

## U.S. Cotton Subsidies: Are Brazil's Accusations True?

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## *Introduction*

The U.S. cotton subsidies have attracted a lot of debate among foreign producers mainly because cotton is the most traded agricultural commodity in the world market. In 2002, Brazil launched a complaint to World Trade Organization that the U.S. government was subsidizing cotton farming in excess of the set WTO commitment of \$2 billion per year and constituted a violation of the WTO free trade policy (CRS 2007). Brazil claimed that the cotton support program was making it hard for Brazilian cotton growers to compete internationally as they distorted and lowered world cotton prices. The U.S. insisted that the programs were within the WTO exempted incentives to farmers and were not illegal neither were they distorting the world prices (WTO, 2007). Later in 2004 the Dispute Settlement panel of the trade organization ruled in favor of Brazil and not even an appeal could change their resolve. The ruling of the case was based on evaluating and quantifying the U.S. subsidies but little was done to study the impacts. However, Brazil is not the only foreign country that has made U.S. cotton support programs an issue. West African French speaking countries led by Mali have also been claiming that their export earnings from cotton have been seriously impaired by U.S. cotton subsidies.

To determine the validity of arguments by these nations, this paper estimates the effects of the U.S. cotton subsidies on cotton export earnings by Brazil and Mali from 1965 to 2004. This in essence is an attempt to find out whether the subsidies interfere with export from poor countries by flooding the world market and resulting to a reduction of cotton prices in the world market. First the paper determines the impacts of the subsidies on export earnings by the U.S. itself to determine the extent to which the subsidy program boosts U.S. cotton exports.

### *The Cotton Subsidy Debate*

The role of agricultural subsidies in the distortion of world market prices has gained considerable attention in the World Trade Organization's trade negotiations since the failure of the 2003 trade talks in Cancun. Trade creates wealth, but while developed countries have to a large extent, been able to enjoy the benefits of agricultural trade, the same cannot be said for developing countries. Although developing countries may have a comparative advantage in agriculture, trade barriers hinder their ability to reap benefits from trade (Masagazi, 2005). Subsidies are a barrier to trade and a need for action to reduce their disastrous effects has gain substantial support over the past few years.

The U.S. cotton policies, being the second-largest cotton producer and by far the largest exporter, are extremely important in cotton world trade. U.S. cotton subsidies have a long history and compose part of commodity programs introduced in the early 1930s. The cotton support programs are quite enormous in the U.S. In 1997 from the 1996 Farm Bill, U.S. cotton growers received \$878 million. Approximately \$700 million of the money came in the form of decoupled payments. The rest was as insurance subsidy payments. In 1998 government payments were \$1.2 billion (Baffes, 2004). Even though spending for export subsidies was limited to US\$201 million for the 1996–2002 period, it was exceeded by the end of 1998. In 1999 the U.S. Agricultural Appropriations Bill was passed by the Congress providing an additional US\$200 million in 2000 and US\$430 million through 2002 for export subsidies (Gillson, et al.,2004, Blasco, et al, 2006).

As a result of the massive U.S. cotton subsidies and their strong impact on world markets, a number of reactionary steps were taken by other countries. Two of which have significant policy implications. On the policy front, a WTO dispute settlement was

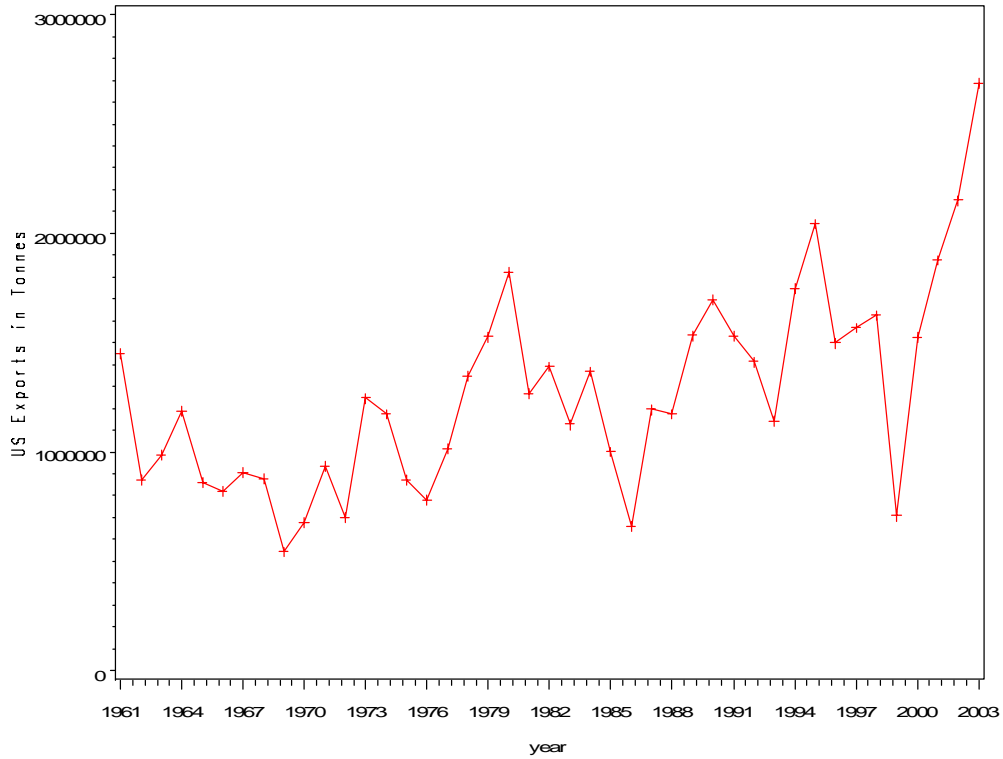
brought by Brazil in 2003, asserting losses to its cotton exports due to subsidies by the United States (WTO, 2002, Blasco, et al, 2006). During this dispute resolution, it was found that the United States actually paid \$ 3.2 billion in annual cotton subsidies and \$1.6 billion in export credits. In March, 2005 the WTO panel concluded that U.S. policies were adversely impacting world trade in cotton, which was so prejudicial for Brazil and other exporters such as West African countries, and, consequently these policies should be eliminated. Accordingly, this case, which constitutes the first formal challenge to the massive agricultural subsidies provided by rich nations to their farmers, ended with the victory to Brazil (WTO, 2004). Finally, U.S. cotton export subsidies are calculated to be US\$3 (Malik, 2005, Blasco, et al, 2006). Despite this reduction in the subsidy ceiling, the discontent with the support programs still persists.

The Food and Agriculture Organization reports that in the year 2000, West African cotton made 50 percent of the total exports and that Western African farmers were three times more cost-efficient than U.S. cotton growers yet they were not getting much benefits from cotton than the American counterparts because of the U.S. subsidy program.

#### *Cotton Trade Trends*

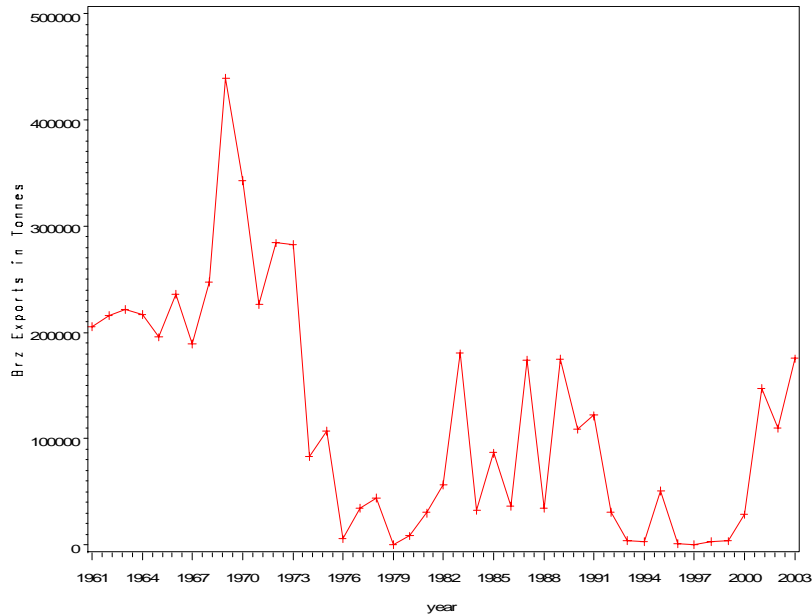
A trend analysis of cotton exports since 1961 show that U.S. Cotton exports have been relatively steady of the period between 1961 and 2004. Cotton exports have slightly increased over the period but there is a sharp increase since the year 2000 perhaps due to recent change in the U.S. farm policy that has put more efforts in cotton export promotion.

**Figure 1: U.S. Cotton Exports trend from 1961-2003 in tons.**



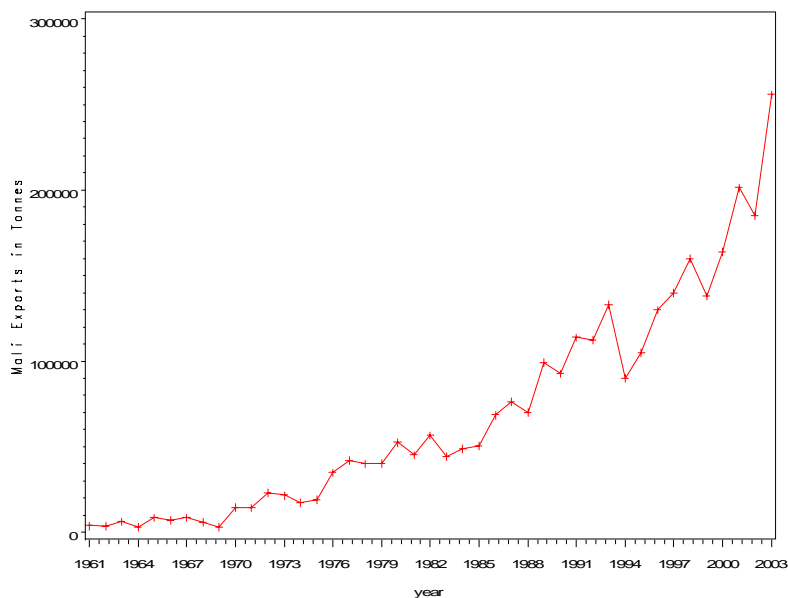
Brazilian Cotton exports trend on the other hand were above 200,000 tonnes and climbed up way over 0.4 million tonnes in 1970 before falling below 200,000 tonnes thereafter. The lowest cotton exports were observed between 1991 and 2000. This also makes a period of major policy changes in Brazil such as allocating more agricultural land to sugar cane production for ethanol.

**Figure 2: Brazil Cotton Exports Trend from 1961-2003 in tonnes**



Mali cotton exports have been small in quantities compared to the U.S. and Brazil have grown steadily over the period. At the beginning, cotton exports were virtually zero by 1994, they had grown to over 100,000 tonnes. In 1998, cotton exports were approximately 150,000 tonnes and almost .3 million tonnes by 2003.

**Figure 3: Mali Cotton Exports Trend from 1961-2003 in tons.**



**Figure 4: U.S. Cotton Loan Rate trend from 1961-2004 as percentage of cotton prices.**



In the late 1960s and early 1970s, the U.S. cotton loan rates were below 50 percent of the market price of cotton. This drastically changed in 1976 after which the loan rate was increased tremendously to above 80 percent in 1982. Although the subsidies fell in the subsequent years, they have remained way above 50 percent as shown in Figure 4.

#### *Data Sources and Methods*

A model expressing excess supply of cotton (exports) as a function of world cotton prices, U.S. programs, cotton harvests, lagged world prices of cotton and cotton producer is formulated to determine the effects of the explanatory variables on exports. It is postulated that U.S. Cotton subsidies distort world market prices for cotton and

therefore negatively impact on exports from Brazil and Mali. This could be captured by a linear relationship model as follows.

$$EXP_{Brz} = \beta_o + \beta_1 * WP + \beta_2 * USprgm + \beta_3 * BrzCtnP + \beta_4 * Brz Pr od + e_{Brz} \dots(1)$$

$$EXP_{Mli} = \beta_o + \beta_1 * MliWP + \beta_2 * USprgm + \beta_3 * MliCtnP + \beta_4 * Mli Pr od + e_{Mli} \dots(2)$$

where  $EXP_{Brz}$  = Brazil's Cotton exports,  $MliWP$  = World price of Brazil's cotton,  $USprgm$  = U.S. cotton farmers loan rate,  $BrzCtnP$  = Brazil's local prices for cotton,  $BrzProd$  = Brazil's cotton production,  $EXP_{Mli}$  = Mali's cotton export,  $MliCtnP$  = Mali's local cotton price,  $MliProd$  = Mali's cotton production,  $MliWP$  = World price of Mali's Cotton,  $\beta_s$  = associated coefficients,  $e_{Brz}$  and  $e_{Mli}$  are disturbances for Brazil and Mali respectively.

To establish whether the U.S. subsidies influence U.S. cotton exports which could in turn flood the world market with cotton resulting in lower prices, we use the following model.

$$EXP_{US} = \beta_o + \beta_1 * USWP + \beta_2 * USprgm + \beta_3 * USCtnP + \beta_4 * US Pr od + e_{US} \dots(3)$$

where  $EXP_{US}$  = US's Cotton exports,  $USWP$  = World price of U.S. cotton,  $USCtnP$  = US's local prices for cotton,  $USProd$  = US's cotton production, and  $e_{US}$  is a disturbance for U.S.

Variables on cotton production, exports, local prices, and acreage 1965 to 2004 for U.S., Brazil and Mali are used to contact our analysis and obtained from FAOSTAT database of the Food and Agriculture Organization of the United Nations



(<http://faostat.fao.org/site/497/default.aspx> ). World prices of cotton from each country are generated using the export values and export quantities.

### Results

Findings of the study are shown below. The data used for the analysis is time series data and this poses autocorrelation changes as indicated by the DW statistic. The R-squared is generally good for all the equations as well. Surprisingly, results show that cotton exports are generally indifferent to world prices of cotton, US subsidies and local prices of cotton. U.S subsidies are not only insignificant on exports not only for Brazil and Mali, but also for the United States itself.

$$EXP_{Brz} = 131240 - 410812USprgm + 40.66183WP - 80.10971BrzCtnP + 0.12442***BrzPr od$$

$$(757110) \quad (725350) \quad (114.0976) \quad (231.63764) \quad (0.02381)$$

$$R^2 = 0.9029 \quad Adj R^2 = 0.8253 \quad DW \text{ Statistic} = 1.376$$

$$EXP_{Mli} = 119186 + 119.4375***MliWP - 118538USprgm + 0.01974MliCtnP + 0.23954***MliPr od$$

$$(119338) \quad (36.8973) \quad (186780) \quad (0.05472) \quad (0.08060)$$

$$R^2 = 0.8435 \quad Adj R^2 = 0.7182 \quad DW \text{ Statistic} = 2.318$$

$$EXP_{US} = 1924913 - 2595.35120***USWP - 4424612*USprgm + 2402.28774***USCtnP + 0.28450***USPr od$$

$$(1580644) \quad (851.9043) \quad (2484584) \quad (846.12154) \quad (0.11601)$$

$$R^2 = 0.7470 \quad Adj R^2 = 0.5446 \quad DW \text{ Statistic} = 2.640$$

Results from the Brazilian equation show that Brazil exports are not affected by US cotton subsidies although they have the expected negative sign. An increment of the

US. Cotton loan rate by one percent results to 410812 tons reduction in cotton exports in Brazil but this is statistically insignificant. The world prices of Brazil cotton surprisingly has no effect on cotton exports neither does the local prices of cotton. World prices of Brazilian cotton has a positive sign as expected but it is insignificant implying that cotton exports are not responsive of world prices. Local price of cotton in Brazil negatively impacts on cotton exports. An increase of local prices of cotton by one unit results to a reduction of cotton exports by 80 tons. However this is again insignificant.

Cotton production as expected is significantly affects Brazil cotton exports. If production increases by one ton, cotton exports increase by 0.12 tons. This finding implies that cotton exports are insensitive to prices and US subsidies and depend much on production as farmers fail to show flexibility in cotton production.

Results from Mali equation indicate that the world price of Mali cotton and cotton production significantly determine cotton exports. An increase of world prices of Mali cotton of one dollar per ton leads to 119.4 tons increment in cotton exports. On the other hand if cotton production increase by one ton, there is a 0.24 increase in exports. However, the US subsidy program despite having the expected negative sign does not significantly affect exports. The local price of cotton variable has positive sign against research expectation but it is insignificant.

The performance of the US Export equation was poor. The R-square was relatively low for time series data. Results of the model show that like the other two countries, production significantly impacts on cotton exports. Increasing production by one metric ton results to 0.28 tons increase in US cotton exports. The local cotton prices like in Mali positively impacts on cotton exports against our expectations.

Like in the other two countries, US cotton subsidies have not effect on cotton exports. However the US cotton subsidies/loan rate has an unexpected negative sign. The world price of US cotton as well is found to have a ridiculous negative relation with cotton exports.

In general despite the poor performance of the US Export equation and data limitations, it is quite clear that the US cotton farm policies have not effect on its exports of cotton and those of Brazil and Mali. Any such claim may only be supported by the amount of support offered to farmers based on whether it exceeds the WTO limits but not econometric methods.

### *Conclusions*

The US cotton farm support programs especially subsidies to cotton growers has drawn a lot of debate and resistance from other cotton producing countries especially developing countries. These countries consistently argue that the subsidies are offer US cotton growers an unfair advantage over cotton growers in poor countries that can not afford such support programs. Mali and Brazil are some the countries that have always disputed these subsidies and this saw WTO ruling against U.S. in favor of Brazil in 2004.

This paper establishes that these arguments are not necessarily true using a simple linear model that determines the effect of the U.S. cotton loans on cotton exports of Mali, Brazil and the U.S. It is shown that the most significant factor that affects exports from all these countries and perhaps most of countries is production and world prices for poorer countries like Mali. This implies that the compensation judgment rendered by WTO in favor of Brazil was unwarranted.

Data availability limited the ability of this study to address all the important issues that possibly affect cotton exports such as foreign exchange, other major producers of cotton such as China, Egypt, and Turkey. Opportunities for future research include studying the relationships and linkages between cotton exporting countries.

## References

- Baffes, J. 2004. "Cotton: Marketing Setting, Policies, Issues, and Facts." In Aksoy and Beghin eds. 2004.
- CRS (Catholic Relief Services) 2007. Brazil's WTO Case against U.S. cotton program. Available in <http://cnie.org/NLE/CRSreports/07Oct/RL32571.pdf>
- FAO (Food and Agriculture Organization) Statistical Data Base. Available in <http://faostat.fao.org/site/395/default.aspx>
- FAO (Food and Agriculture Organization) 2005. "Cotton subsidies in rich countries mean lower prices worldwide" Available in [http://www.fao.org/newsroom/en/focus/2005/89746/article\\_89759en.html](http://www.fao.org/newsroom/en/focus/2005/89746/article_89759en.html)
- Gillson et al 2004. "Understanding the Impact of Cotton Subsidies on Developing Countries". Working Paper, May 2004
- Masagazi, Sophia (2005) Elimination of cotton subsidies at the WTO: Justice not charity for least developed countries. LL.M. dissertation, Queen's University at Kingston (Canada), Canada. Retrieved January 10, 2008, from ProQuest Digital Dissertations database. (Publication No. AAT MR13205).
- Turner, Pamela Rae (1992) An economic analysis of United States cotton exports. Ph.D. dissertation, University of Maryland College Park, United States -- Maryland. Retrieved January 10, 2008, from ProQuest Digital Dissertations database. (Publication No. AAT 9234673).
- World Trade Organization, 2002. Request for Consultations by Brazil, WT/DS267/1, September 27, 2002.
- World Trade Organization, 2004. United States – Subsidies on Upland Cotton (WT/DS267/R).Geneva .

World Trade Organization. 2007. Meeting shows need for result in cotton talks and more coherence on aid. 15-16 March 2007