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

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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] Its production has been described as a unique 'success-story' in SSA (e.g. Lele et al., 1989). Between 1980 and 2000, Africa's share of world cotton trade rose by 30%, while its average share of total world agricultural trade fell by 50% during the same period (Boughton et al., 2003). Performance has been particularly impressive in West and Central Africa (WCA): yields increased more than three-fold on average since the 1960s (see

Tables and Figures

Table 1 and Figure 1). Combined with considerable expansion of the area under cultivation, this resulted in dramatic production growth. In particular, total cotton production in WCA increased more than twenty-fold, on average, over the past fifty years. In East and Southern Africa (ESA), productivity growth has been less impressive, yet production has increased on average ten-fold over the past five decades. Due to widespread smallholder involvement, cotton is moreover considered to play a key role in development and poverty reduction (e.g. Badiane et al., 2002; Moseley, 2008).

Historically, two key characteristics can be attributed to cotton production in SSA. First, as the production of cotton is relatively input-intensive, and small farmers often do not have access to credit or inputs by themselves due to market imperfections, vertical coordination has been widely promoted in SSA cotton supply chains. This implies that cotton gins engage in input provision on credit to their suppliers at the condition that they can secure the returns to this investment through an enforceable buy-back agreement. Second, for cotton has been a major export cash crop for decades, next to cocoa and coffee, 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.

These characteristics are crucial aspects of the institutional organisation of SSA cotton supply chains, and therefore fundamental to understand the potential impacts of liberalization, as has been emphasized by for example Rozelle and Swinnen (2004) and Swinnen et al. (2011). Moreover, the combination of these characteristics has historically resulted in pervasive 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, cotton marketing boards 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 nationalisation of cotton gins (Delpeuch and Leblois, 2011).

However, increasingly there is pressure from international donors to reduce government intervention in the cotton supply chains. This call for liberalizing SSA cotton supply chains is not a recent one. In fact, state control of cotton markets already came under scrutiny in the Berg Report (World Bank, 1981), which laid the foundations for structural adjustment programs; and this call became more intense after the cotton price collapse of the end of the 1980s. The main reason is the fact that the applied 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). Baffes (2005) has also expressed strong disbelief in the fact that in the event of price recovery, price improvements would be passed on to farmers within the current setup of the market system. In addition, inefficiencies in parastatal ginning have been a concern in ESA and have also more recently become so in WCA (Tschirley et al. 2009). These factors, in

[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% of the gross domestic product, 10% of total merchandise exports, and over 60% of total agricultural exports. Moreover, it is the largest employer in countries such as Burkina Faso, Chad or Mali (Townsend, 2006).

combination with the strong dependence of millions of poor rural households on cotton which complicates reform, have been referred to as "the Cotton Problem".

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. Resistance to reforms was stronger in WCA. 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, price fixation 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, prices are still administratively fixed.[2]

These differences in resistance to reform may reflect the unwillingness of certain stakeholders involved in processing or in the administration 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 liberalization of WCA cotton markets, drawing on insights from reform experiences in ESA. 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 provided by 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. It is used to explore the reasons why reforms have generally not yielded the expected results in ESA, as well as the potential implications of liberalization reforms in WCA, given the differences in pre-liberalisation conditions between the two regions.

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, past 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 organisation 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'.

This contracting has historically taken place in a regulated environment in most countries of SSA. While market organisation varied considerably across SSA in the early decades of cotton commercial cultivation (1950s-1960s), after independence, the degree of market concentration increased in the less regulated sectors such that, by the early 1980s, the structure of cotton markets was "remarkably similar" across SSA (Baffes, 2005). Publicly owned companies or marketing agencies, which enjoyed both a monopoly and a monopsony position, were responsible for input distribution, the purchase of raw cotton at regulated prices, its transformation into cotton lint and the trade of the latter on international markets.

[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).

[3] Although input use is less intensive in ESA, transactions are interlinked in most countries, with the exception of Tanzania.

Competition between ginners was either ruled out by law, or very limited.[4] The major advantage of such a single-channel system 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. 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).

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 3 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 induced the World Bank to advocate liberalization of the WCA cotton sector more fiercely (Badiane et al. 2002). Apart from the reasons mentioned above, it was argued that pan-territorial pricing schemes were ineffective in promoting rural development (Baghdadli et al., 2007), and that the strengthening of competitiveness of these sectors would be vital in ensuring their long-term financial sustainability and allowing a fair division of the profits between producers and ginners.

In ESA, a few decades after independence, cotton parastatals were already perceived as highly inefficient, as well as unable to meet their main objectives of supporting cotton production and generating a surplus to fuel the wider economy. In some countries, such as Uganda, the cotton sector almost collapsed, triggering immediate reforms (Baffes, 2005).

2.2 Reforms

Hence, market organisation began to change in the late-1980s, with a drastic acceleration of reforms in the mid-1990s. Tanzania, Uganda, Zambia and Zimbabwe all dissolved cotton boards and allowed private sector competition in the early to mid 1990s (Delpeuch and Leblois, 2011).

In Tanzania, since independence in 1964, cotton marketing had largely been monopolized by cooperatives and a cotton marketing board, while the private sector was kept at a distance between 1964 and 1995. The marketing board intervened in pan-territorial and pan-seasonal price-setting until 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 liberalization.

In post-independence Uganda, the organisation of cotton ginning and marketing was organized similarly, with cooperatives responsible for purchasing and ginning, and a state board to enforce market regulations. In 1994, this board was liquidated and the sector was opened up to private entry. As this had a detrimental effect on the provision of input and extension, the government established regional monopsony rights in 2003 and allowed a few ginners to operate in each zone under quota terms. This system was again abolished in 2008 (Baffes, 2009b). The usual year which is taken for liberalization of the Ugandan cotton sector is however 1994.

Liberalisation also took place in 1994 in Zambia, when the state cotton board was privatized. Prior to 1994, the state cotton board was responsible for ginning, fixing producer prices, as well as distributing inputs on credit, and providing extension services. It had monopsony power in all these activities. However, after liberalization, 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 competed for cotton supplies. The level of competition is said to have declined again in 2000 when the two biggest firms began to cooperate in an attempt to prohibit side-selling (Brambilla and Porto, 2008) and, simultaneously, 'the agents and independent buyers [...] largely disappeared' (Tschirley and Kabwe, 2010). Yet, competition has resumed since the mid-2000s with market entry of new 'larger and better-financed ginners' (Tschirley and Kabwe, 2010).

[4] In Zambia, Zimbabwe, and all countries of WCA, cotton supply chains were organized in a similar way, based on a parastatal single-channel supply chain. In Tanzania and Uganda, cotton ginning was organized somewhat differently, through village level cooperative societies which had exclusive procurement rights (Tschirley et al., 2009).

[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 (WB) 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" (WB, 1981).

Finally, in Zimbabwe, the reform process has known similar ups and downs with respect to competition. Prior to 1994, like in Zambia, the government state board held monopsony power in the procurement, ginning and marketing of cotton. Its procurement base initially consisted of commercial farmers. Only after independence in 1980, smallholder cotton production was promoted, and credit provision institutions were set up. Commercial farmers progressively exited the sector after the cotton price crisis in the late 1980s. The sector opened up to private entry in 1994, the year of liberalization. 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. However, since 2006, regulation of entry has become more severe, with legal requirements at the level of input provision (Poulton and Hanyani-Mlambo, 2009).[7]

In WCA, reforms are much 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 existing 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, market organisation has not been challenged, 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 everywhere in WCA until the late 1980s (see

Tables and Figures

Table 1 and Figure 1). In ESA, however, average yields decreased in the 1970s and 1980s and a positive average output growth hides strong differences between countries. Only Zambia and Zimbabwe display strong output growth.

With regard to the last two decades, the picture is less clear. Output growth has remained higher, on average, in WCA than in ESA. Productivity, however, seems to have stagnated in WCA since the 1990s, so that continued output growth was driven only by increased area under cultivation. In ESA, productivity growth has resumed in the last decade, except in Zimbabwe where it has been almost halved compared to the 1980s average.

Focusing on post-reform performance in reforming countries, more specifically in ESA, the picture is mixed. Table 1 suggests the absence of any sizable collapse in yields (except in Zimbabwe). Output has also grown everywhere, although not the same extent in different countries, with Zambia outperforming all others. What is more, in Uganda, the strongest production growth occurred when competition was abolished in the mid-2000s.

Tschirley et al. (2009 and 2010) explicitly establish a link between market structure and different elements of performance, by arguing that, while competitive, market-based systems can involve relatively high producer prices without any type of budgetary support, 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. Prices can be high in monopolistic markets – even higher than in competitive markets – but this can be at the cost of huge public transfers. In concentrated markets, relatively high prices can be, but are not always paid to producers.[8] As a result, Tschirley et 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.

[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.

[8] Cotton quality is another important issue, which is considered to be affected by reforms, but which we do not discuss in this paper (Larsen, 2003; Gilbert and Tollens and Gilbert, 2003).

3. CONCEPTUAL FRAMEWORK

To analyze the past reforms in ESA and the envisaged reforms in WCA in a comparative framework, we use the theoretical model provided by 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. In brief, the theory predicts that cotton production through interlinked contracts will be realized if there is sufficient surplus value created through the contract, that involves a farmer who invests his labour at opportunity cost p_a, and a buyer who invests his capital in the provision of a package of inputs of value I to the farmer at opportunity cost Π_l. The surplus value created by the contract is denoted by θ, with $\theta = p - p_a - \Pi_l - m$, in which p is the price at which the public or private ginner can sell the processed cotton, and m the "efficient" marketing and processing costs per unit of cotton. Moreover, t_m represents the excess marketing and processing costs due to inefficiencies in the marketing chain, and t_x consists of any potential government taxes or subsidies (tax for $t_x > 0$ and subsidy for $t_x < 0$), with $t_m + t_x = t$. In the absence of effective contract enforcement institutions, contracts need to be made self-enforcing, in the sense that the buyer needs to offer the supplier a potential premium over his opportunity cost, which is increasing in the supplier's opportunities for contract breach, and decreasing in the supplier's reputation cost from breaching a contract (φ^f) . This de facto means that a buyer needs to offer his supplier a price that is at least as high as the supplier's income from diverting the inputs received on credit (with returns equal to $I - \varphi^f$) or side-selling the cotton resulting from contract production to an opportunistic buyer at a price p_s (with returns equal to $p_s - p_a - \varphi^f$). This premium has a positive impact on the farmer's income from producing cotton, but may however also lead to the breakdown of cotton contracts, if there is not enough value in the chain to simultaneously offer the required premium to the farmer, and ensure that the farmer and the ginner's participation constraints are satisfied. In practice, this means that cotton contract production will only take place if $\theta \geq \theta_{min} = max\ (I + t,\ 2I + t - \varphi^f,\ I + t + p_s - p_a - \varphi^f)$. The farmer's income, if the contract materializes, can then be calculated as $Y = p_a + max\ [\beta(\theta - I - t),\ I - \varphi^f,\ p_s - p_a - \varphi^f)]$ (see Swinnen et al. (2011) for more details).

The worse the farmer's ex ante outside options are (p_a), the lower the price producers can fetch on the spot-market (p_s), and the higher the reputation cost (φ^f), the greater is contract feasibility. On the other hand, that the same factors would cause producers prices to be lower. Furthermore, marketing processing inefficiencies (t_m) and taxation by the government (t_x) are expected to reduce contract feasibility, as well as suppress producer and processor payoffs. Conversely, subsidies by the government ($t_x < 0$) improve producer and processor payoffs as well as contract feasibility.

In general, state control in pre-liberalization economies is believed to have a positive impact on contract enforcement through legally banning competition (hence low p_a as well as low p_s) and by imposing high reputation costs on defaulting farmers (high φ^f).[9] Excess marketing costs in state controlled companies ($t_m > 0$) however tend to complicate enforcement, while the impact of price distortions depends on the implicit tax regime. Conversely, privatisation and price and market liberalisation were expected to remove government intervention in price-setting (leading to $t_x = 0$), create new options to side-sell and contract options ex-ante (increasing p_s and p_a), reduce the farmer's reputation cost (φ^f) and improve marketing and processing efficiency (t_m).

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, using the theoretical framework described above and empirical insights from the literature.

Options for contract breach **-** Because cotton is a relatively homogeneous product, market entry is likely to result into relatively strong competition. Indeed, the more homogeneous the product, the less specific are processors' requirements and hence the higher p_s (Swinnen et al., 2011). Moreover, the prices fetched by different firms on the world market are largely dependent 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).

[9] An alternative argument is that centrally imposed conditions to source from all farmers (for political objectives) may imply lower reputation costs for farmers.

There is thus no reason to expect that new entrants should not be able to obtain similar prices to those fetched by the historical ginner.

Competition was thus excepted to have an uplifting effect on producer prices both through increasing p_s, with positive impacts on producer prices but potentially negative impacts on sector performance through increased contract breakdown (as θ_{min} would increase). Moreover, reputation costs were expected to reduce as a higher number of buyers facilitates the search for an alternative buyer after opportunistic behaviour, while it complicates coordination amongst buyers (e.g. for sharing information on defaulting farmers) with positive effects on contract sustainability but potentially negative on producer prices.

Production inefficiencies **-** As cotton state boards in ESA suffered rather bad reputations with respect to efficiency; liberalization was expected to bring substantial gains in processing and marketing efficiency. Through a decrease in t_m (and as such of θ_{min}), farm incomes as well as sector performance were expected to improve. A potential negative impact on efficiency could however stem from the loss of economies of scale and of safeguarding returns to investment in e.g. research and development of improved cotton varieties (see e.g. Pray et al., 2005, Swinnen and Vandeplas, 2009). In line with Hick's "quiet life" hypothesis (1935), however, most reform experiences suggest that competitive cotton sectors are more cost-efficient than concentrated sectors, and both substantially outperform monopolistic sectors in terms of ginning efficiency (Tschirley et al., 2010) such that t_m has effectively been reduced through liberalization, with incentives for better efficiency outweighing potential losses of economies of scale. In particular, the literature reports 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,

Government intervention **-** 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). This suggests that price liberalisation in ESA also offered great potential in terms of eliminating taxation (reducing t_x), resulting in better producer prices as well as improving sector performance by reducing θ_{min}.

Overall taxation **-** Figure 2 shows the nominal rates of assistance (NRAs) to cotton producers since the 1970s (Anderson and Masters, 2009). The NRAs are calculated as the export price approximated by a measure of the world price (the A-index[10]), net of estimated exchange rate distortions and freight, marketing, ginning and inland transport costs. While they may capture more than just direct (t_x) and indirect taxation (t_m), to our knowledge, such figures are the best proxy available for measuring the overall level of taxation or subsidisation in agricultural sectors. During the years of government intervention in price setting (i.e. before the mid-1990s), NRAs have on average been significantly negative in ESA, implying that producer prices were below the estimated "reference" farm gate prices, and hence, that farmers were taxed. The patterns post-reform show clear improvements, even though NRAs have not converged to zero yet.

Institutional organisation and the degree of competition **-** Prior to reform, there was a common belief that opening up the sector would lead to considerable market entry by the private sector. However, the private sector only entered gradually in Tanzania; in Zambia and Zimbabwe, competition remained weak in the years subsequent to reform as a remnant of the extremely concentrated pre-reform market structure; and in Uganda, the government re-imposed strict controls on competition as soon as it reached a level that endangered input provision.

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: the homogeneous nature of cotton and pricing practices in the world market would imply significant spot-market prices increases; lower reputation costs from contract breach; liberalisation would eliminate taxation, and efficiency was also expected to increase as a result of market liberalisation.

However, in hindsight, the overall high expectations from liberalization reforms turned out to be overly optimistic. FAO data suggest that prices rather stagnated or even went down after liberalization (see

[10] The Cotlook A Index is compiled daily by Cotton Outlook as the average of the five lowest quotations of eighteen styles of cotton from a number of origins, including four SSA countries (for more details, see appendix A in Baffes, 2005). Baffes and Ajwad (2001) found that cotton prices in WCA tracked the A index very closely, making it a very good proxy for the price fetched by WCA companies (Baffes, 2009).

Figure 3). A major driver here is probably the general decline in world cotton market prices and a general lack of effective competition.

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 indeed one way to overcome these market imperfections. Liberalization was expected to have mixed effects on contract sustainability. Positive effects would come from the removal of taxation, as well as of existing marketing and processing inefficiencies. Conversely, potential negative impacts on contract sustainability could have resulted from higher outside options for farmers (higher p_a and p_s) and lower reputation costs, with ultimately negative effects on input consumption and on yields and production.

Figure 1 suggests the absence of any sizable collapse in total output and yields, except in Zimbabwe. Yields have been on the increase since the second half of the 1990s. This is also potentially congruent with the fact that competition remained relatively restricted. Moreover, it has been argued in the literature that in those countries where competition has remained modest, input supply systems have been sustained to a large extent, and that service provision has been used as a strategy for non-price competition, suggesting that at low levels of competition, it stimulates rather than suppresses service provision and yield growth (Tschirley et al., 2009). However, defaulting crises have occurred when competition increased over a certain level, leading 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 θ_{min} precisely captures this situation when the impact of increased competition on ex-ante contract opportunities, ex-post outside options and reputation (respectively p_a, p_s, and φ) outweighs the impact of increased efficiency (t_m).

5. EXPECTED EFFECTS OF LIBERALISATION IN WCA

The impact of reforms in ESA (and its contrast with the expected impact pre-reform) have informed and fed the debate on liberalization 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.

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 (p_a) 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.

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 in ESA, 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).[11] During the same period, in WCA, yields increased three-fold. As a result, in 1990, cotton yields in ESA were on average almost 40% lower than in WCA while they were over twice as big in the 1960s (Figure 1). Indeed, there is 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).[12]

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 t_m is not clear-cut.

[11] Zimbabwe is noted as an exception by Tschirley et al. (2009).

[12] Comparing the performance of cotton sectors in Tanzania and in Mali, Gillham et al. (1995) also fond 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".

Government intervention **-** While patterns of intervention in WCA were similar to those observed in ESA until the early 1980s (Figure 2), they have increasingly differed since then and current patterns of government intervention in price-setting in WCA seem to be entirely different from those observed in ESA at the time of reform. Indeed, Figure 2 shows that WCA cotton farmers have been subsidised in the late 1980s and again between the early 2000s and 2009 when world prices strongly declined and producer prices were sustained at their historical level. This resulted in transfers to farms, which ensured contract sustainability but caused financial losses for the ginning companies, which ultimately had to be covered by budget support.[13] The removal of these subsidies is likely to have a negative impact on producer prices; especially for the 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_x is expected to increase in the WCA context, in sharp contrast to the expected reduction in t_x pre-reform in ESA. The reduction of subsidisation is expected to be even more dramatic for producers with higher transaction costs of dealing with them, e.g. producers who are located further away from major roads or in less densely populated areas, often the poorest of all producers, as they have been subsidized even more than other producers. 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.

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 on the market; the degree of concentration is increasing to the point where the sector is said to resemble a private monopsony (Gergely, 2009). As a result, the impact of competition on p_a, p_s and φ^f (and its potentially positive impact for producer prices) 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, and these expectations importantly facilitated the reform process, 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 should remain sustainable even after reform, at least in the short run.

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 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 any yield increases since the mid-1980s. Indeed, the breakdown of inefficient contracts might 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 improve opportunities for diversification, or design more efficient (and better targeted) social safety nets.

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. While this is all easier said than done, it 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 reforms that create opportunities for farmers to move out of cotton production.

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8. TABLES AND FIGURES

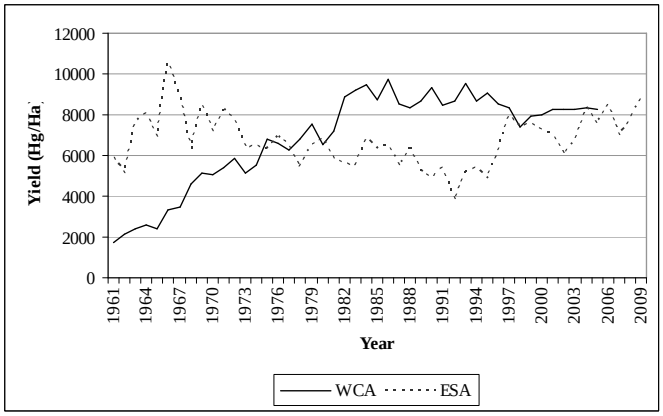
Table 1: Growth of cotton productivity and production in sub-Saharan African countries, 1961-2009 (1960s=100)

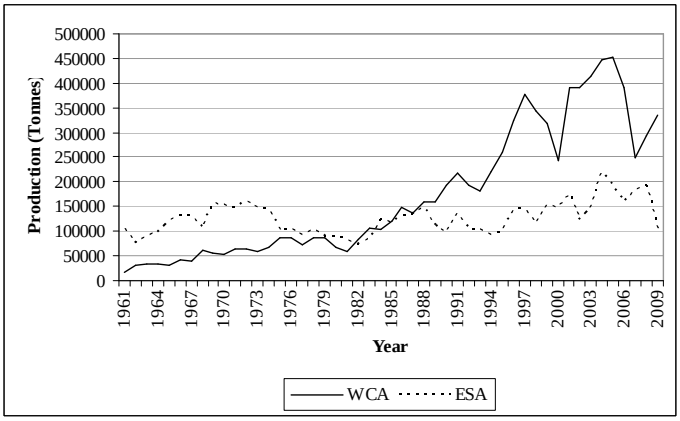
	(a) Cotton productivity growth					(b) Cotton production growth				
Country/Region	1960s	1970s	1980s	1990s	2000s§	1960s	1970s	1980s	1990s	2000s§
WCA										
Benin	100	240	317	356	337	100	301	671	2768	3259
Burkina Faso	100	235	408	423	462	100	282	728	1448	3380
Chad	100	130	208	197	187	100	121	109	166	162**
Mali	100	240	301	276	238	100	387	709	1595	1746
Average	100	211	308	313	306	100	273	555	1494	2137
ESA										
Tanzania	100	108	83	109	138	100	112	95	111	147**
Uganda	100	74	61	108	195	100	69	11	17	31
Zambia	100*	64	57	75	107	100*	299	1222	2024	3454
Zimbabwe	100	100	95	58	53	100	419	624	564	728**
Average	100	86	74	87	123	100	208	420	567	1090

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

Figure 1: Cotton performance in sub-Saharan African countries, 1961-2009

(a) Cotton productivity in Hg/ha **(b) Cotton production in MT/year**





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

Figure 2: Nominal rates of assistance to the cotton sector in sub-Saharan African countries, 1970-2005

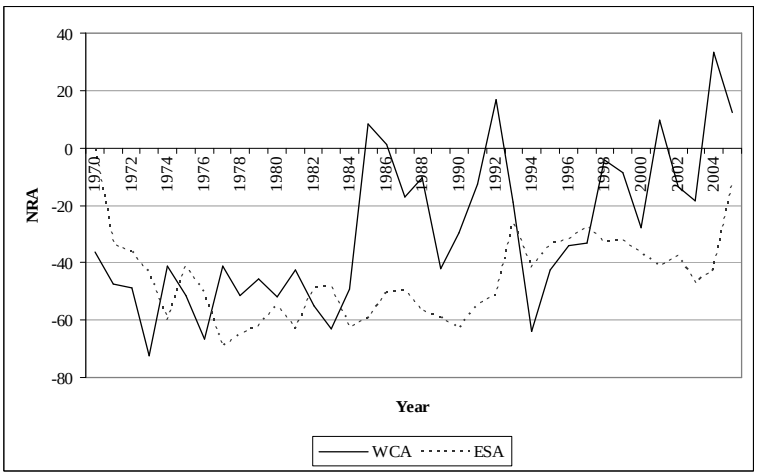


Figure 3: Producer prices in ESA compared to the A index, 1976-2004

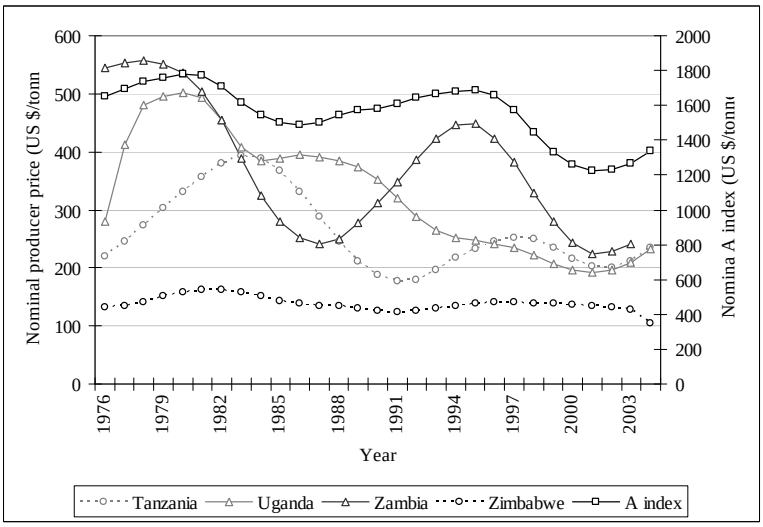
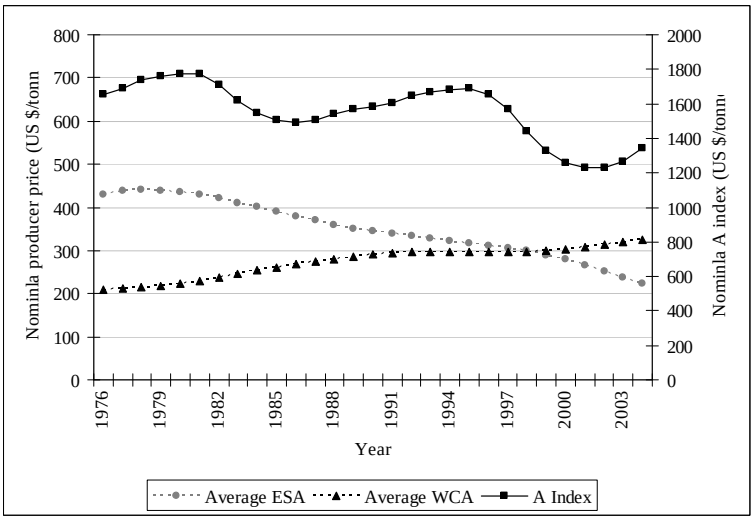


Figure 4: Average producer prices in ESA en WCA compared to the A index, 1976-2004



Source for Figures 2, 3 and 4: Anderson and Valenzuela (2007) – "national spreadsheets"
WCA includes Benin, Burkina Faso, Chad and Mali; ESA includes Tanzania, Uganda, Zambia and Zimbabwe