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# Measuring the impacts of distortions in the European Union cotton sector: A partial equilibrium analysis using the ATPSM model framework

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## ABSTRACT

The “cotton issue” has been a topic of several academic discussions for trade policy analysts. However the design of trade and agricultural policy in the EU and the USA has become a politically sensitive matter throughout the last five years. This study utilizing the Agricultural Trade Policy Simulation Model (ATPSM) aims to gain insights into the global cotton market, to explain why domestic support for cotton has become an issue, to quantify the impact of the new EU agricultural policy on the cotton sector, and to measure the effect of eliminating support policies on production and trade. Results indicate that full trade liberalization would lead the four West African countries to better terms of trade with the EU. If tariff reduction follows the so-called Swiss formula, world prices would increase by 3.5%.

**Keywords:** Cotton, European Union, West African Countries, Partial Equilibrium, Trade Policy

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## ***1. Introduction***

The design of policies concerning the agricultural sector, [whether they are individual policies (one country case) or a common strategy for a group of countries (European Union)] is a very difficult issue that has to take a lot of parameters into consideration. Moreover, the agricultural sector is one to which the most considerable and important interventions are applied by the government to support or control production. As a result of these interventions, many countries have incurred an excess in production, an increase in subsidies, depressed world prices and trade disputes.

Several negotiations have taken place in the past to normalize the conditions in agricultural trade. One of the most important negotiations, the Uruguay Round (UR), succeeded in reaching a conclusion. The UR managed to include agriculture in the rules enforced under the General Agreement on Tariffs and Trade (GATT).

The most important aspect of the UR was the application of rules concerning agricultural trade. These regulations were set and defined and offered the possibility for measuring and quantifying several interventions imposed by global trade policies. Moreover, the UR managed to limit the use of subsidies, both domestic and export related for most of the agricultural products. On the other hand, although the UR had succeeded in introducing some rules concerning trade there were still other issues that had to be taken into consideration. Those issues included high tariffs, tariff escalation, large trade distorting domestic support, vague rules on what constitutes non-trade distorting support, and considerable export subsidies.

The current "Doha Development Agenda" or DDA negotiations of the WTO has again highlighted the reluctance of many countries to place strong and binding limits to their agricultural protectionist and other support policies. Agriculture was one of the reasons behind the failure of the WTO Ministerial Conference held in Cancun in September 2003 to reach an agreement.

The "cotton issue" was an issue of great debate at the WTO Ministerial Conference in Cancun. It was claimed that cotton subsidies led to artificially depressed world market prices and thus negatively impacted on both export earnings as well as production levels in non-subsidizing countries.

The cotton issue has been a topic of several academic discussions for trade policy analysts. However the design of trade and agricultural policy in the EU and the USA has become a politically sensitive issue throughout the last five years. For that reason this paper will try to examine and quantify what the results will be from the new EU agricultural policy (CAP 2003) which was enforced in the cotton sector in 2006. Our main interest is to investigate the effect on cotton trade with the main partners of European Union.

Several studies examining and quantifying the impact of agricultural trade distortions in the global market have been carried out. Prior to the UR and since then, many model based studies have taken place in order to measure the impact of several applied policies. Currently, in the context of the Doha Round negotiations similar works have been undertaken because of the extensive need for information and pre-estimated results for several different scenarios of trade policy. It should be noted that in order to model the agricultural sector or to run a simulation model, a lot of effort and design is required.

Some recent attempts have been made to analyse the impact on world markets and the trade of cotton subsidies. International Cotton Advisory Committee (ICAC, 2002) estimated that 73 percent of the world production of cotton was receiving some sort of direct assistance. They also estimated that the removal of US subsidies alone would have increased world prices in 2000/01 and 2001/02 by around 10 percent. In Goreux's (2003) report referring to the background for the African Countries' submission to the WTO, a simple model to analyse the injury to African producers by the subsidies in developed countries was used. He then concluded that world cotton prices would increase by 13-18 percent in the absence of these subsidies. Quirke (2002) estimated that the removal of production and export subsidies by the United States and the EU would have increased world prices in 2001/02 by 10.7 percent. Tockarick (2003) found that multilateral trade liberalization, in all agricultural products would induce a 2.8 percent increase in world cotton prices. Food and Agricultural Research Institute (FAPRI, 2002), found that under global agricultural trade liberalization the world cotton price would increase over the baseline scenario by 12.7 percent over a ten year period and Africa exports would increase by 12.6 percent. Finally, Sumner (2003), drew up a report that was used by Brazil as a form of complaint to the WTO against the United States. He used a modified version of the FAPRI model and found that the removal of domestic and export subsidies on cotton by the United States would increase world prices by 12.6 percent and reduce United States exports by 44 percent. It is clear that, while there is a consensus on the overall direction of the price, production and trade changes, there is substantial divergence of empirical estimates with respect to the overall impact of the domestic and export subsidies on the world market as well as exports<sup>1</sup>.

This paper discusses these empirical issues and presents some estimates of the above mentioned impacts using the UNCTAD-FAO ATPSM (Agricultural Trade Policy Simulation Model) model. Before the ATPSM results are discussed, it is important to briefly refer to the sector describing the challenges encountered by the world cotton market and trade. The next section aims to explain the context and the problems encountered by the African cotton sector and how subsidies can affect the formation of world price. The last two sections focus on the simulation results and the conclusions of this study.

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<sup>1</sup> FAO commodity and trade policy research working paper. No 8. The impact of domestic and trade policies on the World Cotton Market. Daneswar Poonyth, Alexander Sarris, Ramsesh Sharma and Shangnag Shui, Commodities and Trade Division, April 2004

## ***2. The cotton trade***

One-third of cotton production is traded internationally. The four dominant exporters namely the USA, Uzbekistan, Francophone Africa, and Australia account for more than two-thirds of the world's exports. Four major producers, China, India, Pakistan, and Turkey do not export cotton and occasionally import to supply their textile industries. Imports of cotton are more uniformly distributed than exports. During the 2002/03 season, the eight largest importers (Indonesia, India, Mexico, Thailand, Turkey, Russia, Italy, and Korea) accounted for over half of the world's cotton imports. Apart from Russia, which prior to 1990 was considered a major producer but not an importer because the Central Asian cotton production was considered an internal trade; most of the remaining cotton importers are new in the sense that they have been importing cotton to supply their newly-developed textile industries (Baffes, 2004). For example, four East Asian textile producers (Indonesia, Thailand, Taiwan, and Korea) accounted for less than 3% of world cotton imports in 1960, as compared with 22% in 2002.

In terms of direction of trade flows, 44% of cotton exports went from industrial to developing countries during 2002/03. The shares for 1980/81 and 1990/91 were 38 and 31%. The shares of cotton exports from developing to developed countries increased from 13% in 1980-81 to 31% in 2000-01. This change in the pattern of trade flows reflects the growth of the textile industries in South-East Asia.

### ***2.1 Challenges encountered by the world cotton market.***<sup>2</sup>

The world cotton sector faces several major challenges. All of these also affect developing and less developed producers particularly in Africa. Indeed cotton plays, in a number of African countries, a key role in the economy and development efforts.

A general overview of the state and trends of the world cotton market allows for a better understanding of the specific challenges and situation within which the African cotton sector operates and needs to develop.

The international cotton trade represents a limited share of production (approximately 30%). Some developing countries are heavily dependent on it. For example, between 30 and 40% of export earnings in Benin, Burkina, Chad, and Mali, comes from cotton. The West and Central African region, constituting approximately 12% of world exports, is an important player in the international cotton market; even though its exports are well below these of the United States which account for 30%. Other important exporters comprise Uzbekistan (13%) and Australia (12%). China is the largest cotton producer as well as consumer, but only occasionally exports part of its production. On the other hand, the European Union is a major importer of cotton, and about a third of its imports come from West and Central Africa. In addition, South-East Asia, as well as Brazil, are becoming increasingly important importers due to their growing textile industries. This trend is expected to be amplified by the forthcoming liberalisation foreseen under the Agreement on Textiles and Clothing.

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<sup>2</sup> Communication from the commission to the council and the European Parliament "Proposal for an EU-Africa partnership in support of cotton sector Development", Commission of the European Communities, Brussels COM(2004)

Global cotton demand is over the next decade expected to grow moderately, in line with a population increase (1.8% annually).

Cotton prices, like most agricultural commodities, have been showing a long-term decreasing price trend and strong short term fluctuations. Prices for both exports and imports have been significantly influenced by China's sporadic entry in the world market which highlights the need for deeper analysis of the characteristics of the world cotton market in order to better understand its determinants. Prices of agricultural commodities are determined by several factors, in particular: the level of demand, which reflects changes in the economic situation of major importers, as well as substitution effects from other similar products; the level of supply, which is derived from the commodity chain structures in place, agro-technical capacity and local unpredictable natural conditions; and the level of stocks. The long term decline of cotton prices has averaged 0.2% per annum between 1960 and 1984, and has accelerated thereafter to 0.9% per annum between 1985 and 2002. It has been closely linked to increases in productivity and reduction in production costs, as well as to the competition of synthetic fibres.

Subsidisation regimes in several producing countries, in particular in the industrialised world, add to the general downward pressure on prices. There are different types of subsidies applied to cotton in the United States and the European Union and the Union is spending only a fraction of the amount put at the disposal of cotton producers in the US (€ 0.8 billion in the EU against € 2.9 billion in the US in 2001-02). Due to subsidisation, prices paid to domestic cotton farmers were 90% and 154% above world prices in 2001-02 in the US and EU, respectively. This has had a direct impact on cotton production in both countries. Nevertheless, unlike the US, the EU is a minor player in terms of global production, accounting for just 2% of world output. Therefore, the EU has had only a marginal influence on price formation in international markets. However, in terms of volume, EU production represents approximately 70% of West and Central African exports.

The 2001-02 marketing year witnessed particularly low prices, which, in West and Central Africa where there is no price support, have led to serious difficulties for the cotton sector. Price recently increased sharply once again illustrating the dramatic short-term volatility with which cotton producers have to cope.

## ***2.2 Context and problems encountered by the African cotton sector***

Cotton is a vital export commodity in a number of African countries. Two to three million producers and some 15 million people depend directly or indirectly on the cotton sector. Many of them belong to the poorest sectors of society. Price levels and stability directly affect their capacity to earn a living. Sudden recent fluctuations in price have highlighted the vulnerability of the African cotton sector.

Generally, cotton produced in Africa is competitive in particular in West and Central Africa. However, there is potential for the further strengthening of its competitive position. In addition, the dynamic character of the domestic and international environment raises serious challenges for the future of the sector. In terms of external factors, as analysed above, the long term decline of prices and significant short term fluctuations, as well as heavy international competition

influenced by trade distorting subsidies, are serious concerns that deserve consideration both at the domestic and international level. Regarding the domestic challenges, the sector has limited flexibility in meeting changing demands. Moreover, the slow rate of technological innovation has to be addressed as a matter of priority. The failure to adequately recognise and tackle these international and domestic threats could result in the decline of the sector. This would imply severe consequences in terms of the impoverishment of rural areas, intensification of migrations and even risks for the stability of the cotton-dependent countries.

During the preparation process leading to the World Trade Organisation (WTO) Ministerial Conference of Cancun, four countries of West and Central Africa voiced their concerns regarding the situation of their cotton sectors. The initiative put forward by these countries aimed to obtain specific negotiations within the Doha Development Agenda for cotton. It focused on two demands: 1) the establishment of a mechanism "for phasing out the support for cotton production with a view to its total elimination", and, 2) the offering of financial compensation to offset the income lost during the transitional period when support measures will be phased out and eliminated. Many WTO members have come to a consensus regarding this initiative.

### ***3. Domestic support for cotton in the world***

The main source of distortions in the world cotton market is the level of domestic support of each country. For that reason a short representation of the level and nature of domestic support is represented in the following paragraphs.

**Table 3.1: Subsidies on cotton as compiled by ICAC/Baffes**

<b>Country</b>	<b>1997/98</b>	<b>1998/99</b>	<b>1999/2000</b>	<b>2000/01</b>	<b>2001/02</b>	<b>2002/03</b>
Brazil	29	52	44	44	10	n.a.
China	2 013	2 648	1 534	1 900	1 196	750
Egypt	290	na	20	14	23	33
EU	870	864	795	716	980	957
Mexico	13	15	28	23	18	7
Turkey	na	220	199	106	59	57
US	597	1 480	2 056	1 020	3 001	1 996
<b>Total</b>	<b>3 812</b>	<b>5 279</b>	<b>4 764</b>	<b>3 822</b>	<b>5 287</b>	<b>3 814</b>

**Source:** Table F11 from Baffes (2003), which itself is reported to be based on ICAC sources (ICAC 2002 and 2003). All numbers are expressed in \$ million. 2001/02 and 2002/03 are preliminary estimates. The original ICAC data shows estimates for Greece and Spain separately; they are added here to obtain an EU total.

The subsidies imposed by the two largest producing and trading countries, USA and China, are those that have the most significant effect in the cotton world market. According to the ICAC data (Table 3.1), the global total subsidies to cotton averaged US\$4.5 billion per year during 1997-02, with a range of US\$3.8-5.3 billion. About 75 percent of the total is accounted for by China and the United States - with the share of the United States in the total rising in recent years, from 30 percent during 1997-99 to 47 percent in 2000-02, while China's share fell considerably. The share of the EU subsidies has remained more or less the same, at about 18 percent.



The rest, amounting to about 6 percent, is accounted for by Brazil, Egypt, Mexico and Turkey (Poonyth et al.,2004).

**Table 3.2: Cotton subsidies in the EU**

Marketing year <sup>1/</sup>	Applied Administered Price (Euro/tonne)		Production eligible to receive Applied Administered Price (000 tonnes)		Equivalent measurement of support (million euro)		Total support (million euro)
	EC-14	Greece	EC-14	Greece	EC-14	Greece	
1997/1998	831	903	379	1085	189	620	809
1998/1999	874	772	338	1211	183	532	715
1999/2000	721	676	410	1351	159	464	624

Source: WTO notifications

<sup>1/</sup> September-August

### ***3.1 Coupled and decoupled payments***

Subsidies tend to affect production and hence trade. However, different forms of subsidies have a potentially different impact on production (OECD 2000). In the case of coupled payments a subsidy directly affects the total returns per unit produced increasing the price received by the producer. The effect in this case is no different than if there were a higher price in the market. In other words, coupled payments directly affect the resources allocated to production. On the other hand, decoupled payments affect the production cost and returns only indirectly. For instance, programs that directly affect farm income, such as payments for residing in a given locality, without being dependent on product specific production, tend to have a lower impact on the production of specific products (Poonyth et al.,2004).The decoupled payments are less market and trade distorting. A major problem in the case of decoupled payments is the difficulty in determining to an accurate degree the level of indirect impacts that those programs have.

### ***4. Main features of ATPSM<sup>3</sup>***

The Agricultural Trade Policy Simulation Model (ATPSM) is a comparative static partial equilibrium global model with the following main features:

1. An equation system for all countries, rendering incidences of supply, demand, export and import volume responses to world market price changes, given a set of price support changes, price transmission mechanisms and market structures;
2. Derivation by country (group) and commodity (group) of the volume, trade revenue and welfare effects of the policy changes.
3. Estimation of the size and distribution of tariff revenues and tariff quota rents among countries.

<sup>3</sup> User Manual and Handbook on the Agricultural Trade Policy Simulation Model (ATPSM)

4. Presentation of estimation results in various dimensions, such as by country (group or region), commodity, policy scenario and economic variable.

## 5. *The scenarios*

Four scenarios concerning the alternative cotton agricultural policy and support issues have been developed and analyzed. These scenarios are based on the Cancun, the Harbinson, the Swiss and the conservative formula already built inside the ATPSM model.

### ➤ **The *Cotton1* scenario:**

This scenario is based on a blended formula (Cancun (Derbez) approach<sup>4</sup> and it covers the European Union (EU 15) and the developing countries. The commodity analyzed by this scenario is “cotton”. The data set is provided by the ATPSM software. The parameters examined here are an 80% rate cut on export subsidies for EU and a 70 % rate cut for domestic support. On the other hand, for the developing countries we have a 70% and a 20% rate cut in export subsidy and domestic support, respectively. In the developing countries our main interest had been focused on the West African countries.

### ➤ **The *Cotton2* scenario:**

The second scenario represents the conservative approach to the issue of reducing the domestic support and how this will affect trade. It refers to a reduction in bound out-quota tariffs of 36%, a 55% reduction in domestic support and 45% reduction of export subsidy equivalent in developed countries with two thirds of these cuts allocated to developing countries. There are no reductions in less developed countries. In developing countries we have a 24% reduction in bound out-quota tariffs, a 30% reduction in domestic support and 37% reduction in export subsidies.

The conservative scenario is more problematic as the EU proposal is specified less definitively. First, specified reductions in bound rates apply to all commodities. Countries are assumed not to have flexibility to make fewer reductions in support to politically sensitive commodities, even though the EU proposal specifies this. In the conservative scenario, within-quota tariffs are only reduced if the out-quota or applied rate is cut to below the within-quota rate (Vanzetti and Petters, 2003).

Likewise, in modelling the conservative scenario on export subsidies, it is assumed that the rates are binding and that countries do not take advantage of their flexibility to vary the reductions across different commodities. This assumption thus overstates the likely impacts from reform. However, the EU has called for “substantial” reductions in export volumes, which may have a greater impact because many volume constraints are binding or close to it. Finally, while the EU proposal

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<sup>4</sup> This formula sets the final tariff as specified in column SpecifiedOQT in table FinalOQT in atpsm.mdb

doesn't specify the special and differentiated conditions that apply to developing countries, they are interpreted here as similar to the Uruguay Round conditions<sup>5</sup>.

➤ **The *Cotton3* scenario:**

Based on a tiered formula, the third scenario follows the Harbinson<sup>6</sup> approach. The parameters of this scenario are the same as the Cotton1 scenario. The only difference is the formula used by the model.

➤ **The *Cotton4* scenario:**

The fourth scenario is based on the Swiss Formula which is applied to rates with different coefficients for developed and developing countries. The parameters taken into consideration in this scenario are the following. In the case of the European Union, we have a 100 per cent reduction of export subsidy and a 95% reduction of domestic support which also agrees with the new agricultural policy of the European Union as there will be a partial decoupled payment scheme for the farmers and some specific categories. The Swiss coefficient for developed countries is 25. For the developing countries the parameters are the same with the exception to the Swiss coefficient, which in this case is 50.

## **8. Results**

Impacts of the scenarios are assessed in terms of price, values of consumption, production, imports and exports, and in welfare terms (consumer, producer surplus and government revenue).

***Percentage change in domestic consumer and producer price:*** In all four scenarios, there has been a negative percentage change in the case of China, both in terms of producer and consumer price, whereas in the fourth scenario, where the Swiss formula has been applied, a higher negative percentage change of -6.9% in the case of consumer price for cotton and -6.74 in the case of producer price was incurred. On the other hand, Pakistan also incurred a negative effect but only in the fourth scenario with a percentage change of -4.94% in cotton domestic consumer price and -4.93% in the case of producer price. Smaller percentage changes in all scenarios were observed for Turkey, Uzbekistan and Egypt. It should also be mentioned at this point that Egypt in the first two scenarios (Cancun formula and Harbinson formula) had a negative percentage change in both cases, while in the other two scenarios a positive effect was observed. For the case of the West African countries the percentage change of domestic consumer price is the same as the remaining countries without any significant changes (Tables 1 and 2 in the Annex).

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<sup>5</sup> “An analysis of the WTO, US and EU proposals on agricultural reform”, David Vanzetti and Ralf Petters, Trade analysis Branch, UNCTAD, Geneva, April 2003

<sup>6</sup> The Harbinson formula sets the tariff reduction depending on the initial level and development status. Set  $P1 = 2$  for developed countries and  $=1$  for developing countries. Bands for developed countries are 15 and 90 per cent, and reductions are 40, 50 and 60 per cent, respectively. Bands for developing countries are 20, 60 and 120 per cent, and reductions are 25, 30, 35 and 40 per cent, respectively. These values are hardwired into the file [atpsmscriptformulaclass.ods](#) and can be changed in that file with a text editor.

As far as the change in world price is concerned, the simulation results gave the following estimations presented in the following table where a 3.58% positive change is indicated in the full liberalization (Cotton4) scenario.

**Table 8.1: Percentage change in the cotton world price**

Scenario	Cotton1	Cotton2	Cotton3	Cotton4
Percentage change in the cotton world price	0.53	1.19	1.47	3.58

Source: ATPSM simulation results

**Percentage change in production and consumption:** According to the simulation results that we received from the ATPSM model for the four scenarios, in most countries, the changes in the trade and domestic support policy have negative effects on the consumption of cotton. The country with the highest negative percentage change in consumption is Taiwan with a -2.187% change in the fourth scenario (Swiss formula). On the other hand, the country with the smallest negative percentage change in consumption is Turkey (-0.61%). China is the only country with a positive percentage change in the consumption of cotton.

In the case of percentage change in production, the simulation results of the four scenarios have shown that most of the countries underwent a slight increase in production which indicates that the new trade policies imposed will have a small positive effect in the production of cotton. This might also be a result of the technological changes that might affect the production of all agricultural commodities as well cotton. A disadvantage of the model is that it does not account for the changes in yield for the commodities examined. The only case where a negative percentage change was incurred for all simulation scenarios for the production of cotton is in the case of China where the production seemed to be decreasing -2.74% in the Swiss formula scenario. In the fourth scenario, we have one more country for which we observed a negative change in the production of cotton and this is India, with a -1.99% change in the production of cotton.

As far as are concerned the four West African countries (Benin, Burkina Faso, Chad and Mali) the percentage change in consumption is equal to zero. However there is a positive percentage change in the production for Benin, Burkina Faso and Chad while for Mali, we have a zero percentage change.

**Percentage change in exports and imports:** Our aim in this paper was to examine how the changes in agricultural policies will affect the trade of agricultural commodities among all the partners in the world and more precisely the new policy designed from the European Union. According to the parameters that we have set in the ATPSM model we could examine the change in exports and imports for each country and for each scenario individually.

Generally, ATPSM has shown an increase in the volume of exports for each country with the exception of China which incurred a negative percentage change in all the scenarios and Egypt which underwent a negative percentage change in the Cotton1 and Cotton2 scenarios. This is highly correlated with the predictions for

production, where as it can be noticed from the tables, the countries with the higher percentage change in production also have the higher percentage change in exports.

A 0.12% percentage change was observed in exports for the European Union for the Cotton1 scenario and a 0.28%, a 0.35% and a 0.85% for the Cotton2, Cotton3 and Cotton4 scenarios, respectively. The percentage change in exports for the West African Countries is presented in the following table.

**Table 8.2: Percentage change in cotton exports**

<i>Report</i>	<i>Percentage change in exports</i>	<i>Percentage change in exports</i>	<i>Percentage change in exports</i>	<i>Percentage change in exports</i>
Benin	0.63	1.43	1.77	4.30
Burkina Faso	0.39	0.92	1.15	2.83
Chad	0.23	6.27	9.22	30.92
Mali	0	0	0	0

**Source:** ATPSM simulation results

In the case of percentage change in imports, as it was expected, a reduction was observed for most of the countries that had previously shown an increase in both production and exports. The next table depicts the percentage change in imports for the EU and West African Countries.

**Table 8.3: Percentage change in cotton imports**

<i>Scenario</i>	<i>Cotton1</i>	<i>Cotton2</i>	<i>Cotton3</i>	<i>Cotton4</i>
<i>Report</i>	<i>Percentage change in imports</i>	<i>Percentage change in imports</i>	<i>Percentage change in imports</i>	<i>Percentage change in imports</i>
European Union	-0.28	-0.63	-0.78	-1.89
Benin	0	0	0	0
Burkina Faso	-100	-100	-100	-100
Chad	-87.13	-100	-100	-100
Mali	0	0	0	0

**Source:** ATPSM simulation results

**Changes in Welfare:** The model provides the results for the changes in government revenue, consumer and producer welfare and change in total welfare which is the sum of the three above mentioned parameters.

The sum is the total welfare effect:

$$\Delta W = \Delta PS + \Delta CS + \Delta NGR.$$

**Table 8.4: Change in total welfare (Volumes)**

Scenario	Cotton1	Cotton2	Cotton3	Cotton4
<i>Unit US \$</i>	<i>Change in total welfare</i>	<i>Change in total welfare</i>	<i>Change in total welfare</i>	<i>Change in total welfare</i>
European Union	-2,953,902.92	-6,600,299.34	-8,169,916.38	-19,528,749.46
United States	10,871,226.92	24,488,630.61	30,418,833.57	74,611,705.98
Japan	-1,604,282.92	-3,596,132.81	-4,457,514.42	-10,765,237.50
Australia	5,488,203.70	12,331,964.76	15,301,807.05	37,239,452.74
Benin	552,795.24	1,245,277.28	1,546,859.74	3,794,588.97
Brazil	271,501.12	627,058.81	787,185.25	2,164,441.22
Burkina Faso	395,030.01	889,807.72	1,104,884.94	2,700,447.02
Chad	-458.14	19,793.35	30,181.72	115,354.06
China	35,681,800.66	78,618,318.83	93,728,761.61	96,213,413.90
Egypt	90,028.19	22,774.35	-7,366.45	-139,906.86
India	-2,883,298.82	-6,374,718.86	-7,854,115.94	-17,589,702.63
Mali	0	0	0	0
Pakistan	-1,794,210.10	-1,497,719.96	-1,292,570.37	53,943,126.88
Taiwan	-1,642,112.40	-3,677,146.25	-4,555,898.60	-10,966,604.01
Turkey	-1,783,751.74	-3,983,187.97	-5,004,044.31	-12,702,482.27
Syria	48,591.73	131,632.50	175,370.66	640,998.51
Uzbekistan	116,514.75	316,026.64	417,988.87	1,458,712.15
Rest of World	10,837,441.37	24,333,218.50	30,183,362.73	73,280,044.42

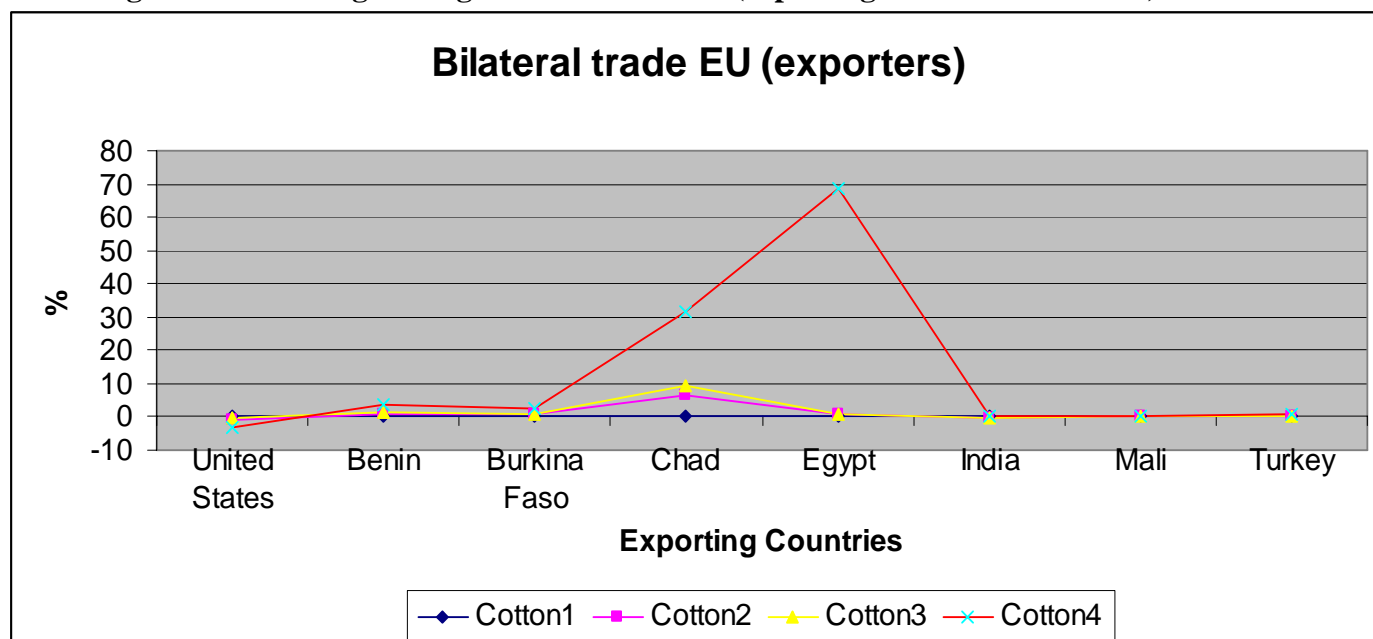
**Source:** ATPSM simulation results

As can be seen from the table above, the EU had a negative total welfare change for all four scenarios. Three of the four West African countries, Benin, Burkina Faso and Chad had a positive welfare change according to the policy changes while Mali remained stagnant (zero change). What can also be noticed is that from the four scenarios, the one providing the results whereby most countries had a positive welfare change is the Cotton4 scenario based on the Swiss formula for the simulation analysis.

It should also be mentioned here that in the case of government revenue, the EU had zero change: A positive change in the case of producer surplus and a negative change in the case of consumer surplus.

**Changes in Bilateral trade among EU and West African Countries:** The European Union is not one of the major players in the cotton trade sector but it has a strong trade relationship with countries like Turkey, Egypt, and the USA. Moreover, it can have a strong influence on the balance of trade for cotton in the West African Countries since Spain, one of the main producing countries in the EU has a strong trade relationship with Benin, Burkina Faso and Chad. On the other hand, Greece is the main producer and exporter of cotton in the EU and has a strong bilateral relationship with Turkey, India and Egypt.

**Figure 3: Percentage change of bilateral trade (exporting countries to the EU)**



Source: ATPSM simulation results

Figure 1 represents the percentage change in bilateral trade for cotton in the European Union. The Cotton4 scenario indicates the higher percentage change for most of the countries. More precisely, Chad, one of the main exporters of cotton for Spain, and Egypt, one of the main exporters for Greece, had the highest impact, with a 31.2% change and 68.7% change, respectively.

All the countries with the exception of India observed an increase in their exports to the European Union while Mali was the only country of the four West African countries that indicated a zero change in the trade balance with the EU. As figure three indicates, there are slight differences among the scenarios for most of the countries. The only scenario with the strongest impacts is Cotton4.

**Table 8.5: Percentage change in bilateral trade**

Scenario	Cotton4		
Report	Percentage change in bilateral trade		
Importers	European Union	Exporters	European Union
United States	-94.90	United States	-3.12
Benin	0	Benin	3.85
Burkina Faso	-100	Burkina Faso	2.60
Chad	-100	Chad	31.32
Egypt	-100	Egypt	68.79
India	-28.58	India	0.43
Mali	0	Mali	0
Turkey	1.00	Turkey	1.08

Source: ATPSM simulation results

In the Cotton4 scenario we have a full reduction of any supporting policy from the European Union (95% reduction of domestic support for cotton). The first two columns depict the importing countries of cotton from the EU and the volume of percentage change. The only country which maintained a positive percentage change is Turkey and this is because imports from the EU, especially Greece, are important for the textile industry in the country. For the West African Countries Benin and Mali remained stable with a zero change in the volume of imports from EU while Burkina Faso and Chad had a 100% reduction in imports from the EU.

The next two columns depict the exporting countries to the EU where it can be noticed that the USA is the only country which is reducing exports for cotton to the EU. The remaining countries examined have indicated a positive percentage change with the exception of Mali which again incurred a zero change. It should also be mentioned at this point that India which as a country in the previous three scenarios was showing a negative percentage change in exports for cotton to the EU now indicates a positive change.

## ***9. Conclusions***

Analysing the impact of agricultural trade distortions is an issue which needs further study. Trade distortions have a lot of parameters that should be taken into consideration for any kind of analysis. The two main policy parameters reflecting distortions in world cotton markets are tariffs and domestic subsidies. Those distortions are not only affecting the global market but also the economies of individual countries. The several round and negotiations of the World Trade Organisation (WTO) have created the need for an extensive and large data set of information concerning prices, elasticities, production, consumption, volumes of imports and exports and welfare information. ATPSM is a model which includes and can also produce all this information. This has proven to be one of the most useful instruments for trade policy analysis. The model is driven primarily by elasticity measures and hence those measures are very important for the model's outcomes. All the trade policy variables are used as a price wedge.

Like all the other models, the two key impact indicators that are generated endogenously from the model are new world market prices, and quantities produced, consumed and traded. All the other indicators like export earning and welfare measure have resulted from the above. Concerning the impact on the world cotton market, the simulation results of ATPSM showed that the Cotton4 scenario (elimination of domestic support) led to a world cotton market price rise of 3.58%. While in Cotton1 the rise was 0.53%, in Cotton2, 1.19% and in Cotton3, 1.47%.

In the levels of production consumption, export and welfare changes in our study we conclude that in contradiction with other studies, countries that are subsidising cotton had a small percentage increase on the production. This is a very interesting conclusion as comparative static analysis has shown that the elimination of subsidies will have as a result a decrease in production, exports and producer surplus. This means that a further study is needed to follow the present one in order to estimate the factors that have lead to this conclusion.



This contradiction results from the structure of the model and also because ATPSM considers the EU as one country. As has been mentioned above the EU is a producer of cotton with a 2% share in the world output. The two main producers are Spain and Greece. However, the EU as a producer is not self sufficient. The balance of trade of cotton for the EU shows that it is a net importer of cotton. This is strongly the simulation results derived the ATPSM simulations.

According to the analysis carried out for the export market, the world market and the import market in section 3.1, it can be concluded that because of the assumptions made from the model, the EU is considered as an importing market. This is due to the following. The reduction of subsidies or even their elimination in the Cotton4 scenario will mislead the function of production in cotton for the EU. If we take the case of Spain and Greece individually we will expect a reduction in production which will eventually lead to reduction of exports and producer welfare. This does not happen in our case. Considering the EU as a net importer means that the reduction of subsidies will result in an increase in production. The EU will be a price taker which in fact is what is happening in the real world. This means that the EU will finally receive a higher price for cotton and thus the producers will be willing to produce more. This can be considered as a limitation of the model which needs to be treated differently in the future.

One more important outcome of this analysis is that for the West African Countries the elimination of subsidies can lead to a better position in the world cotton trade. For the four of them we have positive welfare effects resulting mainly from the increase in exports. The reduction of domestic support from the European Union can produce better terms in trade with those countries.

Another implication that is not treated here is the potential economy wide impacts of lower prices. Given that cotton is an important commodity for some poor countries, notably the four West Africa countries that submitted the WTO complaint, the policy induced depression of world cotton prices has longer term implications for poverty and growth in such countries. As noted by Minot and Daniels (2002), these impacts can be large, even with small long term world price changes.<sup>7</sup>

This study could be continued further with an implication of the model to other commodities such as olive oil that are facing a strong domestic support policy from the EU and which is also one of the most important exporting products in the EU. Moreover, further analysis can be carried out along a country level, again inside the partial equilibrium framework in order to acquire more specific results for the two main producing countries inside the European Union (Greece and Spain).

In conclusion, cotton has been a commodity that has always been heavily subsidised in some developed or developing countries at the cost of non subsidizing countries (West African Countries). In the last few years, the “cotton issue” became the main topic in all trade negotiations and agreements. The need to abandon the heavy subsidisation policy for this commodity has resulted from the strong pressure especially from the non subsidising countries. This paper aimed to offer some further

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<sup>7</sup> FAO commodity and trade policy research working paper. No 8. The impact of domestic and trade policies on the World Cotton Market. Daneswar Poonyth, Alexander Sarris, Ramsesh Sharma and Shangnag Shui, Commodities and Trade Division, April 2004

information about the situation of the cotton world market, explain why domestic support for some commodities have become an issue and discusses what can be the results of eliminating these supporting policies which result in the distortions in trade.

## REFERENCES:

1. **Baffes J., Ajwad M.I.** (1998) “*Detecting Price Links in the World Cotton Market*” policy research working paper WP1944, The World Bank Development Research Group
2. **Baffes J.** (2004) “*Cotton and Developing countries: A case study in Policy Incoherence*”, The World Bank Group, International Trade Department, Trade note 10
3. **Commission of the European Communities** (2004) “*Communication from the commission to the council and the European parliament. Agricultural commodity chains, dependence and poverty-A proposal for an EU action plan*”
4. **Commission of the European Communities** (2004) “*Communication from the commission to the council and the European parliament. Proposal for an EU-Africa partnership in support of cotton sector development*” Brussels, COM(2004) XXX final
5. **O’ Connor L., Ascanio D. P.** (2003) “*Spain Cotton and Products Annual 2003*” USDA, Foreign Agricultural Service GAIN Report
6. **European Commission Directorate-General for Agriculture** (2003), “*CAP reform summary*”, Newsletter, Special Edition, available at [http://ec.europa.eu/comm/agriculture/publi/newsletter/capreform/special\\_en.pdf](http://ec.europa.eu/comm/agriculture/publi/newsletter/capreform/special_en.pdf)
7. **European Commission Directorate-General for Agriculture** (2003) “*The cotton Sector*” available at [http://europa.eu.int/comm/agriculture/markets/cotton/reports/rep\\_en.pdf](http://europa.eu.int/comm/agriculture/markets/cotton/reports/rep_en.pdf)
8. **European Union Directorate-General for Agriculture and Rural Development** (2005) “*Agriculture in the European Union Statistical and Economic Information*” available at [http://europa.eu.int/comm/agriculture/agrista/2004/table\\_en/2004enfinal.pdf](http://europa.eu.int/comm/agriculture/agrista/2004/table_en/2004enfinal.pdf)
9. **FAPRI** (2002) “*The Doha Round of the World Trade Organization: Appraising Further Liberalization of Agricultural Markets*”, Working Paper 02-WP 317, FAPRI
10. **Gillson I., Poulton C., Baliombe K., Page S.** (2004) “*Understanding the impacts of cotton subsidies on developing countries*”, working paper International Economic Development Group
11. **Goreux L.** (2003) “*Prejudice Caused by Industrialized Countries Subsidies to Cotton Sectors in Western and Central Africa*”, available at <http://webdomino1.oecd.org/COMNET/SGE/coherence.nsf>

12. **De Gorter H., Ingco M., and Ignacio L.**, (2004) “*Domestic support economics and policy instruments*”, in Ingco M., and Nash, J. (eds) “Agriculture and the WTO creating a Trading system for development”, World Bank Washington, D.C.
13. **International Cotton Advisory Committee** (2002) “*Cotton: World Statistics*”, Bulletin of the International Cotton Advisory Committee, published by the Secretariat of the International Cotton Advisory Committee
14. **ICAC** (2002) “*Production and Trade Policies Affecting the Cotton Industry*”, International Cotton Advisory Committee, Washington, D.C.
15. **ICAC** (2003) “*Production and Trade Policies Affecting the Cotton Industry*”, International Cotton Advisory Committee, Washington, D.C.
16. **Karagiannis G.** (2004) “*The EU cotton policy regime and the implications of the proposed changes for producer welfare*” FAO commodity and trade policy research working paper April 2004 No 9
17. **Minot N., and Daniels L.**, (2002) “*Impact of global cotton markets on rural poverty in Benin*” Mimeo, International Food and Policy Research institute, Washington D.C.
18. **Murphy A., Sekliziotis S.** (2003) “*Greece Cotton and Products Annual 2003*” USDA, Foreign Agricultural Service GAIN Report
19. **Poonyth D., Sarris A., Sharma R., Shui S.** (2004) “*The impact of domestic and trade policies on the World Cotton Market*”, FAO commodity and trade policy research working paper. No 8. Commodities and Trade Division
20. **Sloman J.**, (2000) “*Economics*” chapter 3, *Government intervention in the market*, p. 77-90, 3.4 *Agriculture and agricultural policy*, 4<sup>th</sup> Edition, Financial Times, Prentice Hall
21. **Stoforos C.** (2003) “*Production consumption and welfare implications of trade liberalisation: The case of Greek agriculture*”, *Agricultural Economics Review*, January 2003, Vol. 4, No 1.
22. **Stout J., Alber D.** (2004) “*ERS/PENN STATE TRADE MODEL Documentation*”, Economic Research Service, US Department of Agriculture, August 2003, updated October 2004
23. **Tokarick S.** (2003) “*Measuring the impact of distortions in Agricultural Trade in Partial and General Equilibrium*” IMF working paper, WP/03/110
24. **van Tongeren F.** (2000) “*Review of agricultural trade models an assessment of models with EU policy relevance*”, Corresponding author F. van Tongeren, paper prepared for the third annual conference of Global Economic Analysis, Melbourne

25. **Vanzetti D., Peters R.** (2003) *“An analysis of the WTO, US and EU proposal on agricultural reform”* Trade Analysis Branch, UNCTAD

**Websites:**

**EUROPA**

- Cotton <http://europa.eu.int/scadplus/leg/en/lvb/l11093.htm>

**Food and Agriculture organization of the United Nations**

- <http://www.fao.org/>

**International Cotton Committee Advisory**

- <http://www.icac.org/>

**United Nations Conference on Trade and Development**

- <http://www.unctad.org/>
- Cotton <http://r0.unctad.org/infocomm/anglais/COTTON/sitemap.htm>