



# ERS *Report Summary*

Economic Research Service

September 2009

U.S. Department of Agriculture



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## U.S. Cotton Prices and the World Cotton Market Forecasting and Structural Change

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In 1929, Congress passed legislation forbidding the U.S. Department of Agriculture from publishing cotton price forecasts. That ban was removed in the Food, Conservation, and Energy Act of 2008. Recent changes in world cotton markets required that a model to forecast cotton prices be developed. This report develops a reduced-form specification for a U.S. cotton price forecasting model based on expected changes in U.S. and global supply and demand factors.

### What Is the Issue?

Although cotton price forecasts were not published by USDA between 1929 and 2008, USDA's Interagency Commodity Estimates Committee for cotton calculated unpublished price forecasts each month. USDA's models have tended to overestimate cotton prices in recent years, however, because of rapid ongoing structural changes in the cotton industry. Other agencies making cotton price forecasts have encountered similar problems. Given the poor predictive capability of existing cotton price forecasting models and the renewed authority of USDA to publish cotton price forecasts, it is important to review and improve the existing models. An updated and improved cotton price forecasting model will more accurately account for the factors now determining U.S. upland cotton prices and illuminate the interaction of commodity markets with U.S. and global supply and demand, macro-economic developments, and policy shifts.

### What Did the Study Find?

Structural change has altered the market for U.S. cotton since the 1990s. Shifts in textile trade policy, combined with significant liberalization of China's cotton production policies, have overturned long-standing global consumption and trade patterns. The result has been to shift the United States into a nearly unprecedented dependence on global markets. While about 60 percent of U.S. cotton was consumed domestically for the last 60 years of the 20th century, exports have significantly surpassed the use of cotton within the United States since 2001/02. As a result, U.S. cotton prices are no longer determined solely by domestic supplies and stocks.

To reflect these recent structural changes, the model draws on a number of variables to forecast changes in the U.S. cotton price: U.S. cotton supply, U.S. stocks-to-use ratio (S/U), China's net imports as a share of world consumption, the proportion of U.S. cotton in the loan program, and the world supply of cotton. The model explains 68 percent of the variation in the U.S. upland cotton price from 1974/75 through 2006/07. The results suggest that a 1-percent increase in U.S. supply from the previous year will cause U.S. cotton prices to drop about 0.9 percent, in real terms. Changes in foreign supply affect U.S. prices on a nearly one-to-one basis: prices fall as foreign supply rises.

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U.S. commodity policy helps support U.S. cotton prices: a 1-percent increase in the end-of-season stocks covered by the loan program (with stocks measured as a proportion of U.S. cotton use) raises prices by 0.4 percent. Import demand by China continues to play an important role in determining prices: a 1-million-bale increase in China's net imports raises prices by 3.1 percent. Given China's recent imports, this is equivalent to a 1-percent increase in China's cotton imports as a share of world consumption.

## **How Was the Study Conducted?**

A review of the theoretical framework for commodity price forecasting revealed that forecasting price as a function of a stocks-to-use ratio and demand shifters, which is the standard methodology, is sufficient only when changes in supply are very small or when changes in stocks-to-use are much greater than changes in supply. Since these conditions were not satisfied in the cotton markets because of the rapid growth in supply due to the spread of genetically modified varieties and other technologies, changes in supply were included in a proposed model. Several demand shifters were also included. China's net trade as a proportion of world consumption was included to account for changes in export demand associated with China's commodity and trade policies. The impacts of U.S. farm policy were accounted for by including a variable representing the amount of cotton in the marketing loan program as a share of domestic consumption and by adjusting the dependent variable to reflect the impact of the User Marketing Certificate (Step 2) program.

The Quandt-Likelihood Ratio test indicated significant structural change in the 1999/2000 marketing year. This structural break was likely caused by a combination of factors, including the increased export orientation of the U.S. cotton industry following the U.S. textile industry's contraction as the Multifiber Arrangement was phased out. Thus, the proposed model was modified to include the foreign supply of cotton to reflect the increased export orientation and to correct for the observed structural change. The final model was subjected to extensive out-of-sample testing to ensure its appropriateness for forecasting.