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STRUCTURAL CHANGES AFFECTING THE WORLD COTTON MARKET

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Abstract

Recognizing structural changes in the world cotton market is important to improving supply and demand forecasts. Analysis of changes in U.S. prices developments from 1996/97 through 2003/04 indicates that rising world production and market shocks have both depressed and destabilized prices. In addition, the increasing dominance of China and uncertainties affecting China's net imports have contributed to instability.

Introduction

Structural changes in the cotton market are permanent changes in the way that supply and demand factors relate to one another, and they are often difficult to recognize except in hindsight. Major changes affecting cotton production, consumption, and trade occur frequently, but analysts are often uncertain as to which changes are the result of temporary phenomena—such as weather or demand cycles--and which are likely to extend into the future. This, in turn, complicates the job of making forecasts—will the market revert to some historical mean, or will the changes we are witnessing persist? This paper will examine recent changes in U.S. prices and price patterns and relate them to underlying causes in an effort to identify structural changes.

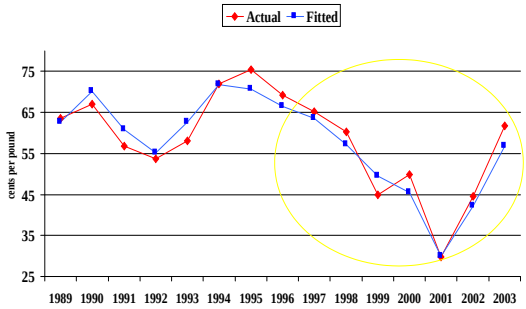
A review of the U.S. marketing year average price (MYP) in recent years reveals several developments which might be indicators of structural change. The first development is that prices are lower: during the 8-year period 1998/89 through 1995/96, the MYP averaged 63 cents per pound; but in the most recent 8-year period, from 1996/97 to 2003/04, the MYP averaged 10 cents lower at 53 cents per pound. The second development is that prices have fluctuated more from year to year—the average annual change in the MYP for 1998/99-1995/96 was 11.3 percent whereas during the subsequent 8 years, the average annual change was 23.3 percent. Finally, prices are more volatile intra-seasonally, as measured by the daily changes in New York futures prices relative to a short-term moving average.

Market shocks, such as weather conditions and world financial and political crises, have depressed prices and increased price instability in recent years; at the same time, there is evidence of structural change that will affect the short- and medium-term outlook, especially rising foreign production and China's dominance of the world market.

The Trend to Lower MYP's in the 1996/97-2003/04 Period

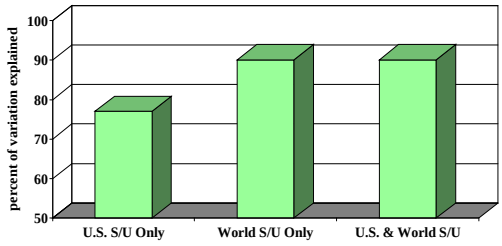
The U.S. MYP is a weighted average of the price received by producers for all qualities marketed; it is collected and reported by USDA's National Agricultural Statistics Service. It is also the price used to determine the level of counter-cyclical payments made under the cotton farm program. A simple ordinary least squares regression analysis explains nearly 90 percent of the variation in the U.S. MYP during the period 1989/90 through 2003/04. The variables used in the regression are the current and lagged world-minus-China stocks-to-use ratio, calculated by taking world stocks outside China and dividing them by the sum of consumption outside China and China's net imports (see ICAC, 2004). The stocks-to-use ratio is derived this way in order to exclude the distortion that would be introduced by including China's very large stocks during the mid-1990's, when those stocks were essentially isolated from the world market due to government policies.

**U.S. Marketing Year Prices –
Actual and Fitted Based on the World-minus-China S/U**



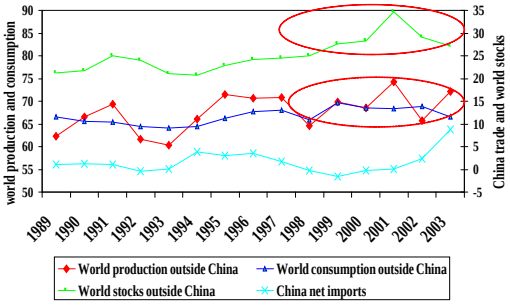
It is interesting to note that the price equation performs best using the world-minus-China stocks-to-use ratio and did not improve when a U.S. stocks-to-use variable was introduced. The conventional wisdom is that the U.S. market has become increasingly globalized in recent years as domestic mill use has declined and the U.S. share of world exports has increased. However, the fact that the price equation performed fairly well beginning in 1989/90 throughout the 1990's suggests that a very strong link between U.S. prices and world supply-demand indicators pre-dated the sharp rise in U.S. export levels that began in 2001/02.

**Variables Explaining Upland Farm Price Variation
Using Linear Regression
1989-2003**



Since the regression explains most of the variation in the U.S. MYP, the 10-cent decline during the 1996/97-2003/04 from the preceding 8-year period can be analyzed by disaggregating the components of the world-minus-China stocks-to-use variable, which are mainly world production, consumption, and stocks (outside China), as well as China's net imports. Both production and consumption outside China rose in the 1996-2003 period from the previous 8 years, but where the production and consumption components were nearly balanced during 1988-1995, production exceeded consumption by an average of 1.7 million bales per year during 1996-2003. The production rise was only partially offset by an increase in China's average annual net imports.

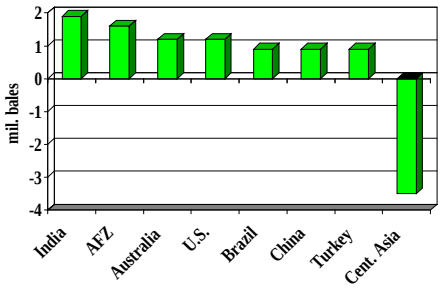
Variables in Price Formula, 1989 – 2003
(mil. bales)



Rising World Production since 1996/97

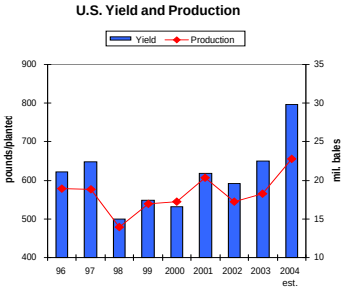
World production averaged approximately 5 million bales higher during the 1996-2003 period compared with the preceding 8 years. The most notable increases occurred in the major cotton producers of India, the African Franc Zone, Australia, the United States, Brazil, China, and Turkey. Central Asia's production declined from the early 1990's due to the break-up of the Soviet Union and its adverse effect on raw cotton demand.

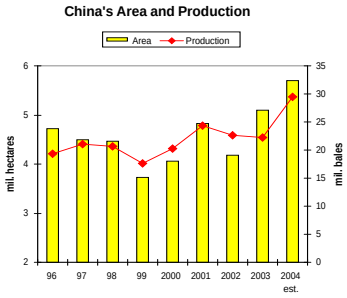
Major Changes in World Production,
1996/97-2003/04 from preceding 8 years



In areas where production has increased, the steadiest rising trend is in Brazil, and more moderate growth is evident in the African Franc Zone and Turkey. China and the U.S., the world's largest producers, increased production on average about 1.0 million bales each in the 1996-2003 period, but reflect more erratic production patterns. China's relatively predictable yields have risen over time; dramatic changes in China's production are due mainly to changes in planted area, which has become more sensitive to prices in the post-1999 reform era. Area has been relatively more stable in the U.S., but yields less so, introducing greater uncertainty into production because of weather influences.

China Production Changes a Function of Area;
U.S. Production Changes a Function of Yield





Australia increased its production an average of 1.2 million bales in 1996-2003, despite a severe drought which began with the 2002 crop. Production there is likely to return to pre-2002 levels once drought conditions are fully alleviated. India had the largest increase of any country—1.9 million bales on average—in 1996-2003 from the preceding 8 years. This increase is mainly associated with a 10-percent increase in area; however, yields there have shown sharp increases in 2003/04 and 2004/05. While weather conditions have been excellent, it is also possible that improvements in varieties and cultivation practices are raising India's yields, which have heretofore been among the lowest in the world.

This analysis suggests that world production is likely to continue to rise and may exert pressure on world prices in the short- and medium-run. The most likely sources of higher production include the continuation of Brazil's expansion, higher yields due to cultivation improvements in India (and possibly also in Pakistan), and the return to normal irrigation capacity in Australia. Partially offsetting this effect is the heightened price sensitivity of Chinese producers in the post-reform era. China's consumption will exceed production for the near-term under almost any projection scenario; in years of world surplus, China's producers are likely to curtail production, thereby raising import demand.

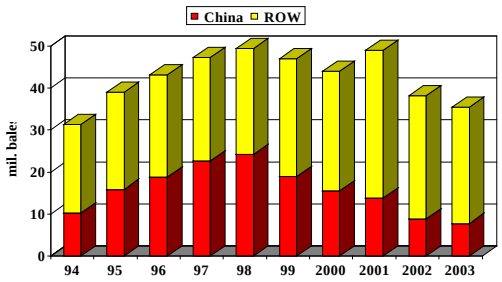
Year-to-Year Changes in the MYP for the 1996/97-2003/04 Period

During the 8 years beginning 1988/89, the annual change in the U.S. MYP was 11.3 percent, more than doubling to 23.3 percent from 1996/97-2003/04. Shocks to the market in the late 1990's, rather than permanent structural changes, account for much of the increase in year-to-year variation. These shocks include: (1) the Asian financial crisis that began in 1997; (2) Chinese policy changes and disposal of surplus stocks; and (3) the co-occurrence in 2001/02 of record world yields and a recession, in which retail demand fell sharply in response to the terrorist attacks on the U.S. of September 2001.

China's Policy Changes and Surplus Disposal

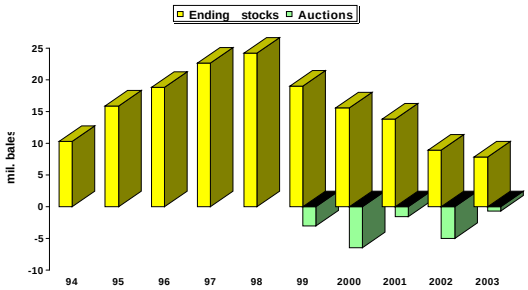
As explained above, China's net cotton trade is an important variable in determining U.S. and world prices. During the mid-1990's, China accumulated surplus stocks as a result of setting internal procurement prices above world market-clearing levels. The government of China permitted some mills to continue importing cotton; thus, import levels rose along with stocks, supporting world prices. China's imports averaged about 3.5 million bales per year for the 1994/95 through 1996/97 seasons, triple the level of the early 1990's, and then fell to half that level in 1997/98. By the end of 1998/99, world ending stocks rose to 49.4 million bales, which to date are the largest on record, and China held 24.2 million bales, nearly half the world total.

China and World Ending Stocks
1994/95 through 2003/04



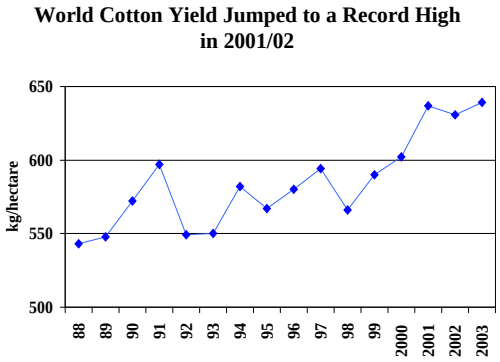
This policy was reversed in September 1999, when China's government rationalized China's policy by allowing procurement prices to float and disposing of surplus cotton stocks—the government of China auctioned more than 16 million bales of stocks between October 1999 and July 2003. Thus, China changed from a policy which indirectly supported world prices in the early 1990's by withholding production and stocks from the market, to one which put pressure on world prices via the disposal of stocks previously accumulated.

China's Stocks and Auctions
1994/95 through 2003/04



The Unusual Events of 2001/02

The 2001/02 growing season marked the first time in 17 years that yields rose simultaneously in the U.S., China, Central Asia, India, the African Franc Zone, and Australia, which collectively account for more than 70 percent of world production. This was a highly unusual circumstance, since typically problems in one region offset favorable conditions somewhere else. U.S. cotton area was virtually the same as in 2000/01, but production rose 17 percent as a result of near-record yields.



While the U.S. economy showed signs of weakening in early to mid-2001, the terrorist attacks of September 2001 pushed the U.S. into a full-blown recession, and precipitated a crisis of confidence in world textile demand. At the retail level, U.S. consumers annually consume over 20 percent of the world's cotton and, in the aftermath of the attacks, there was serious doubt about how much the U.S. would consume and to what extent the crisis would extend to other countries. The nearby December futures contract reached a low of 28.92 cents on October 30, 2001, the point at which qualms about consumption prospects coincided with evidence that large crops would be produced in most northern hemisphere countries; the MYP average for the season was 29.8 cents, the lowest in almost 30 years.

The Asian Financial Crisis

The Asian Financial Crisis was striking not only for the suddenness of its onset, but for its brevity. While Brazil and Russia subsequently suffered exchange rate shocks that are discernable today, Asian GDP rebounded swiftly in virtually every case. Developing Asia's household textile consumption (apparent end-use, ICAC) grew 4.2 percent annually during the 1990's, but dropped to a 0.9 percent growth rate in 1998. By 2000 growth was back to almost 9 percent. The crisis necessitated financial sector restructuring through Asia, and fiber use grew 3.9 million tons in the five years after 1998, compared with 2.9 million tons during the 5 years preceding.

However, on the production side, the emerging markets lending crisis associated with the Asian Financial Crisis shook Brazil loose from its strong, fixed real in January 1999. Brazil's devaluation helped pave the way for expansion in the center-west. (See MacDonald, 2004).

Exchange Rates

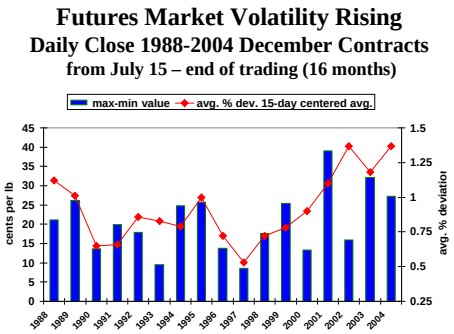
Since cotton is traded internationally in dollars, changes in the dollar's exchange rate should have an inverse impact on cotton price levels. The IMF's trade-weighted exchange rate rose beginning in 1995, reaching a peak in 2001, and likely had a dampening effect on cotton prices in the late 1990's. Since then, the dollar's exchange rate has come nearly full circle, declining to it lowest level since 1996. However, introducing an exchange rate variable into the MYP price equation resulted in only a marginal improvement; thus, the relationship of prices to exchange rates is a topic for further study.

Rising Intra-Seasonal Price Volatility

Fund Participation in the Futures Market

Most participants in the New York cotton futures market are aware that daily prices have become more volatile in recent years. The average percentage deviation of daily closing prices from a short-term 15-day centered moving average was calculated for the December futures contract for the years 1988/89 through 2004/05. This index has trended up, increasing 5 percent in 1996-2003 from 1988-1995; for the most recent 5-years from 2000-2004, the index average 28 percent higher than it had averaged from 1988-1995. In addition, volatility appears to be higher even in years, such as 2002/03 and 2004/05, when the December contract showed relatively less difference between

its minimum and maximum values.



There is research which suggests that increased volume by institutional investors, especially managed funds, which control much larger positions that the individual speculators of the past, are at least partly responsible for the larger short-term price fluctuations. The behavior of the large funds is characterized by ease of movement from one market to another, reliance on technical rather than fundamental factors in making buy and sell decisions and, as a result, moving as a herd because they tend to follow the same signals in deciding whether to be long or short. However, the funds also have an incentive to voluntarily limit their share of the market, since they need the flexibility to exit their positions when the market moves against them without either making or taking delivery. Most observers have concluded that fund participation may cause the market to overreact to supply or demand shocks, but that over a longer period the arbitrage mechanisms between the physical and futures markets will bring markets back into line with fundamentals. The fairly close fit between the U.S. MYP, for which New York futures are the main vehicle of price discovery, and fundamental world supply/demand factors, suggests that this is indeed the case. (See UNCTAD analysis, 1996).

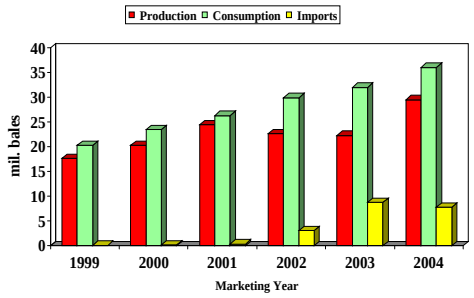
China's Growing Dominance Raises Uncertainty

China has become the dominant force in the world cotton market—and for the 2003 and 2004 marketing years is the world's largest cotton producer, consumer, and importer. It is likely that China's expanding role is contributing to price volatility due to three factors: (1) problems in the reporting and estimation of China's cotton supply and demand; (2) continued lack of policy transparency; and (3) the role of large entities in buy and sell transactions.

It is axiomatic in economics that reliable and accessible information is an essential attribute of market efficiency; however, the United States is one of the few countries in the world that gathers and reports data on all of the components of the supply-demand balance sheet, i.e., production, trade, consumption, and stocks. For most countries, some data are available, and the missing pieces have to be estimated using the best available sources. The government of China provides official estimates of production, usually three times during the course of the marketing year. Import and export data are available from Chinese customs. However, consumption data for raw cotton has to be estimated using the government's statistics on total yarn production, which is not broken down between cotton and manmade fibers. The government also does not provide stock surveys, so stock levels in China continue to be the object of speculation by the world cotton industry.

We have seen that China's net trade in raw cotton is a key determinant of world and U.S. prices. In recent years, China's net imports have been the residual needed to maintain mimimal stock levels after depleting domestic supplies. Thus, the volume of imports is highly dependent on demand-minus-supply; due to the order of magnitude, small errors estimating production or consumption can result in large errors in the import forecast. Further complicating the task of forecasting imports is the recent very rapid rise in China's consumption. Absent hard information, the market is vulnerable to shocks from Chinese purchases, such as the price run-up that occurred in October 2003.

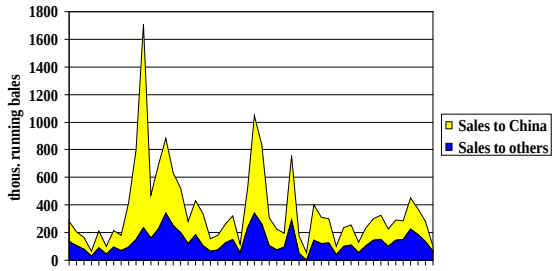
China's Imports Relative to Production & Consumption



While China's 1999 reforms reduced to role of the government in the merchandising of cotton between farm and mill, the government maintains a policy of "macro-control" and reserves the right to intervene in the market through such policies as limiting imports, buying up reserves, or subsidizing the production of one crop over another. The government can make ad hoc decisions at any time to use one or more of these policy tools without advertising them publicly; as a result, the potential for government intervention contributes to market uncertainty.

Linked to the lack of transparency of Chinese government policies is the continued operation of large trading entities in China, whose market power sometimes derives from official or quasi-official status, or merely from being designated as a vehicle for implementing a particular macro-control policy. The concentration of import purchases by the state trading entity Chinatex and by large Chinese mills, such as Weiqiao, also increases the potential for shocks to the market. This potential is illustrated by the history of Chinese import purchases from its major supplier, the U.S., during the 2003/04 marketing year, when China's total imports reached a record level of 8.8 million bales. Large purchases by Chinese buyers caused U.S. weekly sales levels to fluctuate markedly.

Weekly U.S. Net Export Sales
Aug. 14, 2003 to July 22, 2004



Conclusions

U.S. prices that are lower and more volatile since 1996/97 result from both structural changes and market shocks. While market shocks, especially the record yields which coincided with demand uncertainty in 2001/02, are partially responsible for recent price fluctuations, there is evidence to suggest that growth in world production has also pressured prices. A strong upward trend in Brazil's production, recovery from drought in Australia, and the potential for higher yields in India continue to be important factors boosting world supplies.

The most important recent structural changes in the world cotton market emanate from China following the reforms of September 1999. China's hoarding of stocks supported world prices in the mid-1990's; conversely, disposal of those stocks was a key factor depressing prices following the institution of the reforms. China's cotton consumption has grown nearly 70 percent over the past five years due to textile industry investment and the relaxation of textile trade restrictions; at the same time, China's production has become more price responsive due to the elimination of

the procurement price system. Because China's production cannot keep pace with consumption, net imports have increased sharply and are a key driver of world cotton prices. However, imports by China are difficult to estimate due to: (1) lack of transparency of the government's macro-control policies; and (2) incomplete information regarding China's raw cotton production, consumption and stock levels. In addition, the concentration of purchasing in the hands of a few large Chinese entities contributes to world and U.S. price uncertainty.

The volatility of daily New York futures prices for a given marketing year has also increased sharply since 2000/01, due partly to the increased volume by institutional investors. Uncertainties about China, especially China's import demand, have also played a role.

References

MacDonald, Stephen, "Trends in World Fiber Consumption," in Cotton and Wool Outlook, CWS-04g, Economic Research Service, USDA, August 2004.

Rutten, Lamon and the UNCTAD Secretariat, "New Types of Non-Trade-Related Participation in Commodity Futures Markets," May 1996.

Skelly, Carol and MacDonald, Stephen, "Issues in the Global Cotton Market: a U.S. Perspective," China International Cotton Conference, October 2003.

Townsend, Terry, "ICAC Price Forecasts," in Cotton: Review of the World Situation, International Cotton Advisory Committee, September-October 2004.