

COTTON PRICE DETERMINANTS: A SUMMARY

Colin Mues

Australian Bureau of
Agricultural and Resource Economics
CanberraIntroduction

The Australian Bureau of Agricultural and Resource Economics is one of the few organisations that publish cotton price forecasts to assist growers in making their planting decisions. The US Department of Agriculture, for example, is forbidden by legislation from publishing cotton price forecasts for fear of influencing actual market outcomes. Consequently, the Bureau has a responsibility to ensure that its forecasts are as sound and as accurate as possible, given the data available to it at the time. Thus, the objective of recent research has been to improve the subjective forecasting process that was previously used by the Bureau through the development of an economic model of the world cotton market. Using this model, structural characteristics of the market have been studied and the effects of US farm policy have been analysed.

Methodology

The design of the model needed to reflect the principal elements of the world cotton market, including government policy variables. The model deals specifically with: the United States, Australia and the rest of the world with respect to production;

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the United States, Western Europe and the rest of the world with respect to mill use; and world closing stocks. China and the USSR were treated separately from the rest of the world group after preliminary results showed that production and mill use in these countries did not respond to the world price. Rather, it seems likely that production targets and mill use levels in these countries are decided on independently of world market conditions.

Summary of Model Results

Results indicated that area planted and mill use are largely determined twelve months in advance. Producers rely heavily on current price to evaluate expected returns for the crop that they are about to plant. Thus the quantity harvested often reflects prices prevailing in the previous year. Similarly, cotton mills take orders for yarn up to twelve months in advance. In order to secure raw cotton to fulfil these contracts, forward buying is common. Due to these lagged price effects, when production and consumption differ in a particular season, most of the adjustment between the two is reflected in stock changes. This causes the stocks market to be the focus of price formation in the world cotton market. Consequently, a good indicator of the forthcoming season's average cotton prices is the ratio of estimated closing stocks to mill use. The long run average of the stocks to use ratio of 41 per cent has usually been associated with a world price of around US73c/lb. A 1 per cent increase in the stocks to use ratio is estimated to correspond with a US1.4c/lb decrease in world price.

The three producing groups studied exhibited widely different characteristics (see table 1). The rest of the world group proved to be relatively unresponsive to the prices of cotton and alternative crops; that is, even when prices rise these countries show little increase in production, and vice versa. This may be due to governments in these countries supporting or artificially depressing producer prices and hence insulating their producers from world market forces.

The results from the United States acreage response equation indicated that US plantings were more responsive than the rest of the world group to the prices of cotton and soybeans (an alternative crop) in the short run. In the long run US plantings are relatively unresponsive to price. Australian plantings were found to be the most responsive to the prices of both cotton and

Table 1: SENSITIVITY OF AREA PLANTED AND MILL USE TO PRICE CHANGES

Item	10 per cent increase in cotton price		10 per cent increase in price of alternative crop	
	Short run	Long run	Short run	Long run
	%	%	%	%
Area planted change				
- United States	4.8	6.4	-4.5	-6.1
- Australia	5.9	24.6	-5.6	-23.5
- rest of the world (a)	0.6	2.5	-0.5	-1.9
Mill use change				
- United States	-3.4	-9.7		
- Western Europe	-2.6	-5.4		
- rest of the world (a)	-1.0	-1.9		

(a) Excluding China and the USSR.

an alternative crop, wheat, especially in the long run. The high level of responsiveness in Australia is probably attributable to the lack of any government protection from world market conditions and the existence of a wide range of viable production alternatives.

The non-responsiveness of Chinese and Soviet production and mill use to world price also has implications for the world cotton market. If the world cotton market is experiencing oversupply, for example, then prices would fall in order to induce a reduction in production. However, if production in China and the USSR does not respond to the price fall, the burden of adjustment falls onto those countries who do respond to price, such as Australia and the United States.

The results for the price responsiveness of mill use in the other three regions studied were also very interesting. The initial response to a 10 per cent increase in the price of cotton was a fall in mill use of 3, 3 and 1 per cent respectively in the United States, Western Europe and the rest of the world (see table 1). Since mills cannot change their fibre usage instantly and without cost, the full response would take several years. The long run fall in mill use in response to the price rise is estimated to be 10, 5 and 2 per cent respectively. Mill use in all of the country groups, with the exception of the United States in the long run, can be considered to be moderately unresponsive to price. This is because the cost of raw cotton only represents a small proportion of the total cost of the finished textile good. Hence, an increase in the

price of cotton can be expected to result in a proportionately lower increase in the price of the finished item to the consumer. The slightly higher responsiveness in the United States could be due to intense price competition from synthetic fibres in that country.

Mill use in the United States and Western Europe was found to be unresponsive to changes in world income growth. Rather, the increase in demand resulting from world income growth would be met by imports instead of increased mill use within these country groups. As expected, mill use in the rest of the world group, a net exporter of cotton textiles, was found to respond to world income growth. Another related result was that mill use in the United States and Western Europe was found to be gradually declining as textile investment is being increasingly directed to lower labour cost nations such as Hong Kong, Korea, China and the ASEAN countries.

US farm policy

There have been two main features of US farm programs for cotton over the years. The first is the provision of price and income support. Growers who enroll in the cotton program and abide by all provisions are virtually guaranteed a minimum price through the system of loan rates and target prices. The second is periods of acreage reduction programs for program participants. Under this provision, growers must restrict plantings to a certain percentage of their base acreage, determined by historical plantings, so as to be eligible for program payments.

These two features were incorporated into the US planting response equation. As expected, the provision of a guaranteed price leads to higher US plantings, since it removes much of the price risk faced by US growers, and the acreage reduction requirement was found to be effective in reducing area planted. Because the US farm program can influence US plantings and thus production, it also has an effect on world prices.

World market implications of US cotton policy

Using the model, the effects of changes in US farm policy were simulated. The 1985-86 season was chosen as a benchmark. In that year, the target price was US81c/lb and the acreage reduction requirement was 30 per cent. The effect of changing these policy variables was analysed. When the guaranteed price was reduced by 10 per cent, the simulated market moved to a new equilibrium position where the world price was 1 per cent higher. Australian growers' revenue was 2 per cent higher as a result of the higher price and there was a slight increase in production in response to the improved returns. When the acreage reduction requirement was halved to 15 per cent, the results indicated that the world price was 11 per cent lower in the long run and Australian growers' revenue was 16 per cent lower.

The effects of removing the US farm program were also simulated by setting the guaranteed price and the acreage reduction requirement to zero. In the long run, the world price and Australian growers' revenue fell by 11 and 15 per cent respectively. The implication of this result is that the US farm

program provisions in 1985-86 actually led to a higher world price than would otherwise have prevailed. The acreage reduction program reduced acreage by more than the provision of price and income support increased it.

The conclusion from this result is that if price or income support, or both, are accompanied by effective supply constraints, then the detrimental effect of subsidised production on the world market would be reduced. However, this situation has not always prevailed in the past. In 1985-86, the target price offered and the acreage reduction requirement, with the exception of the 1983 payment in kind program, were the highest in the history of the US farm program. Hence, 1985-86 was an isolated case and the situation has changed dramatically. In 1988-89 for example, there is only a 12.5 per cent acreage reduction requirement but the target price is still high at US75.9c/lb. Although the 1985-86 farm program may have buoyed world prices, the effect of the current farm program may in fact be quite different, although final market outcomes will have to be observed before this can be stringently tested.

Conclusions and Applications

This research has supported expectations that the level of and changes in stocks are the key to price formation in the world cotton market. In addition, by developing the model, Bureau forecasters now have quantitative estimates of the level of responsiveness of producing and consuming groups to price. Enhancement of the Bureau's subjective forecasting process with

these research results will lead to the publication of sound and timely forecasts by the Bureau. Forecasts are published in each issue of the Quarterly Review of the Rural Economy and can be used by growers as part of their planting and marketing decision making process to maximise the profitability of their operations.

In addition, the results of this research should contribute to the efforts made by representatives of the Australian industry to minimise the price depressing effects of the US cotton program. If countries such as Australia emphasise the importance of the relative setting of the two policy variables, the presence of subsidised US cotton on the world market may be reduced.

Publications

Mues, C. and Simmons, P. (1988), The effects of US farm policy on Australian cotton revenues. ABARE paper presented at the 32nd Annual Conference of the Australian Agricultural Economics Society, Melbourne, 9-11 February.

Mues, C. and Simmons, P. (1988), 'Determinants of cotton prices', Quarterly Review of the Rural Economy (forthcoming).