o. Tschirley *et al.* (2009 and 2010); however, our paper goes one step further by assessing the reform impacts in a formal theoretical framework adapted from Swinnen *et al.* (2011). This framework integrates key institutional characteristics of agricultural markets in developing countries such as factor market imperfections, the absence of effective contract enforcement institutions, and the prevalence of linkages between input and output markets.

The paper is organised as follows. First, we provide a brief account of cotton sectors in Sub Saharan Africa, with a focus on market organisation, reforms and performance in terms of yields and total output. Section 3 presents our conceptual framework, which is used to analyse the past cotton sector reforms in ESA in Section 4 and the potential implications of the envisaged cotton reforms in WCA in Section 5. Section 6 concludes.

2. Regional Trends in Institutional Reforms and Cotton Performance

2.1 Cotton sector organization in SSA

The cultivation of cotton requires the use of various external inputs that most smallholders cannot afford without resorting to credit. As credit access for smallholders is severely restricted in SSA, cotton production occurs almost exclusively through interlinked transactions, whereby inputs are provided on credit by the ginning companies.[3] Such transactions are also referred to as 'contract farming' or 'outgrower schemes'.

[3] Although input use is less intensive in ESA, transactions are interlinked in most countries, with the exception of Tanzania, where less than 10 percent of farmers used any fertilizers before liberalization (Larsen, 2003).

This contracting has historically taken place in a regulated environment in most African countries of SSA. While market organisation varied considerably across SSA in the early decades of cotton commercial cultivation (1950s-1960s), it became "remarkably similar" (Baffes, 2005) in the post-independence period, when the degree of market concentration increased in the less regulated sectors. Competition between ginners was either ruled out by law, or very limited. Publicly owned companies or marketing agencies, which enjoyed both a monopoly and a monopsony position, were responsible for the purchase of raw cotton at regulated prices, its transformation into cotton lint and the trade of the latter on international markets. In Zambia, Zimbabwe, and all countries of WCA, single-channel supply chains were based on a parastatal, which also distributed inputs on credit and provided extension services.[4] In Tanzania and Uganda, cotton purchasing and ginning was organized through village level cooperative societies and a marketing board ensured marketing and enforced market regulation (Tschirley *et al.*, 2009). Regulation also included government intervention in price setting, and cotton prices were fixed pan-territorially and pan-seasonally (i.e. the producer price was fixed throughout the country and throughout the year).

The major advantage of such single-channel systems is the prevention of 'side-selling', where farmers sell their cotton to other higher-bidding buyers at harvest, instead of to the company that has pre-financed their inputs. In WCA, where single-channel systems had been set up by the colonial rulers, successful input provision schemes for cotton production were maintained after independence, with positive spillovers for food crops through improved access to inputs as well as crop rotation (e. g. Chapter III in Hussein *et al.*, 2006).[5] For several decades, cotton parastatals in WCA have been perceived as relatively efficient, even by proponents of orthodox market institutions.[6] However, the cotton price collapse at the end of the 1980s and early 1990s led the World Bank to advocate liberalisation of WCA cotton markets more fiercely (Badiane *et al.* 2002). Apart from the reasons mentioned above, it was argued that the strengthening of competitiveness of these sectors

[4] Especially in WCA, the parastatal would also be responsible for developing new seeds (to varying degrees, with public budget support), distributing inputs on credit, providing technical advice to farmers, taking care of relevant infrastructures, and sometimes, even building schools and dispensaries.

[5] In Benin, for example, according to a 1998 farm survey, 97 percent of cotton growers used fertilizer, which they all purchased on credit through the cotton parastatal, while only 24 percent of other farmers did (IFPRI and LARES, 2001).

[6] The Berg report, considered to be the reference paper for World Bank adjustment programs in developing countries' agricultural markets, notes: "some of the smallholder cotton growing schemes in francophone African countries are organized by agencies with mixed private-public ownership and are among the more successful ventures on the continent" (Berg, 1981).

would be vital in ensuring their long-term financial sustainability and allowing a fair division of the profits between producers and ginners.

2.2 Reforms

Market organisation hence began to change in the late-1980s, with a drastic acceleration of reforms in the mid-1990s in ESA. Tanzania, Uganda, Zambia and Zimbabwe all dissolved cotton boards and allowed private sector competition in the early to mid 1990s.

In Tanzania the reform process started with the elimination of pan-territorial and pan-seasonal price-setting in 1992. In 1995, the sector was opened up, and the private sector entered progressively in cotton processing and distribution (Poulton, 2009). This is the year which we consider as the year of liberalisation.

In Uganda, the board was liquidated and the sector opened up to private entry in 1994 such that new buyers progressively competed with cooperative unions.

Liberalisation also took place in 1994 in Zambia, when the state cotton board was privatized. However, after liberalisation, competition initially remained very limited. The state ginneries were sold to two companies, which benefited of *de facto* regional monopsony power until 1997. New small firms and independent traders then emerged and started to compete for cotton supplies.

Finally, in Zimbabwe, the cotton sector opened up to private entry in 1994, the year of liberalisation, and the state board was privatized a few years later in 1997. Still, the level of competition has remained modest until the early 2000s. The degree of competition increased in 2001 when several smaller firms entered the ginning market (Poulton and Hanyani-Mlambo, 2009).[7]

In WCA, reforms have been more recent and of a much more restricted scope. Prices have not been liberalised in any of the countries under consideration. Even though private entry has been allowed to some extent in Benin and Burkina Faso (resp. in 1995 and 2000), competition remains weak at best. In Burkina Faso, each of the three cotton companies has been allotted local monopsony rights for the purchase of cotton in a particular region while, in Benin, seed cotton is allocated administratively to cotton ginners. In Chad and Mali,

[7] In theory, input provision has become a requirement for 'cotton contractors', who in exchange, are guaranteed of buying the crop ahead of other firms. The system is however reported to function relatively poorly, with several companies failing to provide the required inputs.

parastatal governance of cotton markets has not been touched upon as yet, even though reforms have been discussed for several years (Delpeuch and Leblois, 2011).

2.3 Performance

Cotton sector performance has widely varied across sub-Saharan Africa. However, trends emerge at the regional level. First, in the post-independence era, in the 1970s and 1980s, WCA performed clearly better than ESA. Both productivity and output growth were strongly positive in all countries of WCA until the late 1980s with yields and production tripling, on average, compared to the 1960s (Tables 1 and 2). In ESA, on the other hand, average yields decreased in the 1970s and 1980s (Table 1) and a broadly stagnating average output growth hides strong differences between countries: while Zambia and Zimbabwe displayed high output growth, production almost collapsed in Uganda (Table 2).

With regard to the last two decades, when reforms were implemented to a far greater extent in ESA, the picture is less clear. Productivity has broadly stagnated on average in WCA (Figure 1). Yields continued to grow, at a lower pace, in Burkina Faso and, to a lesser extent, in Benin. However, they decreased in Chad and in Mali (Table 1). Conversely, in ESA, productivity growth has slowly resumed in the last decade, except in Zimbabwe where it has been almost halved compared to the 1980s average (Table 1). Output growth, on the other hand, has remained much higher, on average, in WCA than in ESA (Figure 2), driven mainly by increased area under cultivation. While Chad is the only exception to the cotton-boom in WCA, Zambia is an exception in ESA with output growth rates comparable to those witnessed in WCA (Table 2).

Tschirley *et al.* (2009 and 2010) explicitly establish a link between market organisation and different elements of performance.[8] They argue that competitive, market-based systems could enhance production by involving relatively high producer prices without any type of budgetary support but that they mostly fail in the provision of inputs and extension. Monopolistic and concentrated sectors, on the other hand, are better in providing inputs and services to farmers, although the latter tend to cover fewer farmers than the former. However, while prices can be high in monopolistic markets – even higher than in competitive markets – this can be at the cost of huge public transfers. As a result, Tschirley *et*

[8] One of these elements, which we do not discuss in this paper, is cotton quality (Larsen, 2003; Gilbert and Tollens and Gilbert, 2003).

al. (2009 and 2010) maintain that no market sector type seems to have performed so well that it can be used as a reference for other countries.

To complement these findings, we now turn to analyze the past reforms in ESA using the theoretical model adapted from Swinnen *et al.* (2011). After outlining the model predictions, we contrast these theoretical findings with a more detailed analysis of post-reform performance in ESA.

3. Conceptual framework

3.1 A Model of liberalisation

The required inputs for cotton production are labour on the one hand, and capital on the other hand. We assume the required inputs are not directly available to the farmer because of market imperfections. Conversely, processors do not have the skill (or land) to produce directly. However, processors have better access to credit and/or inputs, such that they can provide inputs on credit to farmers. A farmer and a processor can thus join forces to produce an amount q of cotton: the farmer will provide labour l, the processor will provide inputs of value k.[9] The farmer's opportunity cost of labour ($\bar{l}$) equals his disagreement payoff, i.e. his income when the contract does not materialise, and is an indicator of his alternative opportunities.[10] The processor's opportunity cost of exporting cotton ($\bar{k}$) is his opportunity cost of using the capital for cotton exports rather than for any other investment.[11] His processing and marketing costs are assumed to be equal to the market valuation of processing and marketing.

Inefficient processors face extra processing and marketing costs, denoted by c. These costs may encompass different inefficiencies such as excessive transport and storage costs (Kherallah *et al.* 2003) or poor sales strategies, management tools, and technology (Baffes, 2007). They could also reflect, for example, the fact that parastatals have a record of serving as job providers to politicians needing to reward political support.

[9] Note that we assume an indivisible production function and a fixed proportions production technology as well as perfect information (production, price and market risks are thus not considered).

[10] For example, if the farmer's only ex ante outside option is to produce food crops for the local market, then $\bar{l}$ equals the product of their quantity and their sales price. Alternatively $\bar{l}$ can reflect the lower quantity of cotton that can be produced without inputs. The value of $\bar{l}$ increases if the farmer has better alternative opportunities.

[11] $\bar{k}$ depends both on the capital intensity of cotton cultivation, and on the buyer's potential return to alternative investments.

Finally, to account for government intervention in price setting, t represents a government tax ($t > 0$) or subsidy ($t < 0$).[12] The processor exports the cotton lint at price p, the exogenous world price for cotton.[13] The net value that is created if a contract is agreed and enforced, the "surplus", is denoted by θ, with

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

Under perfect and costless enforcement conditions, if a surplus is realised (i.e. $\theta > 0$), 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). The farmer will then receive share β, while the processor appropriates share $1 - \beta$. In this way, β can be considered as the farmer's bargaining power under perfect enforcement.[14]

To account for the fact that, in most of rural SSA, credible contract enforcement is however often unaffordable (among other reasons because of the oral nature of many arrangements, the low volume of individual transactions, the geographical dispersion of agents and the weakness of judiciary systems), we consider the extreme case that there is no external enforcement mechanism and show how the respective pay-offs are affected.[15] This implies that after the farmer accepts a processor's offer for inputs, he can still decide ex-post (i) whether to use the inputs for cotton production or to divert them (by selling them or using them on other crops) and (ii) if cotton is produced, whether to supply it to the contracting party or side-sell, that is, sell its cotton to an alternative buyer at the spot market price (p_s). An alternative processor may indeed be able to offer a higher price than the contracting party, as he does not need to account for the cost of the provided inputs. By defaulting on his contract obligations, however, the farmer incurs a reputation cost (φ).[16]

---

[12] Note that, as t only enters into the equations as a net tax contribution or a net subsidy received, we do not explicitly account for possible benefits that producers (or processors) could obtain from possibly beneficial effects of public expenditures on infrastructure, agricultural research and development, and research extension (or, conversely, for foregone benefits of public investment that has been crowded out by the subsidies to cotton farmers). This can however be considered to be implicitly comprised in the value of t.

[13] African countries remain "small" exporters on the World market, unable to influence the world price. In 2007, the four WCA countries under consideration, which together are the first African exporter, accounted for just below 3 percent of world exports, while, for example, the US accounted for above 19 percent and Uzbekistan for above 5 percent (UN Comtrade, 2007).

[14] In a principal-agent setting (as in Kranton and Swamy, 2008), β would equal zero. Here, we keep it as general as possible.

[15] In this respect, this model can be viewed as a particular case of "bargaining with imperfect enforcement", as described in White and Williams (2009), which implies that the weakest party in the negotiation can actually gain a larger share of an agreement if it must be implemented non-cooperatively as "the lot of the weaker player must be improved in order that he finds continuing the agreement worthwhile."

[16] In fact, the reputation cost is a short-hand way of introducing some dynamics in the model and keeping it simple (Kranton and Swamy, 2008). The source of this reputation cost can be very diverse: from the loss of

In the absence of a formal enforcement mechanism, contract compliance can be ensured only by making the contract self-enforcing. This implies that the processor might have to increase the price paid to his cotton supplier so as to incentivize the latter to comply with the contract. Indeed, while the farmer will participate in the contract if his expected return (Y) exceeds his disagreement payoff: $Y \geq \bar{l}$; he will comply with the contract only if his payoff from compliance is at least as high as his payoffs from input diversion and side-selling*:* $Y \geq max\ \{k + l - \varphi;\ (p_s - c_s - t_s)\ q - \varphi\}$, with c_s and t_s respectively the inefficiencies and government taxation patterns faced by the alternative, non-contracted buyers. The respective payoffs of the contract (with Π the processor's return) are then given by:

$$Y = max\ (\bar{l} + \beta\theta;\ \bar{k} + \bar{l} - \varphi;\ (p_s - c_s - t_s)\ q - \varphi) \quad (2)$$

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

On the other hand, the processor will only join the contract if his expected return covers his opportunity cost of capital: $\Pi \geq \bar{k}$. As a result; a contract will be feasible only if the world price is sufficient to cover each of these constraints, that is, if it satisfies the following condition:

$$p \geq p_{min} = \frac{1}{q} max\left[\bar{k} + \bar{l};\ 2k + \bar{l} - \varphi;\ k + (p_s - c_s - t_s)q - \varphi\right] + t + c \quad (4)$$

Condition (4) shows that the better the farmer's opportunity cost of labour (high $\bar{l}$), the higher the spot-market price (p_s), and the lower the reputation cost *(φ),* the lower contract feasibility is. On the other hand, it can be seen from condition (2) that the same factors would cause producers prices to be higher. Furthermore, processing inefficiencies (*c)* are expected to reduce contract feasibility, as well as suppress producer and processor payoffs. Finally, taxation by the government ($t > 0$) has a similar impact as processing inefficiencies, while subsidies by the government ($t < 0$) improve producer and processor payoffs as well as contract feasibility (as they reduce p_{min}).

3.2 The effects of liberalisation: Model predictions

As in Swinnen *et al.* (2011), we focus on two crucial, and interrelated, aspects of the liberalisation process: "price liberalisation", i.e. the government no longer determines prices, and "market liberalisation", i.e. the removal of state control over the structure of the cotton chain by allowing private trade and competition. Define T as the government's "price policy"

---

future contracting opportunities and to access credit and input, over a fine which must be paid the contracted buyer, to a loss of face vis-à-vis other members of the local community.

and Z as the "market policy". Price liberalisation is represented by $\Delta T > 0$ and market liberalisation by $\Delta Z > 0$.[17]

First, price liberalisation removes government intervention in price-setting: $\partial y / \partial T < 0$ for $t < 0$ (government subsidy) and $\partial y / \partial T > 0$ for $t > 0$ (government tax).

Second, market liberalisation is hypothesised to affect c, p_s, $\bar{l}$ and φ. Competition indeed creates new options to side-sell: p_s is expected to increase, as we move from a monopsony (where p_s is virtually equal to zero) to a competitive environment (where it is high, as long as processors do not collude). Hence, $\partial p_s / \partial Z \geq 0$. As competition increases, it might also bring along improved contract options ex-ante: $\partial \bar{l} / \partial Z \geq 0$.[18] In addition, the farmer's reputation cost φ is likely to decrease: the more numerous processors are, the more expensive it gets for them to coordinate and share information (Zanardi, 2004) and the more alternative buyers remain after defaulting with one of them (Hoff and Stiglitz, 1998). Hence, $\partial \varphi / \partial Z \leq 0$.

Furthermore, because of the removal of soft budget constraints and the created competitive pressure, market liberalisation might lead to increased processing efficiency ($\partial c / \partial Z \leq 0$), for example through the removal of excessive employment or the adaptation of better technologies and management strategies. This is in line with Hick's "quiet life" hypothesis (1935) which argues that competition brings incentives for cost minimisation and the removal of processing inefficiencies, as was the case in, for example, Eastern Europe and China (Rozelle and Swinnen, 2004). On the other hand, some have suggested that competition might increase costs ($\partial c / \partial Z \leq 0$) by suppressing economies of scale (e.g. Demsetz, 1973; Guy *et al.*, 2004), increasing transaction costs (Shervani *et al.*, 2007) or lowering incentives for investing in research (e.g. Pray *et al.*, 2005).

If we combine these effects with equation (2), we can derive the impact of the orthodox reforms on the farmer's returns, at the condition that contracts can be sustained:

$$\frac{\partial Y}{\partial T} + \frac{\partial Y}{\partial Z} = \frac{\partial Y}{\partial t}\frac{\partial t}{\partial T} + \frac{\partial Y}{\partial \bar{l}}\frac{\partial \bar{l}}{\partial Z} + \frac{\partial Y}{\partial p_s}\frac{\partial p_s}{\partial Z} + \frac{\partial Y}{\partial \varphi}\frac{\partial \varphi}{\partial Z} + \frac{\partial Y}{\partial c}\frac{\partial c}{\partial Z} \qquad (5)$$

The first term in equation (5), which captures the effect of price liberalisation, will be positive (or zero) if the government taxed farmers before the reform (implying that $t > 0$), and negative (or zero) if farmers were subsidised (implying that $t < 0$). The second, third and

[17] T and Z are both continuous, with $T \in [0;1]$ and increasing with the size of taxation/subsidy and Z going from no competition ($Z = 0$) to perfect competition and no constraint on private ownership ($Z = 1$).

[18] Note that ex-ante competition refers to competition between buyers at the time of negotiating the agreement, while ex-post competition relates to competition between buyers at the time of contract execution, i.e. trading. In the case of contract farming, ex-post competition is only possible in case of weak contract enforcement.

fourth terms, which capture the effect of market liberalisation on outside options, the spot-market price and reputation costs, are non-negative. Interestingly, the third term is increasing in q if (but only if) the sideselling option is binding, implying that suppliers may benefit from any yield increase brought about by the use of specific investments. Finally, the fifth term, which captures the effect of market liberalisation on firms' efficiency, will be positive if competitive pressure, budget pressure and private management outweigh the potentially negative impact of the elimination of economies of scale, increased transaction costs or reduced incentives to invest in research. Hence, if contracts remain sustainable after reform, farmers are expected to benefit from liberalisation unless a decline in efficiency and/or the abolition of state support counteract entirely the positive effects of increased ex-ante and ex-post competition and lower reputation costs. In case farmers were taxed before reform and efficiency in the sector improves through reform, the right-hand side of equation (5) will be strictly positive and reform is expected to benefit farmers.

A crucial issue, however, is the sustainability of contracting with reforms. Indeed, if it improves outside options for farmers, liberalisation also increases the price that has to be paid to farmers to ensure contract compliance, hence strengthening the constraint on the level of the world price needed for contracts to be sustained (p_{min}). Using equation (4), the aggregate effect of liberalisation on contract sustainability can be summed up as follows:

$$\frac{\partial p_{min}}{\partial T} + \frac{\partial p_{min}}{\partial Z} = \frac{\partial p_{min}}{\partial t}\frac{\partial t}{\partial T} + \frac{\partial p_{min}}{\partial \bar{l}}\frac{\partial \bar{l}}{\partial Z} + \frac{\partial p_{min}}{\partial p_s}\frac{\partial p_s}{\partial Z} + \frac{\partial p_{min}}{\partial \varphi}\frac{\partial \varphi}{\partial Z} + \frac{\partial p_{min}}{\partial c}\frac{\partial c}{\partial Z} \qquad (6)$$

The first term of equation (6) will be positive if the sector was subsidised before liberalisation and negative otherwise; the second, third and fourth terms will be zero or positive; and, again, the sign of the last term will depend on whether efficiency is improved through liberalisation (in which case the fifth term will be negative and positive otherwise).

If production was subsidised before liberalisation and processing efficiency is reduced, all terms in equation (6) are zero or positive, implying that liberalisation undermines contract feasibility (as p_{min} increases). If, on the other hand, production was taxed before liberalisation and processing efficiency improves through liberalisation, the first and the fifth terms are negative and may counteract the detrimental impact of increased competition on contract feasibility. A yield increase resulting from the use of specific inputs will increase contract feasibility if the first or the second term in the maximand of equation (4) is binding; but it will reduce contract feasibility if the third term in this maximand is binding (unless we allow the reputation cost to increase in q).

In conclusion, while farm incomes are expected to improve with price and market liberalisation, as long as contracts do not collapse, contracts are more likely to collapse because of competition. This underscores the existence of a trade-off between competition and "coordination", as pointed out by Dorward, Poulton, Tschirley and their co-authors in various publications (e. g. Dorward *et al.* 1998 ; Poulton *et al.* 2004 ; Tschirley *et al.*, 2010).

This trade-off is particularly relevant in cotton as cotton is a relatively homogenous product. Buyers seek broadly the same quality requirements, which are imposed by the textile industry, which highly values homogeneity (Tschirley *et al.*, 2009). Moreover, contrary to other crops, the prices fetched by different firms on the world market depend largely on the national origin of cotton and on the quality reputation of that origin, rather than on the specific reputation of different firms (Larsen, 2003). This means that non-contracted buyers willing to buy raw cotton should be able to obtain prices in the international market similar to those fetched by the ginners who pre-financed the inputs, and thus to offer a high spot-market price (p_s). To the extent that the contracted buyers are not able to exert market power, p_s could thus converge to $p - c_s - t_s$ post-liberalisation, with c_s and t_s respectively the inefficiencies and government taxation patterns faced by the non-contracted buyers. If the latter are identical to those of the contracted buyers (meaning that $c=c_s$ *and* $t=t_s$), equations (2), (3) and (4) reduce to:

$$Y = max\ (\bar{l}+\beta\theta;\ (p - c - t)q - \varphi) \tag{7}$$

$$\Pi = pq - c - t - Y \tag{8}$$

$$p \geq p_{min} = \frac{\bar{l}+\bar{k}}{q} + c + t \qquad s.t.\ \varphi \geq \bar{k} \tag{9}$$

With $p_s = p$, the sideselling option translates into a simple condition for contract sustainability which does not depend on p or on q: $\varphi \geq \bar{k}$. The condition on p implied by (9) is nothing more than the condition for efficient contracts, and will weaken (i.e. p_{min} will decrease) with an increasing q. Hence, while contracting can be sustained even with a nil reputation cost ($\varphi=0$) in the case where the initial buyer can fetch a higher price on the international market than that fetched by its competitors; when such quality premiums do not exist, there is a lower bound to φ. This implies that, whatever the efficiency gains of liberalisation through the elimination of c and t, if the post-liberalisation reputation cost is not sufficiently high (i.e. $\varphi < \bar{k}$), contracts will break down (irrespective of the level of p).

4. An explanation of reform effects in ESA

We now discuss the ex-ante expectations of reforms in ESA on farm incomes and contract feasibility and explain the reform outcomes, using the theoretical framework described above and empirical insights from the literature.

Production inefficiencies

As cotton state boards in ESA suffered rather bad reputations with respect to efficiency, liberalisation was expected to bring substantial gains in processing and marketing efficiency. Through a decrease in c (and as such of p_{min}), farm incomes as well as sector performance were expected to improve. Most reform experiences suggest that competitive cotton sectors are indeed more cost-efficient than concentrated sectors, and both substantially outperform monopolistic sectors in terms of ginning efficiency (Tschirley *et al.*, 2010). With incentives for better efficiency outweighing potential losses of economies of scale, c is said to have been effectively reduced through liberalisation. In particular, the literature suggests that no negative impact of reform was found on economies of scale in research and development. In fact, Tschirley *et al.* (2009) mention that, even after reform, most ESA cotton research programs remained in public hands.

The level of efficiency gains however depends on the level of pre-reform inefficiency. This is likely to have been smaller in countries such as Zimbabwe where the board was said to perform relatively well (Tschirley *et al.*, 2009). Indications of this better performance can be found in the fact that yields were maintained throughout the 1970s and 1980s, while they significantly declined elsewhere in ESA (Table 1). As a result, in the late 1970s, yields were more than twice as big in Zimbabwe as they were in other ESA countries.

Institutional framework and the degree of competition

While prior to reform, there was a common belief that opening up the sector would lead to considerable market entry by the private sector; private market entry has been only gradual. As mentioned earlier, in Zambia and Zimbabwe, in particular, competition remained very weak in the years subsequent to reform as a remnant of the extremely concentrated pre-reform market structure (Brambilla and Porto, forthcoming).

In addition, the degree of competition has fluctuated as a result of different types of re-regulation. In Zambia, the level of competition is said to have declined during the first half of the 2000s when the two biggest firms began to cooperate in an attempt to fight side-selling (Brambilla and Porto, forthcoming) and, simultaneously, “the agents and independent buyers

[...] largely disappeared" (Tschirley and Kabwe, 2010). Competition later resumed with the market entry of new "larger and better-financed ginners" (Tschirley and Kabwe, 2010). States have also aimed at restricting market entry to buyers engaging in input-credit provision. In Zimbabwe, regulation of entry has become more severe since 2006, when legal requirements with respect to input provision by cotton ginners were enforced. Similarly, in Uganda, the detrimental effect of competition on the provision of inputs and extension has led the government to establish regional monopsony rights between 2003 and 2008 (Baffes, 2009b). A few ginners were allowed to operate in each zone under quota terms, which were made proportionate to companies' capacity for inputs and extension provision on credit. As a result, Tanzania is the only country where competition has been unrestrained since the reform was adopted (Delpeuch and Leblois, 2011).

Government taxation

The empirical political economy literature finds that African governments (like governments in other developing countries) have largely taxed agriculture, especially exportable cash crops (e.g. Krueger, Schiff and Valdes, 1988; Anderson and Masters, 2009; Swinnen *et al.*, 2011; Bates and Block, 2010).[19] This suggests that price liberalisation in ESA also offered great potential in terms of eliminating taxation (reducing t), resulting in better producer prices as well as improving sector performance by reducing p_{min}.

Figure 3 depicts the nominal rate of assistance (NRA) to the cotton sectors in ESA between 1970 and 2005. The NRA is defined as "the percentage by which government policies have raised gross returns to farmers above what they would have been without the government's intervention" (Anderson and Masters, 2009, p. 11) and is, to our knowledge, the best proxy for estimating the evolution of t over long time periods. Apart from direct taxation (t), the NRA also captures exchange rate distortions.[20]

[19] Various reasons have been put forward to explain this, among which, chiefly, the largely agricultural and rural nature of African economies. Taxation of agricultural products is indeed expected to be higher if agriculture occupies a larger share of the national GDP, and if the government has fewer alternative sources of income at its disposal. Besides, the more numerous farmers are, (i) the more costly it is to organize them (Olson, 1985) and (ii) the higher the costs on the rest of society are for supporting them (Swinnen 1994; 2010). In addition, exported cash crops are considered to be a relatively easy target for taxation, because it is easier to control exports than domestic market products, and because there are no local consumers for whom prices should be kept low (Bates, 1981).

[20] Depending on the methodology used for different countries, NRAs sometimes also include indirect taxes or subsidies resulting from administrative pricing and excessive post-harvest margins due to the inefficiency of state enterprises (see Poulton and Delpeuch, 2011, for a detailed analysis of NRA figures for cotton and calculation methods).

As shown in Figure 3, NRAs have been significantly negative in ESA during the years of heavy government intervention, with the exception of Zimbabwe. The Zimbabwean exception is likely to have reflected the fact that commercial farmers, who made up for most of the country's cotton until the post-independence period, were able to obtain higher prices out of political bargaining (as illustrated in Figure 4). In Zambia and Uganda, taxation actually began to decrease before the reforms, reflecting the reduction in exchange rate distortions brought about by structural adjustment. Yet, in the early to mid-1990s, at the time of reforms, there was scope for reducing taxation, especially in Tanzania.

As expected, in the post-reform period taxation was reduced in Uganda and Tanzania, and gradually converged to zero. However, in Zambia and Zimbabwe, the opposite occurred. Worsening exchange rate distortions in the 2000s are largely responsible for the plummeting of the NRAs in the latter country, where the decline post-reform was most dramatic (Ndlela and Robinson, 2009).

Overall impact on producer prices

Prior to reform in ESA, the expectations were overall high with regard to the scope for improvement of producer prices. Our model provides an ample range of rationales for these expectations: if contracts could be sustained, liberalisation would eliminate taxation, lower the reputation cost from contract breach and imply significant spot-market price increases given the homogeneous nature of cotton and pricing practices in the world market. In addition, efficiency was expected to increase as a result of market liberalisation.

However, in hindsight, the overall high expectations from liberalisation reforms turned out to be overly optimistic. As suggested by FAO data in Figure 5, producer prices have increased post-reform only in Tanzania, and to a lesser extent in Zimbabwe, with significant variation over time. The key reason for disappointing performance in this respect in Zambia and Uganda is likely to be the imperfectly competitive nature of post-reform markets. In addition, as mentioned in the previous sub-section, in Zimbabwe, prices were already relatively high pre-reform (Larsen, 2002). Combined with the general decline in world cotton market prices, this explains why producer prices have stagnated or even went down after liberalisation.

Overall impact on contract sustainability

As has been mentioned before, a key aspect of market performance for cotton is ensuring that farmers have access to inputs. If farmers face important credit constraints, interlinking input and output markets through contract farming is one way to overcome these market imperfections. Liberalisation could be expected to have mixed effects on contract sustainability. Positive effects would come from the removal of taxation (t), as well as of existing marketing and processing inefficiencies (c). Conversely, potential negative impacts on contract sustainability could have resulted from higher outside options for farmers (higher $\bar{l}$ and p_s) and lower reputation costs (φ), with ultimately negative effects on input consumption and on yields and production.

Focusing on post-reform performance in terms of yields, which are directly affected by contract sustainability through input use, the picture is indeed mixed – ranging from sustained yield increase in Zambia to long-term decline in Zimbabwe and variation over time in Uganda and Tanzania.

As depicted in Figure 6, in Zambia, yields have declined in the immediate post-reform period, but subsequently increased rapidly and strongly before declining a bit and stagnating at about 160 percent of their pre-reform level. This good performance in terms of yields seems to indicate that contracts have been sustained to a large extent after liberalisation. This is because, as already mentioned, competition has remained relatively restricted and, when it has, input supply systems have been sustained to a large extent. Tschirley et al. (2009) even show that service provision has been used as a strategy for non-price competition in Zambia, suggesting that, at low levels, competition stimulates rather than suppresses service provision and yield growth (Tschirley *et al.*, 2009).

In Zimbabwe, the medium run increase in yields has been much more modest (this might reflect the already higher level of yields pre-reform) and the decline in the longer term far stronger: despite one or two better years, average yields have been below the pre-reform level for about a decade.

In Tanzania, the country where competition has increased most significantly, yields declined significantly in the immediate post-reform period and remained below the pre-reform level for a decade before slowly recovering.

In Uganda, finally, a short-lived increase in yields gave rise to a significant decline, with yields remaining below pre-reform levels for five years. They subsequently recovered and peaked to over two times their pre-reform level, albeit with considerable year-to-year

variation. This period of higher yields corresponds to the times when the government re-regulated the sector and restricted competition among buyers.

In short, in post-liberalisation ESA markets, defaulting crises have occurred when competition increased over a certain level triggering direct implications in terms of input use and yields. This led Tschirley *et al.* (2010) to conclude that "tipping points may exist, in which the entry of additional companies can dramatically change the prospects of co-ordination for input supply and extension." Our definition of p_{min} precisely captures this constraint when the impact of increased competition on ex-ante contract opportunities, ex-post outside options and reputation outweighs the impact of increased efficiency.

In conclusion, as predicted by the model, liberalisation seems to have impacted returns and contract sustainability conversely: countries where the price response was the weakest (Zambia and Uganda) were also those where contracting and productivity increased most (Figures 5 and 6).

5. Expected effects of liberalisation in WCA

The impact of reforms in ESA (and its contrast with the expected impact pre-reform) inform and feed the debate on liberalisation in WCA. We now outline a set of predictions on the expected outcomes of reforms in WCA, combining our theoretical framework, the lessons of reform experiences in ESA and differences in the production and market structure between the two regions.

Production inefficiencies

The comparative literature on cotton policies in SSA reveals that parastatals have historically been less inefficient in WCA than boards in ESA. One indication of this is that, from the 1960s through the 1980s, as government-controlled organisations increased their involvement in the cotton sector, performance declined in most ESA countries, eventually resulting in debts and delayed payments to farmers as well as declining yields (Tschirley *et al.*, 2009). During the same period, in WCA, yields increased three-fold (Table 1, Figure 1). As a result, in 1990, cotton yields in ESA were on average over 40 percent lower than in WCA while they were over twice as big during most of the 1960s (Figure 1).

There is indeed some evidence that, in times of taxation, WCA governments were at least partially using the collected funds for research and extension, as well as the development of infrastructure, hereby benefiting the farmers (Townsend, 1999). Comparing

the performance of cotton sectors in Tanzania and in Mali, Gillham *et al.* (1995) also found that while (i) "good leadership and management and integration of adaptive research, extension and production in Mali ensured that supplies of pure, quality seed were available to the farmers and that new developments in varieties and production technology reached them rapidly", (ii) "Tanzania is reflective of other East African countries where there was poor training of cotton professionals, inefficient administration and an absence of any integration of research, extension, production and marketing".

The efficiency of WCA parastatals is now said to be declining. However the benefits of past investment seem to have enduring positive effects (Tschirley *et al.*, 2009) suggesting less scope for efficiency gains from reform in WCA than there was in ESA. Hence, the expected impact of reform on our model parameter *c* is not clear-cut.

Government intervention

While NRAs were more negative in WCA than in ESA for most of the pre-2000 period (implying that farmers were taxed to a larger extent), they have increasingly differed since then. Based on his own NRA-type calculations, Baffes (2007) reports that producer prices were maintained at higher levels than companies could afford between 1985 and 1993 and again since 1998 (producer prices being subsidized at an equivalent rate of 6 and 9 percent during these two periods, respectively). Anecdotal evidence for the past few years over which NRA figures are not yet available suggests that such subsidization has not ceased since 2007 (e.g. Kaminski *et al.* 2011).

This divergence in government intervention is likely linked to the particular role of cotton in WCA. The governments in the region indeed have had few options other than to use the cotton sector as a resource to finance their public budgets. This is still largely the case, especially in Benin and Burkina Faso, where cotton accounted for more than 50 percent of the total merchandise export value in 2006 (Figure 7). This has meant that when world prices strongly declined, producer prices were sustained at their historical level to avoid production disruptions (Figure 8).[21] Such transfers to farms have ensured contract sustainability but

[21] The countercyclical nature of support to the agricultural sector is believed to be a common feature of agricultural policies (e.g. Gawande and Krishna, 2003; Swinnen, 2010). One possible explanation is that government preferences exhibit loss aversion (Tovar, 2009) and therefore tend to protect especially the sectors where profitability is on the decline. Another argument can be understood from a simple perspective of rent maximization: if cotton is governments' major source of income, it is rational for governments to subsidize their cotton sectors at times of low world prices. Nubupko and Keita (2005) for example find that, in Mali, the

caused financial losses for the ginning companies, which ultimately had to be covered by budget support. This resulted in positive NRAs, as shown in Figure 9. The removal of these subsidies is likely to have a negative impact on producer prices; especially for less efficient farmers, which were subsidised to an even greater extent because of pan-territorial pricing. Hence, unless these trends change as a result of the very recent increase in the world price, *t* is expected to increase post-reform in the WCA context, in sharp contrast to the expected reduction in *t* pre-reform in ESA. This can be considered a major factor triggering resistance to reform in WCA, as it would both have a depressing impact on producer prices, and invoke a higher level of contract breakdown.

Farm outside options

In contrast with ESA, WCA farmers may have fewer alternative crops to switch to if cotton schemes collapse. Goreux (2003) argues that, in most cases, the farmers' only alternative to the cotton/maize rotation scheme, is planting cowpea, with lower yields (and profitability). This would imply that in WCA, the farmer's ex-ante outside option ($\bar{l}$) is lower than in ESA, and consequently, that cotton schemes could be sustained at lower levels of *p*, but also that producer prices for cotton in a market-based system might be lower in WCA than in ESA.

Institutional organisation and the degree of competition

Because parastatals have been the sole operator of cotton purchasing, selling and input provision for over half a century in WCA, it seems that the experiences of Zambia and Zimbabwe, where this was also the case, are more relevant benchmarks for what could happen in WCA than those of Tanzania or Uganda. Hence, based on pre-reform institutional arrangements, strong competition should not be expected as a result of reforms in this region. What is more, the partial reforms introduced since the early 2000s provide additional signs that competition might be hard to achieve. In Benin, where the private sector has been allowed to enter ginning (but not to compete as cotton is administratively allocated to the different firms), after the initial entry of numerous private buyers on the market, the degree of concentration is increasing to the point where the sector is said to resemble a private

negative macroeconomic impact of a 20 percent drop in producer prices would be bigger than the positive impact of the budget saving that would allow such a reduction.

monopsony (Gergely, 2009). As a result, the impact of competition on $\bar{l}$, p_s and φ is likely to be more modest than in ESA.

Overall impact on producer prices

While reforms in ESA in the 1990s were expected to bring higher prices to farmers, expectations for price improvement after liberalisation are significantly more modest in WCA today. First, price liberalisation would likely eliminate subsidies, not taxes. Second, although some efficiency gains could be expected, it seems that in general, they will be more modest than in ESA. Third, the positive price effect resulting from increased competition is expected to be small since WCA markets are likely to achieve only limited competition. Finally, scarce opportunities for switching to other crops would reinforce the potentially negative impact of a concentrated private cotton sector in WCA.

Overall impact on contract sustainability

According to our model, the removal of subsidies and the more modest expectations on efficiency improvements are two reasons why liberalisation in WCA might be more detrimental for contract feasibility than in ESA. On the other hand, other initial conditions such as the nature of pre-reform institutional organisation (and limited expectations with respect to the level of post-reform competition) and lower farm outside options predict that contracting in WCA could remain sustainable even after reform, at least in the short run. This however holds only if the entry of a limited number does not lead to the extreme scenario where $p_s = p$ and high reputation costs cannot be maintained.

Because of environmental conditions, the yield improvement from using inputs in WCA is greater than in ESA where cotton can be produced relatively profitably without inputs (i.e. q is larger in WCA). This implies that the supply response to contract breakdown would be more significant. WCA countries are also, on average, more dependent on cotton both at the household level and at the macro level (Figure 7).This, again, underscores the greater sensitivity of a liberalisation of cotton markets in the latter region.

6. Conclusion

This paper uses a stylised contracting model to investigate the link between market structure and equity and efficiency in SSA cotton sectors, explain the outcome of reforms in ESA and analyze their potential consequences in WCA. We argue that the level of the world

price and of government intervention, the nature of pre-reform institutional organisation, as well as the degree of parastatal inefficiency, all contribute to making reforms less attractive to farmers and governments in WCA today, as compared to ESA in the mid 1990s. We illustrate our arguments with empirical observations on the performance of cotton sectors across SSA.

By shifting the objective of the cotton policy from maximal production to efficient production, orthodox reforms are likely to have detrimental effects especially for farmers with high transaction costs of dealing with them, who often are also the poorest. In pointing at the limitations of orthodox market reforms in the WCA context, however, we do not intend to minimise the need for change: the present system is depleting public budgets, while failing to bring about yield increases in most countries of the region since the mid-1980s. The breakdown of inefficient contracts might thus ultimately be beneficial to the national economy if freed resources can be used to support poor farmers in finding alternative sources of income. Whereas governments in WCA have historically presented cotton production promotion as one of the most efficient ways of pulling rural populations out of poverty, they should now try to improve opportunities for diversification, or design more efficient social safety nets that target recipients based on needs rather than on cultivation choices. Moreover, from a macro-economic perspective, a movement out of cotton production of the less efficient farmers could help to reduce the strong dependency on a single commodity.

This is all easier said than done: market policies are more easily implemented in developing countries with limited budgets and administrative capacity than social policies (Brooks, 2011). However, this paper suggests that the very strong focus on cotton reforms, both by donors and governments, should maybe be put into perspective and more attention should be paid to designing global agricultural and rural policies that create opportunities for farmers to move out of cotton production.

References

ANDERSON, K. and W.A. MASTERS (Eds.) (2009). *Distortions to Agricultural Incentives in Africa*, Washington DC: World Bank

ARAUJO BONJEAN, C. and J.-L. COMBES (2001). "Modes l'organisation des filières et lutte contre la pauvreté: les cas du coton et du cacao." Ministère des Affaires Etrangères.

BADIANE, O., D. GHURA, L. GOREUX and P. MASSON (2002). "Cotton Sector Strategies in West and Central Africa." World Bank Policy Research Working Paper No. 2867.

BAFFES, J. (2009a). "The Cotton Sector of Uganda."Africa Region Working Paper Series No. 123, March.

BAFFES, J. (2009b). "Benin, Burkina Faso, Chad, Mali, and Togo," in K. Anderson and W.A. Masters, eds., *Distortions to Agricultural Incentives in Africa*. Washington DC: World Bank

BAFFES J (2007). "Distortions to cotton Sector Incentives in West and Central Africa." Presented at the CSAE conference *Economic Development in Africa*, March 19-20, Oxford.

BAFFES, J (2005). "The 'Cotton Problem'." *The World Bank Research Observer, 20* (1), pp. 109-144.

BAGHDADLI, I, H. CHAIKHROUHOU and G. RABALLAND (2007). "Strategies for Cotton in West and Central Africa. Enhancing competitiveness in the 'Cotton-4'." World Bank Working Paper No. 108.

BASSETT, T. J (2001). The peasant Cotton Revolution in West Africa. Côte d'Ivoire, 1880-1995. Neww York: Cambridge University Press.

BATES, R. H. (1981). *Markets and States in Tropical Africa*. Berkeley and Los Angeles: University of California Press.

BATES, R. H. and S. BLOCK (2009). "The political Economy of Agricultural Trade Interventions in Africa." World Bank Agricultural Distortions Working Paper No. 87.

BECKER, G. S. (1985). "Public Policies, Pressure Groups, and Deadweight Costs." *Journal of Public Economics* 28 (3), pp. 329–47.

BERG, E. (1981). Accelerated Development in Sub-Saharan Africa: An Agenda for Action. Washington D.C.: The World Bank.

BIJMAN, J. and M. WOLLNI (2008). "Producer organizations and vertical coordination: an economic organization theory perspective." Presented at the *International Conference on Cooperative Studies*, October 7-9, Köln.

BINGEN, R. J. (1998). "Cotton, Democracy and Development in Mali." *Journal of Modern African Studies, 36* (2), pp. 265-285.

BOUGHTON, D., D. TSCHIRLEY, B. Zulu, A. OSORIO OFIÇO and H. MARRULE (2003). "Cotton Sector Policies and Performance in Sub-Saharan Africa: Lessons Behind the Numbers in Mozambique and Zambia." Presented at the *25th International Conference of Agricultural Economists,* August 16-22, Durban.

BRAMBILLA, I. and G. PORTO (Forthcoming). "Market Structure, Outgrower Contracts and Farm Output. Evidence from Cotton Reforms in Zambia." *Oxford Economic Papers*.

BROOKS, J. (2011). "Agricultural Policies for Strengthening Incomes in Developing Countries: A synthesis." OECD TAD/CA/APM/WP(2010)41FINAL.

BULLOCK, D. S. (1994). "The Countercyclicity of Government Transfers: A Political Pressure Group Approach." *Review of Agricultural Economics* 16 (1), pp. 93–102.

CLEAVER, K. M. and W. G. DONOVAN (1995). "Agriculture, Poverty, and Policy Reform in Sub-Saharan Africa." World Bank Discussion Paper No. 280.

DEMSETZ, H. (1973) Industry Structure, Market Rivalry, and Public Policy. Journal of Law and Economics, 16(1): 1-9.

DERCON, S. (1993). "Peasant Supply Response and Macroeconomic policies: Cotton in Tanzania." *Journal of African Economies, 2* (2), pp. 157-194.

DORWARD, A., J. KYDD AND C. POULTON (1998). Smallholder Cash Crop Production under Market Liberalisation: A New Institutional Perspective. Wallingford: CAB International.

DORWARD, A., J. KYDD AND C. POULTON (2004). "Market and Coordination Failures in Poor Rural Economies: Policy Implications for Agricultural and Rural Development." Presented the AAAE Conference *Shaping the future of African Agriculture for Development : The Role of Social Scientists*, 6 to 8 December, Nairobi.

DORWARD, A., P. HAZELL AND C. POULTON (2008). "Rethinking Agricultural Input subsidies in Poor Rural Economies." Future Agricultures Briefing.

EICHER, C. (1982). "FacingU p to Africa's Food Crisis." *Foreign Affairs, 61*, pp. 151-174.

FRIEDMAN, M. 1954. "The reduction of fluctuations in the incomes of primary producers: a critical comment," *Economic Journal, 64*, pp. 698-703.

GILLHAM, F. E. M., T. M. BELL, T. ARIN, G. A. MATTHEWS, C. Le RUMEUR and A. B. HEARN (1995). "Cotton Production Prospects for the Next Decade." World Bank Technical Paper No. 287.

GOREUX, L (2003). "Réformes des filières cotonnières en Afrique subsaharienne." Ministère des Affaires Etrangères.

GOVEREH, J., T.S. JAYNE, and J. NYORO (1999). "Smallholder Commercialization, Interlinked Markets and Food Crop Productivity: Cross-Country Evidence in Eastern and Southern Africa." Michigan State University, Department of Agricultural Economics and Department of Economics.

GUY, C., BENNISON, D., and CLARKE, R. (2004) Scale economies and superstore retailing: new evidence from the UK. Journal of Retailing and Consumer Services, 12(2): 73-81.

HIRSCHMAN, A. (1958). *The strategy of economic development*. New Haven: Yale University Press.

HUSSEIN, K., C. PERRET and L. HITIMANA (2006) . *Cotton in West Africa. The Economic and Social Stakes*. Paris: The OECD.

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE (IFPRI) AND LABORATOIRE D'ANALYSE RÉGIONALE ET D'EXPERTISE SOCIALE (LARES) (2001). "Impact des Réformes Agricoles sur les Petits Agriculteurs au Bénin.Volume 1." Report prepared for the Deutsche Gesellschaft Für Technische Zussammenarbeit (GTZ). Project 97.7860.6-001.00.

JAYNE, T.S., J. D. SHAFFER, J. M. STAATZ, and T. REARDON (1997). "Improving the Impact of Market Reform on Agricultural Productivity in Africa: How Institutional Design Makes a Difference." Michigan State University International Development Working Papers No. 66.

JOHNSTON, B. and J. MELLOR (1961). "The role of agriculture in economic development," *American Economic Review, 51* (4), pp. 566-593.

KAMINSKI, J., D. HEADEY and T. BERNARD (2011). "The Burkinabè Cotton Story 1992-2007: Sustainable Success or Sub-Saharan Mirage?" World Development (article in press).

KHERALLAH, M., C. DELGADO, E. GABRE-MADHIN, N. MINOT, and M. JOHNSON (2000). "The Road Half Traveled: Agricultural Market Reform in Sub-Saharan Africa." International Food Policy Research Institute.

KRANTON, R. and A. SWAMY (2008). "Contracts, Hold-Up and Exports: Textiles and Opium in Colonial India." *American Economic Review, 98* (3), pp. 967-989.

KRUEGER, A. O., M. SCHIFF and A. VALDÉS (1988). "Agricultural Incentives in Developing Countries: Measuring the Effect of Sectoral and Economywide Policies." The World Bank Econmic Review, 2 (3), pp. 255-271.

KWABE, S. and D. TSCHIRLEY (2007). "Farm Yields and Returns to Farmers From Seed Cotton: Does Zambia Measure Up?" Michigan State University International Development Collaborative Policy Briefs No. ZM-FSRP-PB-26.

LARSEN, M (2003). "Quality Standard-Setting in the Global Cotton Chain and Cotton Sector Reforms in Sub-Saharan Africa." *Institute for International Studies,* IIS/Gl. Kongevej Working Paper 03.7

LELE, U. and R. E. CHRISTIANSEN (1989). "Markets, Marketing Boards, and Cooperatives in Africa. Issues in Adjustment Policy." World Bank MADIA Dicussion Paper No. 11.

LEWIS, W. A. 1954. "Economic development with unlimited supply of labor." *Manchester School of Econoic and Social Studies 22* (2), pp. 139-91.

MINOT, N. and L. DANIELS (2002). "Impact of global cotton markets on rural poverty in Benin." Presented at the Northeast Universities Development Consortium Conference, October 25-27, Williamstown. This paper was prepared for the World Bank.

MOSELY, W. G. AND L. C. GRAY (Eds.) (2008). *Hanging by a Thread. Cotton, Globalization and Poverty in Africa*. Athens: Ohio University Press.

NUBUKPO K.K. and M. S. KEITA (2005). "Reform of the fixing mechanism for the purchase price for Malian cotton farmers and its consequences in the context of falling world prices," in E. Hazard, ed., *International trade negotiations and poverty reduction: The white paper on Cotton.* Dakar: ENDA.

OLPER, A (2001). 'Determinants of Agricultural Protection: The Role of Democracy and Institutional Setting', *Journal of Agricultural Economics, 52* (2), pp. 75–92.

OLSON, M. 1985. "Space, Agriculture and Organization." *American Journal of Agricultural Economics, 67* (5), pp. 928–37.

POULTON, C. and C. DELPEUCH (2011). "Not Ready for Analysis? A Critical Review of NRA Estimations for Cotton and Other Export Cash Crops in Africa." Under Review.

POULTION, C. AND B. HANYANI-MLAMBO (2009). "The Cotton Sector of Zimbabwe." World Bank Africa Region Working Paper No. 122.

POULTION, C (2009). "The Cotton Sector of Tanzania."Africa Region Working Paper Series No. 127, March.

POULTION, C (2007). "All-Africa Review of Experiences with Commercial Agriculture. Cotton Case Study." World Bank background paper for the Competitive Commercial Agriculture in Sub-Saharan Africa (CCAA) Study.

POULTON, C (2006). "Bulk Export Commodities: Trends and Challenges." World Bank background paper for the World Development Report 2008 No. 41374.

POULTON, C. and W. MARO (2007). "Multicountry Review of the Impact of Cotton Sector Reform in sub-Saharan Africa: Tanzania Country Study." Prepared for the World Bank (mimeo).

POULTON, C., P. GIBBON, B. HANYANI-MLAMBO, J. KYDD, W. MARO, M. N. LARSEN, A. OSORIO, D. TSCHIRLEY AND B. ZULU (2004). "Competition and Coordination in Liberalized African Cotton Market Systems." *World Development, 22* (3), pp. 510-536.

PRAY, C., OEHMKE, J.F., & NASEEM, A. (2005). "Innovation and dynamic efficiency in plant biotechnology: An introduction to the researchable issues." AgBioForum, 8(2/3), 52-63.

ROZELLE S. and SWINNEN J.F.M. (2004). "Success and failure of reform: Insights from the transition of agriculture." *Journal of Economic Literature*, *42* (2), pp. 404–456.

Shervani, T.A., Frazier, G., Challagalla, G. (2007) The moderating influence of firm market power on the transaction cost economics model: an empirical test in a forward channel integration context. *Strategic Management Journal,* 28: 635-652.

SPOONER, N. and L. SMITH (1991). "Structural adjustment policy sequencing in Sub- Saharan Africa." FAO Economic and Social Development Paper 104.

SWINNEN, J.F.M., A.VANDEPLAS and M. MAERTENS (2009). "Liberalisation with Endogenous Institutions: A Comparative Analysis of Agricultural Reforms in Africa, Asia, and Europe," *World Bank Economic Review*, 24(3): 412-445.

SWINNEN, J.F.M (2009). "The Growth of Agricultural Protection in Europe in the 19th and 20th Centuries." *The World Economy, 32* (11), pp. 1499-1537.

SWINNEN, J.F.M. and A. VANDEPLAS (2009). "Rich consumers and poor producers: Quality and Rent Distribution in Global Value Chains." IFPRI Discussion paper 932, IFPRI, Washington DC.

THIES, C. G. AND S. PORCHE (2007). "The Political Economy of Agricultural Protection". *The Journal of Politics*, *69* (1), pp. 116–127.

TIMMER, C. P. 1991. Agriculture and the state: growth, employment and poverty in developing countries. Ithaca: Cornell University Press.

TOWNSEND , R.F. (1999). "Agricultural Incentives in Sub-Saharan Africa. Policy Challenges." World Bank Technical Paper No. 444.

TSCHIRLEY, D., C. POULTON N. GERGELY, P. LABASTE, J. BAFFES, D. BOUGHTON and G. ESTUR (2010). "Institutional Diversity and Performance in African Cotton Sectors." *Development Policy Review, 28* (3), pp. 295-323.

TSCHIRLEY, D., C. POULTON and P. LABASTE, eds (2009). *Organization and Performance of Cotton Sectors In Africa. Learning from Reform Experience*. Washington DC: The International Bank for Reconstruction and Development /The World Bank.

TSCHIRLEY, D., and B. ZULU (2002)." Zambian Cotton in a Regional Context: Performance Under Liberalisation and Future Challenges". Zambia FSRP Policy Synthesis.

VAN DE WALLE, N. (2001). African Economies and the Politics of Permanent Crisis, 1979-1999. Cambridge: Cambridge University Press.

WHITE, L. and M. WILLIAMS (2009). "Bargaining with Imperfect Enforcement." *The RAND Journal of Economics, 40* (2), pp. 317-339.

Tables

Table 1: Growth of cotton productivity (yields) in ESA and WCA countries, 1961-2009 (1960s=100)

Country/Region	1960s	1970s	1980s	1990s	2000s§
WCA					
Benin	100	240	317	356	337
Burkina Faso	100	235	408	423	462
Chad	100	130	208	197	187
Mali	100	240	301	276	238
Average	*100*	*211*	*301*	*303*	*291*
ESA					
Tanzania	100	108	83	109	138
Uganda	100	74	61	108	195
Zambia	100*	64	57	75	107
Zimbabwe	100	100	95	58	53
Average	*100*	*90*	*80*	*78*	*100*

Source: FAOStat (September 2, 2010)
§ For the 2000s, data was available until 2009, unless specified otherwise.
* countries with * have data for 1963-1969

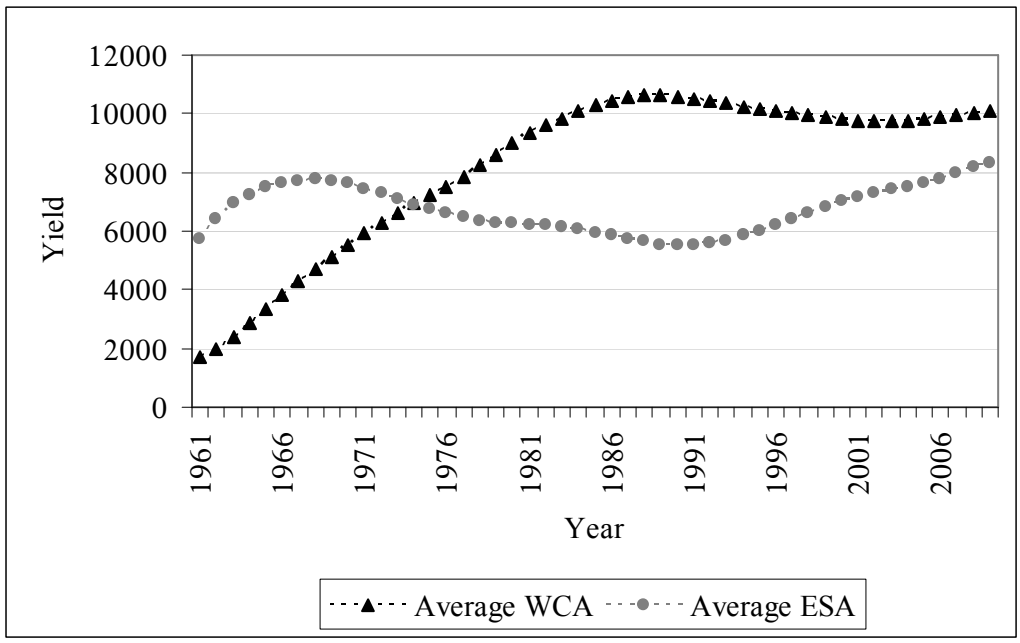
Table 2: Cotton production growth in ESA and WCA countries, 1961-2009 (1960s=100)

Country/Region	1960s	1970s	1980s	1990s	2000s§
WCA					
Benin	100	301	671	2768	3259
Burkina Faso	100	282	728	1448	3380
Chad	100	121	109	166	162**
Mali	100	387	709	1595	1746
Average	*100*	*191*	*303*	*694*	*952*
ESA					
Tanzania	100	112	95	111	147**
Uganda	100	69	11	17	31
Zambia	100*	299	1222	2024	3454
Zimbabwe	100	419	624	564	728**
Average	*100*	*111*	*97*	*106*	*146*

Source: FAOStat (September 2, 2010)
§ For the 2000s, data was available until 2009, unless specified otherwise.
* countries with * have data for 1963-1969
** countries with ** have data for 2000-2008

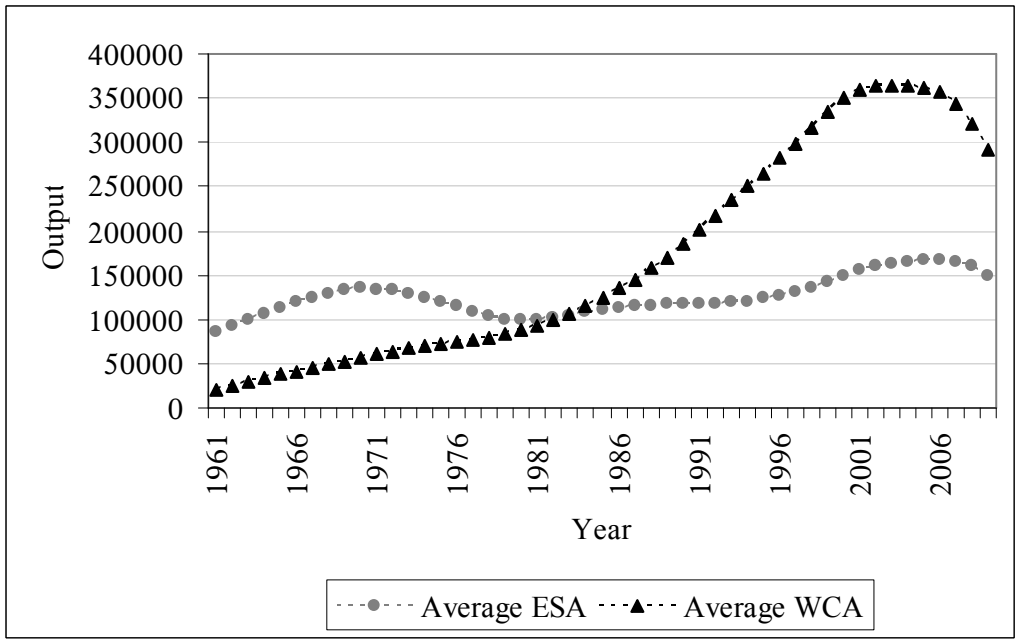
Figures

Figure 1: Cotton productivity (yields) in ESA and WCA countries, 1961-2009 (Hg/Ha)



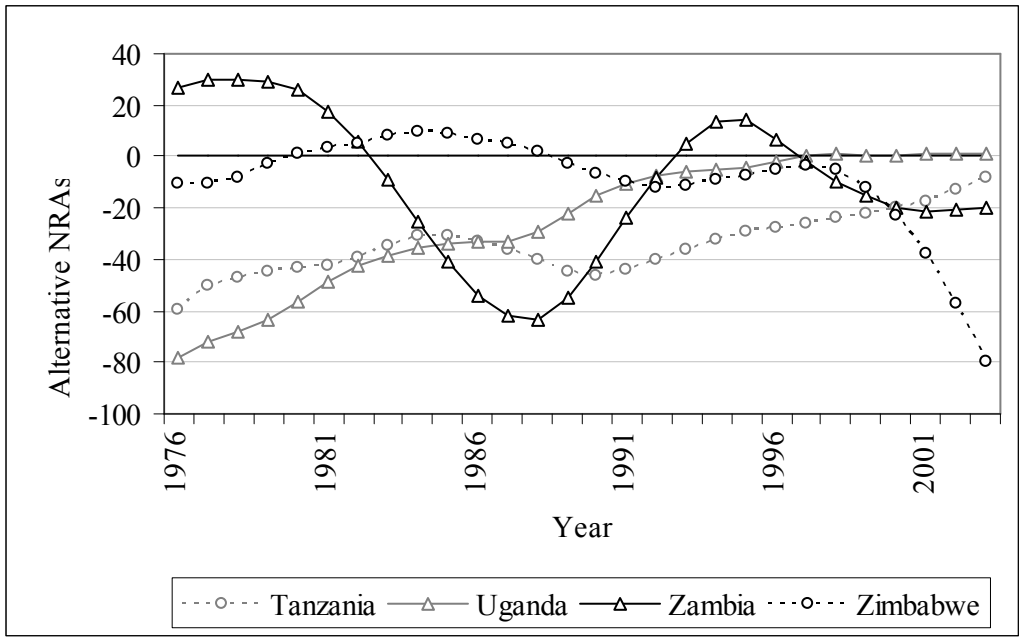
Source: FAOStat (September 2, 2010)
Note: WCA includes Benin, Burkina Faso, Chad and Mali; and ESA Tanzania, Uganda, Zambia and Zimbabwe

Figure 2: Cotton production in ESA and WCA countries, 1961-2009 (MT)



Source: FAOStat (September 2, 2010)
Note: WCA includes Benin, Burkina Faso, Chad and Mali; and ESA Tanzania, Uganda, Zambia and Zimbabwe

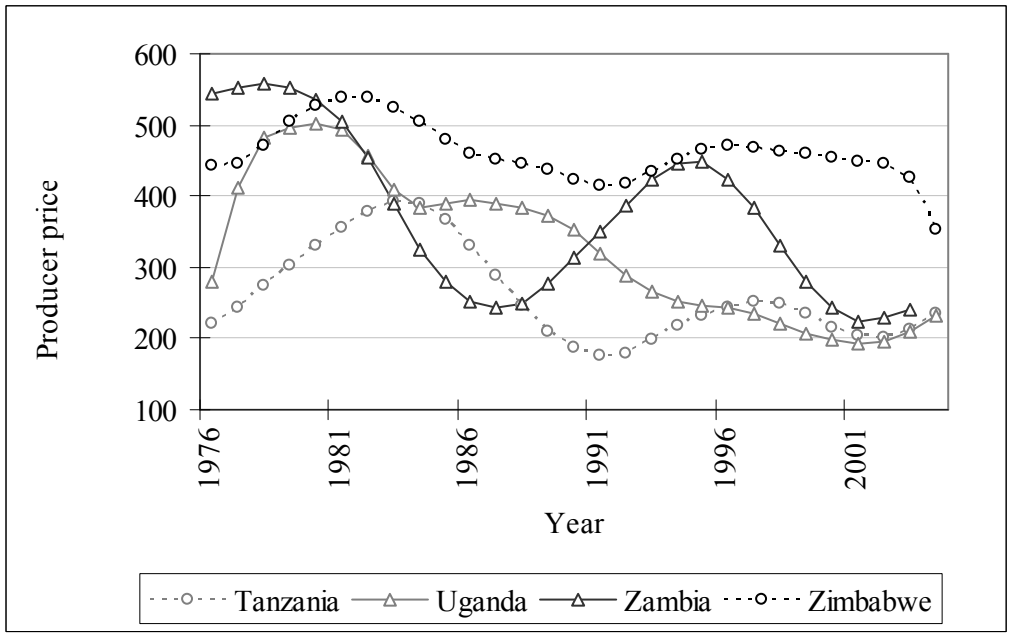
Figure 3: NRAs to the cotton sector in countries of ESA, 1970-2005



Source: Poulton and Delpeuch (2011)

Note: ESA includes Tanzania, Uganda, Zambia and Zimbabwe

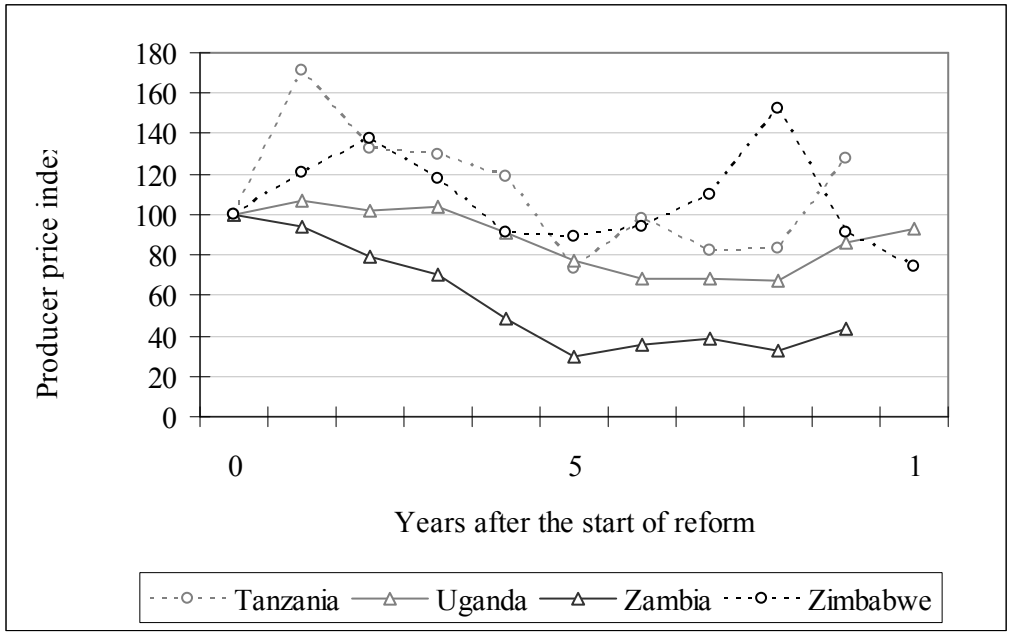
Figure 4: Producer prices in countries of ESA, 1976-2004 (US$/MT)



Source: Anderson and Valenzuela (2007) – "national spreadsheets".

Note: ESA includes Tanzania, Uganda, Zambia and Zimbabwe

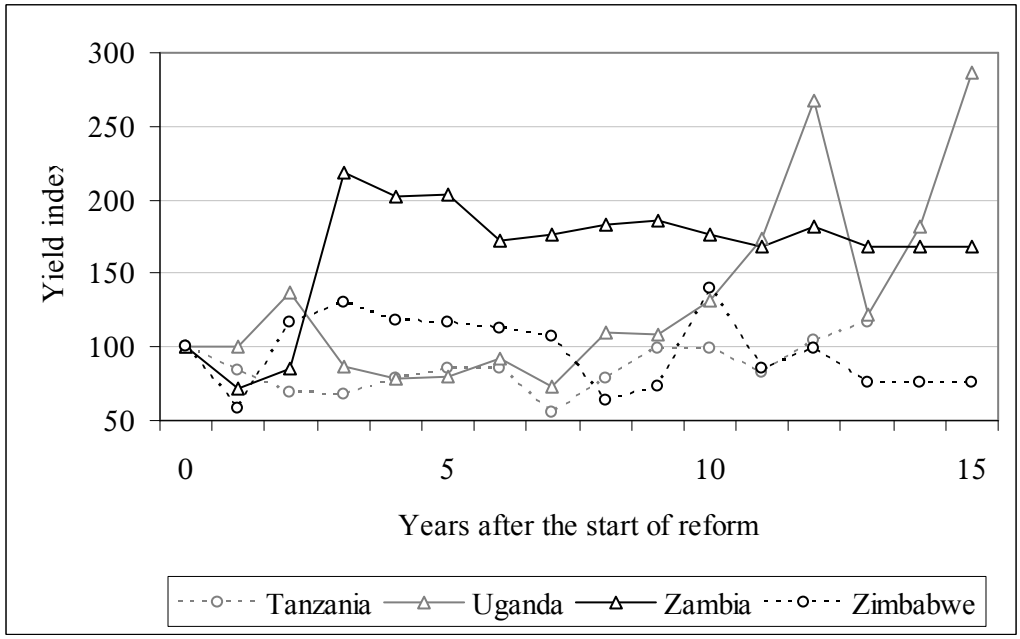
Figure 5: Producer prices in ESA countries post-reform



Source: Anderson and Valenzuela (2007) – "national spreadsheets"

Note: the price index is 100 in the year of reform. ESA includes Tanzania, Uganda, Zambia and Zimbabwe

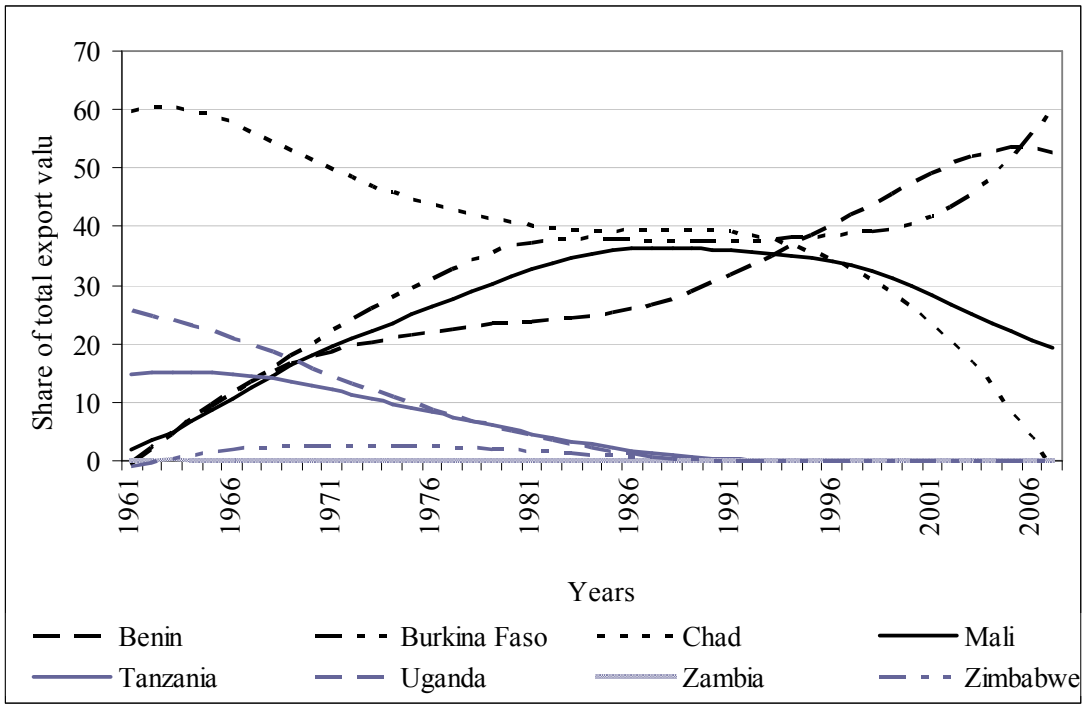
Figure 6: Growth of cotton productivity (yields) in ESA post-reform



Source: FAOStat (September 2, 2010)

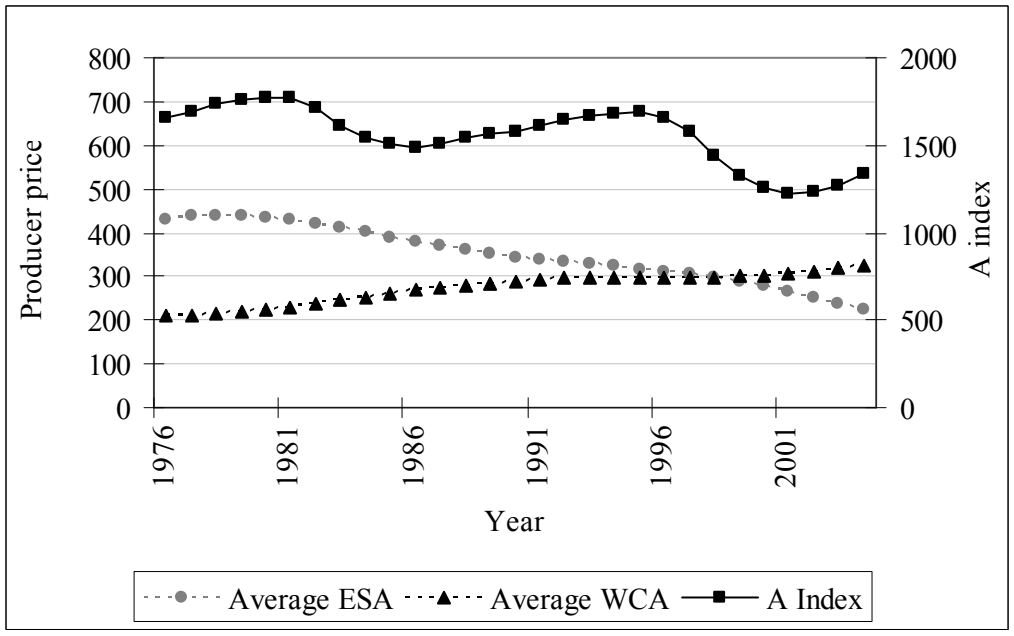
Note: the yield index is 100 in the year of reform. ESA includes Tanzania, Uganda, Zambia and Zimbabwe

Figure 7: Cotton export as a share of merchandise export value in ESA and WCA countries, 1961-2007



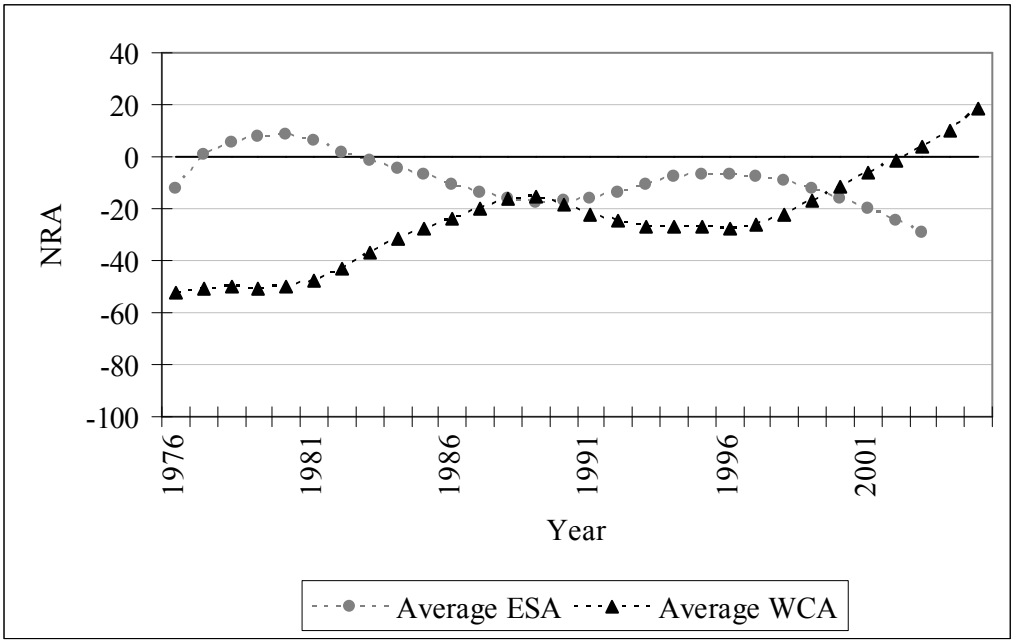
Source: FAOStat (September 2, 2010)

Figure 8: Producer prices in ESA and WCA compared to the A index, 1976-2004 (US$/MT)



Source: Anderson and Valenzuela (2007)
Note: WCA includes Benin, Burkina Faso, Chad and Mali; and ESA Tanzania, Uganda, Zambia and Zimbabwe

Figure 9: NRAs to the cotton sector in ESA and WCA, 1970-2005



Source: Poulton and Delpeuch (2011)
Note: WCA includes Benin, Burkina Faso, Chad and Mali; and ESA Tanzania, Uganda, Zambia and Zimbabwe