Cotton in a Free Trade World

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Introduction

The United States has issued a proposal to the world trading community outlining several steps to jumpstart the stalled World Trade Organization (WTO) negotiations on agriculture. The proposal is intended as a challenge to members of the WTO to improve market access through "ambitious tariff reduction" and to "move aggressively" to cut trade-distorting domestic support (Portman, 2005). Although the major parameters of the proposal are yet to be defined, these steps seem consistent with commitments made by WTO participating countries to move agricultural trade negotiations forward in the framework agreement of July 2004.

Cotton has been at the center of much of the controversy surrounding the inability of the WTO membership to reach consensus regarding significant agricultural trade reform. In 2003, four African countries (Benin, Burkina Faso, Chad, and Mali) presented as their negotiating position for the upcoming Cancun Ministerial conference, a "sectoral initiative on cotton" also referred to as the Cotton Initiative (OECD). This proposal called for the elimination of cotton subsidies worldwide in order to "…ensure the survival and development of the cotton sector of West and Central Africa (WCA), where cotton accounts for up to 80 percent of export earnings" (Bridges, 2003). Additionally, they requested compensation to be paid to West African cotton producers for economic losses caused by these subsidies (estimated at US$250million per year over four years) (OECD). Support for this proposal solidified among other developing countries (referred to as the Group of 21 or G-21) with a leading role played by the nation of Brazil, which had filed its own grievance against U.S. cotton programs in 2002[1]. Refusal on the part of developed countries to meet the demands of the G-21 resulted in a collapse of the Cancun meetings.

In an effort to get negotiations on track once again, the U.S. agreed to a deal with the four African nations to make discussions on cotton an integral part of the agricultural negotiations and to address the issue "ambitiously, expeditiously, and specifically" (*Bridges Weekly*, 4 August 2004 and *WTO News*, 19 November 2004). This language, included in the July 2004 agreement, reaffirms a reduction in all trade distorting policies to ensure an open market, an elimination of all forms of export subsidies to increase export competition, and a major overhaul of domestic policies in all countries. Thus, an important component of the framework agreement serves as recognition of the concerns expressed by the four African countries in their Cotton Initiative: the nexus between trade and development and the vulnerability of least developed countries to downturns in international prices of cotton.

U.S. cotton subsidies have been the focus of attention for many researchers since they were first contested by Brazil in 2002 (ICAC, 2002; Sumner, 2003; Goreux, 2004; Pan et al., 2004). However, cotton production is also subsidized in other countries. In the EU, Greece and Spain produce 2.5% of the world's cotton yet they receive 18.5% of the world's cotton subsidies (Townsend, 2003). As shown in Table 1, subsidies to EU cotton growers are approximately $1 per pound of lint compared to 20 cents per pound in the U.S. In China, the world's largest cotton

[1] The WTO ruled, in a decision upheld by the Dispute Settlement Body, against U.S. farm policy in favor of Brazil that the U.S. cotton program and the U.S. export credit program contribute to depress prices in the world cotton market.

producer, the estimate of per pound assistance for cotton growers is 8 cents per pound. Other per pound subsidies offered to cotton producers include Mexico at 16 cents, Egypt at 14 cents, and 6 cents in Turkey.

In addition to the trade distorting effect of domestic support offered to producers, many importing countries use high tariffs to restrict imports. China for example, uses a two-tier tariff structure on cotton imports (known as a tariff rate quota, TRQ). Currently, the out-of-quota tariff for cotton to China is 40 percent for any imports above 890,000 metric tons (about 4 million bales). Import tariffs on cotton to India are 10% and tariffs are 9.7% for cotton imports to Mexico (ICAC, 2005). Table 1 presents the cotton import tariff rates and domestic subsidies of the world's major importers and exporters of cotton.

The purpose of this study was to analyze how the U.S. and the world cotton sector would be impacted by the complete elimination of both domestic support mechanisms and market access restrictions in the world cotton market. To answer this question, a partial equilibrium econometric model of the world fiber market, developed by the Cotton Economics Research Institute (CERI) at Texas Tech University, was used. The analysis considered a scenario under which all distortions directly affecting cotton supply and demand (price supports, input subsidies, and border measures such as import tariffs and TRQs) are eliminated for all major market participants.

Methods and Procedures

The world fiber model of the CERI was used to estimate the effects of domestic and trade distortions in the world cotton market. This model includes 24 countries and regions, including all major cotton exporters and importers. Some of the unique characteristics of the model include the incorporation of a regional supply response for cotton (accounting for production area heterogeneity) within some countries, substitutability between cotton and competing fibers, and linkage between raw fiber and the textile manufacturing sector.

For a representative country, the model includes supply, demand, ending stocks, and market equilibrium conditions for both cotton and man-made fibers. The cotton A-index, domestic cotton price, cotton textile price index, non-cotton textile price index, farm price, and polyester price are endogenously solved by respectively equalizing world exports and imports. A two-step procedure is used for estimating fiber demand that connects textile output to fiber inputs. The first step involves the estimation of total domestic textile production from which is derived the demand for all fibers. In the second step, total domestic textile production (total fiber demand) is allocated among the various fibers. Thus, demand for each fiber type (cotton, man-made, and wool) can be estimated according to its utilization in the textile production process. It is important to note that total fiber mill use is a residual of textile fiber consumption and textile fiber net trade.

Cotton production is modeled using separate acreage and yield equations. Cotton production is a function of the previous year's cotton net returns and the relative net returns of competing crops. Man-made fiber production is modeled using estimations of capacity and utilization. The capacity and utilization equations depend on the man-made fiber price and petroleum spot price.

Imports and exports are functions of domestic price, international price (A-index), exchange rates, tariff rates, and quota restrictions[2].

Data used in the study were compiled from various sources. The historic and predicted macroeconomic variables (real GDP, exchange rate, population, and GDP deflator) were from the Food and Agricultural Policy Research Institute (FAPRI). Cotton production, consumption, ending stocks, imports, and export data are from Production, Supply & Distribution (PSD) statistics of the U.S. Department of Agriculture Foreign Agriculture Service. Fiber mill consumption and man-made fiber data are from the Food and Agriculture Organization of the United Nations (FAO) World Fiber Consumption Survey (before 1994) and Fiber Organon (after 1994).

Policy Shock and Assumptions

The approach used was to develop a five year baseline (2006/07-2010/11) assuming continuation of current domestic and border protection policies (given in Table 1). Then domestic subsidies and border protections were removed beginning in 2005/06. The world cotton market without subsidy and border protection was then allowed to react to the resulting price signals over a five year period. The effects were measured by comparing the world cotton price of the baseline to the world cotton price after elimination of the trade distorting policies. Additionally, the effects of these policies on cotton production, consumption, and trade for the world's major users and producers of cotton were derived by comparing baseline projections to their respective quantities without subsidies and border protection.

Simulation Results

Results are reported as average annual changes over the outlook period (2006/07–2010/11) in terms of deviations from baseline estimates. Table 2 gives the principal global results regarding prices and trade for the full trade liberalization scenario for each year of the outlook period. The average annual change is reported in the last column of the table.

Under full trade liberalization (removal of all distortions), the cotton price (A-index) increased by an average of 10.79%, which corresponds to an average 7.68 cents per pound over the baseline. World cotton net trade increased by an average 1.73 million bales (about 4%) following the removal of all trade distortions. Thus, a free trade environment for the cotton market resulted in a higher world price and increased the quantity traded. These results are more conservative than those of other studies: FAPRI (2002) finds larger impacts for both price (+15.71%) and net exports (+5.44%) for the time period of 2003/04-2007/08 and Hertel (2005) estimates a price of effect of +25%. The variation in results may be explained by differences in data base years used to estimate equation parameters, projected baseline time periods, as well as differences in the way the trade policies of various nations are modeled in each respective study.

[2] For a complete description of the World Fiber Model, including a list of countries included, see Pan, Mohanty, Ethridge, and Fadiga (2004).

United States

In the United States, this scenario modeled the elimination of the cotton loan program, counter cyclical payments, direct payments, and Step 2 payments. Impacts of this policy change were partially offset by increased access to the world's cotton markets through the removal of import tariffs and domestic supports. Baseline estimates of the U.S. domestic price and production and usage of cotton are reported in Table 3. The baseline domestic cotton price ranged from about 56 cents in 2006/07 to 61 cents in 2010/11. With free trade, the domestic U.S. price was roughly 7 cents higher than the baseline each year. In the final year of analysis, the U.S. domestic price reached 68 cents, 4 cents below the current target price.

In a free trade environment, U.S. cotton producers responded to prices below those possible with present program benefits, but steadily approaching current target prices. This decrease in cotton price received by U.S. farmers tempered U.S. cotton production by a yearly average of about 700,000 bales (-3.72%). Mill use, already in decline under baseline estimates, was projected to decline by an additional 2.7% per year. Additionally, Step 2 program benefits provided a price subsidy for the users and exporters of U.S. cotton making U.S. cotton more competitive in world markets. The elimination of Step 2 caused some decline in exports as well. Lower production, declining mill use, and the loss of Step 2 payments combined to cause exports to decline by 8% (approximately 1 million bales) in the first year following the policy changes, with an average decline of about 5% (600,000 bales) over the scenario horizon. Therefore, in the projected free trade environment (estimated average percentage changes in parentheses):

- The domestic U.S. cotton price went up (+12%);
- U.S. cotton production declined (-3.72%); and
- The quantity of cotton exported from the U.S. decreased (-5%).

In terms of the average market value of exports, U.S. cotton in the world market totaled $4.3 billion under the baseline. With free trade, the value of U.S. cotton exports increased to $4.6 billion. Even though increases in the U.S. domestic price remained below current target prices, percentage increases in domestic prices in excess of percentage decreases in cotton exports served to mitigate the welfare changes for the U.S.

China

The removal of all trade distortions was projected to have a significant impact on China's cotton trade and the world as well (Table 4). Under the baseline, China's cotton imports continued to grow in spite of triggering the out-of-quota tariff rate (a 40% tariff) while most Chinese cotton producers receive some form of subsidy. If China removed the TRQ and ceased subsidizing its farmers, cotton imports would be only affected by the world price. Even though the A-index is projected to rise in a free trade environment, the removal of tariff barriers is estimated to lower average prices for China's cotton importers. They increased their purchases by more than 10% in the first year of free trade and averaged a 9.33% increase for the entire simulation period. This means that imports to China, already the world's largest importer of cotton, increased by 1.3 million bales per year, or approximately 75% of the total increase in cotton traded around the world. Over a five year period, cotton imports to China increased by almost 7 million bales.

Others
The projected decline in cotton exports from the U.S. and expansion of the world trade of cotton resulted in an increase in market share for U.S. competitors. Under the scenario presented here (see Table 5), the increase in world price resulted in increased average exports from Brazil (+9.90%), Australia (+6.53%), Uzbekistan (+3.78%), and Western Africa (+3.57%).

Other cotton net importers, those with relatively low or no import duties (Japan, South Korea, and Taiwan) decreased their imports of cotton slightly as a result of higher world prices. Importing countries whose domestic cotton industries have higher levels of border protection and/or domestic support (the E.U., India, Pakistan, Mexico, and Turkey) increased their imports of cotton in a free trade environment. The results of this study are significantly different from FAPRI (2002) in which cotton imports by China, India, and Turkey decreased. Again, basic model assumptions and differing base data years may explain the preponderance of variation in findings.

Although the import tariff rates of the major cotton exporters in the baseline were higher than major importers, the effects were relatively small due to the low elasticities of cotton imports in these countries.

Conclusions

Trade flows in the world cotton market would be significantly affected if all domestic and trade protection policies were removed under the conditions used in this study. The world cotton price (A-index) would rise by about 11% relative to the baseline. Significant export expansion would occur in countries that are the main competitors of the United States in the world cotton market: Australia, Brazil, West Africa, and Uzbekistan. U.S. cotton exports would decrease, but the welfare effects of this reduction would be moderated by an increase in the domestic and world cotton price.

Textile industries in low-duty countries (Japan, South Korea, and Taiwan) would be worse off as the world cotton price increased and they lowered their imports. However, the textile industries in relatively highly protected net importing countries (e.g., EU, China, India, Mexico, and Turkey) would benefit as a result of removing both domestic cotton subsidies and market restrictions.

An important caveat is that precise magnitudes of shifts in markets under changes as substantial as those analyzed in this study must be viewed with caution. Model parameters used here, as well as all others, must be derived from historical data, and the conditions of complete free trade without domestic market distortions have never existed. The information presented is, however, the most reliable possible under current circumstances.

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Table 1. Cotton Import Tariff Rates and Subsidies for the Major Importers and Exporters of Cotton

Countries	Import Tariff Rate		Government Assistance to Cotton Producers	
	Year	%	Year	$/lb
Argentina	2003	7.5	2004/05	0
Australia	2001	0	2004/05	0
Brazil	2003	9.2	2003/04	0.01
Canada	2002	0	2004/05	0
China	2003	TRQs	2004/05	0.08
Egypt	2003	5	2004/05	0.14
EU	2002	0	2004/05	0.97 (Greece)
India	2003	10	2003/04	0.03
Japan	2003	0	2004/05	0
South Korea	2002	1	2004/05	0
Mexico	2002	9.7	2004/05	0.16
Pakistan	2002	5	2004/05	0
Russia	2002	0	2004/05	0
Taiwan	2002	0	2004/05	0
Turkey	1999	0	2004/05	0.06
United States	2003	14	2004/05	0.20
Uzbekistan	2003	10	2004/05	0

Source: UNCTAD (2003) and ICAC (2005).

Table 2. Effects of Trade Liberalization on World Cotton Prices and Trade

	2006/07	2007/08	2008/09	2009/10	2010/11	Average
			Cents Per Pound			
A-Index						
Baseline	63.91	65.08	65.74	66.35	67.06	65.63
Change	6.94	7.13	7.10	7.10	7.15	7.68
% change	10.85%	10.96%	10.80%	10.70%	10.66%	10.79%
			Million Bales			
Total Trade						
Baseline	39.33	40.89	42.51	43.78	45.39	42.38
Change	1.52	1.86	1.74	1.76	1.76	1.73
% change	3.86%	4.55%	4.10%	4.03%	3.89%	4.09%

Table 3. Effects of Trade Liberalization on the U.S. Cotton Market

	2006/07	2007/08	2008/09	2009/10	2010/11	Average
			Cents Per Pound			
Domestic Price						
Baseline	56.29	58.10	59.11	59.18	61.43	58.82
Change	6.85	7.23	7.02	6.57	6.75	6.88
% change	12.17%	12.45%	11.87%	11.10%	10.99%	11.71%
			Thousand Bales			
Production						
Baseline	18641.73	18998.65	18962.57	18863.60	18714.52	18836.21
Change	-1086.98	-677.69	-584.91	-576.78	-570.35	-699.34
% change	-5.83%	-3.57%	-3.08%	-3.06%	-3.05%	-3.72%
Mill Use						
Baseline	6094.10	5697.63	5339.69	5318.86	5151.42	5520.34
Change	-409.20	-207.64	-107.29	-28.46	-17.05	-153.93
% change	-6.71%	-3.64%	-2.12%	-0.58%	-0.46%	-2.70%
Exports						
Baseline	13547.15	13456.27	13676.27	13500.38	13847.45	13605.50
Change	-1084.03	-557.72	-563.77	-554.97	-563.39	-664.78
% change	-8.00%	-4.14%	-4.12%	-4.11%	-4.07%	-4.89%
Ending Stocks						
Baseline	6411.88	6305.58	6302.33	6396.37	6164.01	6316.03
Change	-259.03	-171.36	-85.21	-78.55	-68.46	-132.52
% change	-4.02%	-2.72%	-1.35%	-1.23%	-1.11%	-2.09%

Table 4. Effects of Trade Liberalization on World Cotton Imports, Selected Countries

	2006/07	2007/08	2008/09	2009/10	2010/11	Average
			(Thousand Bales)			
China						
Baseline	14468.59	14663.22	14705.78	14807.20	15046.38	14738.23
Change	1464.13	1472.25	1304.32	1312.56	1317.67	1374.19
% chg	10.12%	10.04%	8.87%	8.86%	8.76%	9.33%
European Union						
Baseline	2722.61	2683.08	2573.03	2449.53	2349.25	2555.50
Change	124.02	120.90	110.88	92.32	85.13	106.65
% chg	4.56%	4.51%	4.31%	3.77%	3.62%	4.15%
India						
Baseline	766.21	886.81	931.61	1120.67	1125.50	966.16
Change	50.49	45.17	43.39	50.77	54.16	48.80
% chg	6.19%	5.40%	5.10%	4.99%	4.73%	5.28%
Pakistan						
Baseline	1486.91	1559.46	1595.56	1653.88	1782.13	1615.59
Change	74.14	68.18	53.46	39.28	34.46	53.90
%chg	5.07%	4.84%	3.95%	2.97%	2.55%	3.88%
Japan						
Baseline	642.30	604.35	575.90	554.71	534.10	582.27
Change	-18.63	-15.03	-12.77	-10.53	-8.20	-13.03
% chg	-2.55%	-2.34%	-2.29%	-2.24%	-2.13%	-2.31%
Mexico						
Baseline	1612.95	1575.20	1510.55	1471.09	1401.35	1514.23
Change	18.36	20.30	18.98	15.53	12.22	17.08
% chg	1.24%	1.22%	1.02%	0.79%	0.57%	0.97%
South Korea						
Baseline	1217.21	1203.66	1175.53	1112.32	1074.42	1156.63
Change	-18.39	-15.28	-12.47	-10.33	-8.83	-13.06
% chg	-1.71%	-1.49%	-1.28%	-1.15%	-1.03%	-1.33%
Taiwan						
Baseline	1032.32	1009.21	991.24	975.48	962.66	994.18
Change	-93.03	-43.03	-26.96	-21.54	-18.35	-40.58
% chg	-10.96%	-5.59%	-3.87%	-3.45%	-3.25%	-5.42%
Turkey						
Baseline	3669.37	4020.91	4403.22	4508.17	4720.03	4264.34
Change	248.65	231.52	224.55	220.88	219.09	228.94
% chg	6.78%	5.76%	5.10%	4.90%	4.64%	5.43%

Table 5. Effects of Trade Liberalization on World Cotton Exports, Selected Countries

	2006/07	2007/08	2008/09	2009/10	2010/11	Average
			(Thousand Bales)			
Australia						
Baseline	3131.05	3329.70	3447.04	3537.48	3626.01	3414.26
Change	276.26	242.95	201.23	199.42	183.15	220.60
% chg	8.82%	7.30%	5.84%	5.64%	5.05%	6.53%
Brazil						
Baseline	2778.10	3437.49	4060.16	4651.10	5285.88	4042.55
Change	311.50	371.98	377.17	430.21	471.68	392.51
% chg	11.21%	10.82%	9.29%	9.25%	8.92%	9.90%
Western Africa						
Baseline	3308.43	3226.93	3188.49	3173.21	3158.23	3211.06
Change	133.44	126.93	123.43	101.38	89.15	114.87
% chg	4.03%	3.93%	3.87%	3.19%	2.82%	3.57%
Uzbekistan						
Baseline	3971.37	3929.56	3901.61	3933.79	3978.48	3942.96
Change	190.10	156.45	133.33	132.01	132.89	148.96
% Chg	4.79%	3.98%	3.42%	3.36%	3.34%	3.78%