Textile Trade Liberalization and its Welfare Implications for US Cotton Producers

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Abstract: This study analyses the impact on the US cotton industry of removal of the Multi-Fibre Arrangement (MFA) using a multimarket displacement equilibrium model. The model captures the basic linkages of textile products and cotton markets in the USA and in non-US markets. Different textile trade policy reforms are simulated. Results suggest that removal of textile trade restrictions in the OECD countries induces a decrease and structural change in the total demand for US cotton towards a larger dependency on the world market. The decrease in total demand for US cotton has negative welfare effects on the US cotton industry. However, the welfare loss depends on how non-US cotton exporters respond to changes in OECD trade policy. The largest estimated loss is about $200 million. Ignoring agricultural linkages of the textile industry in the analysis of textile trade liberalization would induce an upward bias in estimated welfare gains for the US economy. The results suggest the likely formation of a coalition of US cotton-textile-apparel producers to generate political pressure for more trade protection.

Introduction

International trade in textiles and apparel is comprehensively regulated and managed under the Multi-Fibre Arrangement (MFA). The MFA provides the framework for the negotiation of bilateral agreements between importing and exporting countries to control textile and apparel trade among its signatories. The USA currently has bilateral restraint agreements with 43 countries and regions, covering 80 percent of textile and apparel imports from developing countries. In the EC, the MFA regulations cover about 77 percent of total EC textile and apparel imports from 27 countries.

The MFA has been under scrutiny because it conflicts with the basic principles of the GATT; i.e., the use of quotas and country-based discrimination. The MFA also brings about substantial welfare losses because of its trade distortions. The welfare implications of removing the MFA have been extensively analysed in the literature (Jenkins, 1980; Hufbauer *et al.*, 1986; Cline, 1987; and Trela and Whalley, 1990). These studies have shown that substantial welfare gains for both exporting and importing countries would be induced by the removal of MFA. Most of these studies, however, centre their analysis on manufacturing sectors, and little attention has been paid to the impact on derived demand industries, especially the cotton industry, of removal of the MFA.

The objective of this paper is to analyse the impact of removing textile and apparel trade barriers in the USA and other OECD countries on US raw cotton producers, for both domestic and export markets. US cotton is one of the basic raw materials for US textiles; it is also exported and enters textile production abroad. Since both US and non-US textile and apparel production would be considerably affected by a removal of the MFA, the US cotton sector is likely to be deeply influenced by such trade policy changes. Cotton is one of US agriculture's largest field crops, and the USA is the world's largest cotton producer and exporter.

Textile and Apparel Industries and the MFA

Derived demand relationships link the cotton, textile, and apparel markets. Two basic fibre types—cotton and manufactured fibre—comprise the raw materials for the textile industry. Textile manufacturing involves several intermediate stages and products. These products, which are heavily traded domestically and internationally, are used to produce three types of end-goods: apparel, home furnishings, and industrial products. The demand for fibres such as cotton is a derived demand for two end-use goods (home furnishings and industrial products) and for a semi-finished good, fabrics, which enters into apparel production. All these commodities are traded internationally.

The original objectives of the MFA were to allow developing countries to increase their shares of the world market for textiles and apparel and to encourage developed countries to abandon production of non-competitive textile products. In practice, the MFA has evolved into an import-restraining device for developed countries, which use a battery of quantitative and tariff restrictions to protect their domestic textile and apparel producers.

The Uruguay Round of the GATT negotiations has been exerting pressure for removal of the MFA, since it contradicts the GATT principles (Goto, 1989). Developed countries will have to make major concessions on the MFA if they expect trade liberalization in agriculture and services of developing countries. Several schemes have been considered for textile and apparel trade liberalization: tariffication of quotas, phasing out of quotas, total removal of the MFA, etc. The major scenario considered in this paper—total removal of OECD trade barriers—is a benchmark case. The qualitative implications of this scenario remain valid for less radical reforms.

Model

The analysis relies on a multi-market model comprising cotton, textile, fabric, and apparel markets in different country groups. Following Muth (1964), the model solves for the comparative statics of shocks in exogenous policy variables; i.e., the tariffs and quotas on textile, fabric, and apparel imports in the USA and other OECD countries. The endogenous variables are the equilibrium price and quantity in the markets mentioned above. The welfare changes for US cotton producers are approximated by producer surplus and revenue changes.

OECD countries are divided into the USA and other OECD countries. Developing countries are categorized by destination of their exports (USA, other OECD, and non-OECD) and by the structure of their cotton derived demand (users of US cotton, users of US and non-US cotton, and users of non-US cotton). To avoid double-counting problems, four-digit SIC classification was used to define the goods. Textile goods are defined as household and industrial end-use of textiles; fabrics are the semi-finished textile products entering apparel production.

In the USA, textile and fabric production use US cotton exclusively, whereas in other OECD and some developing economies, US cotton competes with non-US cotton. In all OECD countries, apparel production uses both domestic and imported fabric. Similarly, in final consumption of OECD countries, textile and apparel commodities compete with developing countries' substitutes. Market equilibrium conditions close the model. Import tariffs on textiles, fabric, and apparel enter as wedges in identities linking the price paid for these goods in the USA and other OECD countries and the price received by the non-OECD producers of these goods. All producer prices are endogenous and respond to input price changes. Import quotas are explicitly modelled as exogenous quantity constraints entering market equilibrium conditions for imported textile, fabric, and apparel goods in the USA and other OECD countries.

Additional simplifying assumptions are made for tractability of the model. All textile fabric and apparel production exhibits constant returns to scale and nonjointness in technology, and all producers are price takers. These assumptions are convenient to trace output effects on cotton derived demand and cotton price effects on textile and fabric prices. In addition, US, other OECD, and non-OECD goods are assumed to be imperfect substitutes.

The removal of quotas and tariffs in OECD countries has a direct negative impact on their textile, fabric, and apparel production. These in turn induce a decrease in domestic demand for US cotton. Conversely, non-OECD textile, fabric, and apparel producers expand their output because of export expansion. This production expansion outside the OECD countries stimulates both US and non-US cotton exports. Hence, there is a structural change in the composition of US cotton demand (a decrease in domestic use along with an expansion of exports). There are also secondary substitution effects between US and non-US cotton because

of changes in their relative price. The net impact of these three effects (lower domestic use, increased export, relative price change) is ambiguous analytically.

The full model includes 54 equations and identities describing cotton, textile, fabric, and apparel production and trade for 29 countries (the USA, other OECD, and 22 developing economies). The equations are log-differentiated and show changes in endogenous variables caused by policy shocks.

Data

Although conceptually simple, the model requires a larger number of cost and market share parameters and elasticity estimates. The existing empirical literature is used to define ranges of values for most price elasticity estimates that will serve as bound for sensitivity analysis (Duffy *et al.*, 1987 and 1990; Anson and Simpson, 1988; Cline, 1987; and Wohlgenant, 1986). The estimates are adjusted for consistency with the underlying structure of the model. The detailed procedures for this step are explained in Shui (1990). Output elasticities of cotton demand are derived assuming constant returns to scale and non-jointness in textile, fabric, and apparel production. Most share parameters come from USDA data and Anson and Simpson (1988). Shares are average values for 1982–87, excluding 1985 because of its unusual cotton trade flows.

Policy Simulations

Results are reported for five policy scenarios. The first two consider the removal of all quotas and tariffs in all OECD countries for short-run cotton supply response and long-run supply response for both US and other cotton growers. The third policy scenario looks at the same policy reform assuming a non-US cotton expansion of 10 percent (supply shift of 10 percent). This third simulation is motivated by the steady expansion of non-US cotton production in the last decade. The last two cases analyse the implications of tightening MFA quotas (decrease of import quotas of 5 percent in all OECD countries). These last scenarios differ in their assumptions on cotton supply price response: short-run and long-run. These two pessimistic cases reflect the attempt by US textile producers and the politicians to pass the textile trade bill. The results for the five simulations are presented in Table 1. The table shows changes in US cotton price, total demand, export demand for other OECD countries, non-US textile exporters to OECD countries, and other non-US textile producers. Table 1 also gives changes in revenue and producer surplus for US cotton production.

Strong tendencies emerge from these simulations. The policy reform effects on US total cotton demand and price are small, but a considerable structural change in the composition of cotton demand would occur with trade liberalization. US cotton growers would be much more exposed to world competitive forces because US domestic use of cotton would decrease and export demand would represent the lion's share of total demand. In the long run (assuming more elastic cotton supply responses or non-US cotton supply expansion), total demand for US cotton would decline, with a maximum welfare loss of around $110 million. However, in the short run, textile trade liberalization would increase US cotton growers' surplus because of a large substitution effect in the non-OECD demand for cotton. Because non-US cotton supply is inelastic in the short run, the output effect induced by the expansion of non-US textile production creates a strong increase in the non-US cotton price. This, in turn, induces a substitution effect against non-US cotton towards increased use of US cotton. Conversely, a tightening of MFA quotas would be beneficial to US cotton production, although such restrictions decrease non-US use of US cotton because of the smaller quotas and through substitution effects driven by higher US cotton prices.

Sensitivity analysis suggests that these results are extremely robust. Most results are driven by share parameter values and output effects in textile, fabric, and apparel production.

The cost and trade share parameters are available and are not as arguable as the choice of elasticity estimates. Hence, the sensitivity analysis centres on price elasticity estimates. The production effects on derived demands for US and non-US cotton systematically dominate price (substitution) effects, although the latter are significant. For the 10-percent supply shift scenario, the maximum welfare loss estimated for US cotton producers is around $200 million.

Table 1—Changes in US Cotton Price, Demand, Revenue, and Producer Surplus

Variable	Policy				
	Removing All Trade Restrictions		Removing All Trade Restrictions with non-US Expansion of 10 Percent	USA Tightens Quota Restrictions (Quotas Decrease by 5 Percent)	
	Short-Run	Long-Run*	Supply Shock	Short-Run	Long-Run*
Price (percent)	1.660	−0.989	−3.684	1.198	0.730
Demand					
Total demand	0.581	−0.633	−1.289	0.420	0.467
US mill	−26.953	−24.631	−22.243	0.729	1.152
Total exports	28.559	23.752	21.003	−1.588	−2.112
Other OECD	−7.780	−12.686	−16.010	−0.627	−0.834
Textile exporters	45.133	42.752	42.610	−3.955	−4.098
Other importers	4.452	2.225	1.386	−0.255	−0.287
Revenue					
Percent	2.241	−1.622	−4.973	1.618	1.197
Value (million 1982 $)	66.672	−48.256	−147.950	48.137	35.612
Producer Surplus					
Percent	1.665	−0.986	−3.660	1.201	0.732
Value (million 1982 $)	49.535	−29.334	−108.889	35.731	21.778

*Long-run cotton supply price elasticity is 0.64 for the USA and 2.36 for other cotton producers. Short-run supply price elasticity is 0.35 for the USA and 0.38 for other cotton producers.

The results imply the existence of an upward bias in estimated welfare gains such as in Cline (1987), when the backward linkages of US textile and fabric production are not incorporated into the analysis. Nevertheless, this bias is small compared to the expected consumer welfare gains from textile and apparel trade liberalization.

Another implication concerns the political economy of the MFA. The results show that US cotton farmers would lose from trade liberalization (lower producer surplus in the long run and greater exposure to world market forces). They are likely to join a grand coalition of US textile-apparel and cotton producers to put pressure on policy makers for more trade distortions. The costs of adjustment associated with the change in the composition of US cotton demand is likely to be significant while US growers work their way through new export channels. These expected adjustment costs associated with trade liberalization, and not accounted for in this paper, may reinforce the aversion of cotton producers to less distorted textile trade.

Conclusions

In this paper, an attempt was made to analyse the implications for the US cotton market of liberalization of the textile and apparel trade. A multi-market equilibrium displacement model was used to trace the impact of exogenous changes in the import tariffs and quotas in OECD countries on the derived demand for cotton in the USA and in the rest of the world. The major impacts were the increase in export demand for US cotton and the long-run decrease in producer surplus due to a sharp decrease in textile and apparel production in OECD countries. The efforts of US cotton, textile, and apparel producers are likely to converge in putting pressure on the political body for more protection.

Notes

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[2] A companion paper that describes the model more fully is available from the authors.

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