STATE-LEVEL ECONOMIC IMPACTS OF THE NEW COTTON PROGRAM IN MISSISSIPPI

John R. C. Robinson, Extension Economist
Barry J. Barnett, Assistant Professor
Department of Agricultural Economics, MSU
Mississippi State, MS

Abstract

The paper analyzes the statewide impact of the provisions of the Agricultural Reconciliation Act on Mississippi, with a focus on the State's cotton industry. Because of the nature of the new provisions, economic analysis of the new provisions depends critically on the assumptions about cropping pattern and future market prices.

Introduction

New Farm Bill Provisions

The coincidence of farm bill reauthorization and the balanced budget effort in 1995 has given rise to major changes in the structure and future of farm programs. These changes are embodied in the Agricultural Reconciliation Act (ARA) of 1995.

While the ARA retained the current structure of loan rates and marketing loans, the target price/deficiency payment program was replaced with "Freedom-to-Farm" style transition contract payments. This provision establishes an annual spending pool which shrinks from $5.5 billion in 1996 to about $4.0 billion in 2002, of which cotton would receive 12% annually. By dividing cotton's share of the annual allocation across expected cotton contracted acreage, the ARA provisions specify payment rates to cotton (in cents per pound) of 7.93, 7.53, 8.06, 7.74, 7.09, 5.71, and 5.50 between 1996 and 2002, respectively.

The ARA provisions allow planting any program crop on contracted crop acres (i.e., former crop base). Further, 15 percent of past base acreage is designated as "noncontract acreage" and may be planted to fruits and vegetables or be hayed and grazed without restriction.

Thus, the biggest differences between the 1990 Food Security Act and the ARA provisions are (1) how direct payment rates are calculated, and (2) relative planting flexibility. Under the new ARA provisions, participating growers would receive their fixed schedule of payments, regardless of prices or crops planted. This means that growers could plant practically anything, basing their decisions on expected market returns.

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Economic Variables

The ARA provisions concerning payment rate calculation and planting flexibility account for much of the potential economic impacts in changing from current law. The statewide effect of ARA is measured by the change in gross farm income. Gross farm income is measured by the sum of the value of crops produced and the level of farm program payments. The key variables considered in this study are:

- ♦ change in value of crop production
- ♦ change in direct payments
- ♦ expected crop prices and crop production
- ♦ expected payment acres.

The change in value of production is determined by crop prices and production levels. Aggregate production levels are, in turn, a function of average yields and harvested acreage. The determination of direct payments varies between current law and ARA. Under current law, direct payments equal the product of deficiency payment rates, program payment yields, and payment acres. The key difference between current law and the ARA is that deficiency payment rates under the former are determined by average crop prices. In contrast, market transition payment rates under the ARA are predetermined in the legislation and, in the aggregate, are only a function of crop payment acres and program payment yields within Mississippi.

Data Development

FAPRI Price Forecasts

Crop prices are a key determinant of differences between current farm policy and ARA. This analysis used crop price forecasts generated by the Food and Agriculture Policy Research Institute (FAPRI) under baseline conditions (e.g., continuation of 1990 Farm Bill) and under ARA [1, 2]. The FAPRI price forecasts include the major program crops for 1996 through 2002.

A significant issue for this study is the accuracy of the FAPRI baseline price forecasts made earlier in 1995. Many crops saw above average prices in 1995. The effects of improved market conditions are reflected in the crop price forecasts under the ARA [2], but not in the baseline estimates. This revision in market conditions may account for much of the difference between the FAPRI baseline and the ARA price forecast. For this reason, our study focused on sensitivity analysis using higher baseline crop prices. (As of this writing, no revised baseline price estimates are available.)

Historical Crop Data

A ten-year series of Mississippi crop data was used to estimate expected crop yields and statewide acreage [3]. The crop mix reflected by the historical average embodies institutional (i.e., farm program) determinants as well as

the effects of soil type, machinery investment, and tradition.

Results and Discussion

Scenario I. Aggregate Gross Farm Income Comparison

The State's gross farm income was calculated for the period 1996 through 2002 under the conditions of current law and the ARA. The forecasted value of Mississippi crop production was calculated as the product of expected crop production (ten year average) and the relevant forecasted crop prices. Annual direct payments under current law were determined as the difference between relevant target prices and forecasted crop prices. Marketing loan payments were not relevant under either policy scenario because of high crop prices.

For each policy scenario, the annual value of production and annual payments were used to estimate the average value of production and the average payments expected for the period 1996 through 2002. These two average values were added together to obtain an estimate of the average annual gross farm income from crop production in Mississippi under each policy scenario. Thus, the basis for comparison of the two policies was the change in average annual gross farm income between current law and the ARA.

Changing from current law to ARA results in positive changes in market prices (and thus value of production) offset by negative changes in direct payments. The net effect of this, on average, is a decrease in aggregate gross farm income of $29.2 million per year. It should be noted again that the key beneficial element of adopting ARA is the positive change in market price, some of which is probably due to an improving market condition relative to the baseline (independent of the new policy). If the baseline estimates of crop prices were revised upward, then the loss in aggregate farm income under ARA would probably be greater. In order to examine the effects of adjusted baseline prices, two additional sensitivity analyses were conducted.

Scenario II. Sensitivity to Changes in Baseline Cotton Prices

As baseline cotton prices are adjusted higher, there are two opposite effects on the valuation of ARA. First, the change in the value of cotton production gets smaller. As baseline cotton prices are adjusted higher, the change in cotton price associated with going to ARA decreases. When this adjustment in baseline cotton prices exceeds 5%, the change in cotton price from adopting the ARA becomes increasingly negative.

Conversely, as baseline cotton prices are adjusted higher, there is a greater change in cotton payment rates from adopting the ARA. This occurs because ARA payment rates are fixed while conventional deficiency payment rates shrink with higher baseline crop prices (except for soybeans). As baseline cotton prices are adjusted up beyond 12%, the adoption of ARA produces an increasingly positive change in cotton payment rates. The increase in cotton payment gains slightly dominates the greater loss in value of cotton production. For example, the overall effect of adopting ARA with a 12% upward adjustment in baseline cotton price is an average loss of $27.8 million per year (Table 1, Scenario II). Thus, ARA produces a smaller aggregate loss under Scenario II than under Scenario I (Table 1), but the ultimate effect of adopting ARA is still a loss. In fact, the sensitivity analysis shows that baseline cotton prices would have to be (unrealisticly) adjusted upwards by 260% (e.g., $1.63 per pound) in order for the adoption of ARA (with conventional cotton prices) to produce a net gain in aggregate farm income.

Scenario III. Sensitivity to Change in All Baseline Crop Prices

A revised baseline would likely involve higher initial price forecasts for other crops under current law. Therefore, the effects of ARA were evaluated when *all* baseline crop prices were adjusted upward by 12%. Higher initial baseline prices for all crops produce different results than for Scenario II. When the baseline price of other crops (e.g., rice) are adjusted upward under Scenario III, the loss in value of production dominates the gain in direct payment. Moreover, soybeans have no direct payment program. As baseline soybean prices are adjusted up, then adoption of ARA only results in reduced value of soybean production, and thus reduced income under ARA, *ceteris paribus*. In the aggregate, when all baseline crop prices are adjusted up by 12%, the loss in farm income under ARA increases from $29.2 million under Scenario I to $33.6 million.

Estimated Effects on the Mississippi Economy

The ARA will reduce the gross income of farm households within the state. It was estimated above that the ARA will reduce gross farm household incomes by between $27.9 million and $33.6 million depending upon the scenario assumed (Table 1, Table 2). It was assumed that these farm households have a marginal propensity to consume of 85 percent. Therefore, the estimated reduction in consumption expenditures is between $23.7 million and $28.3 million (85 percent of the estimated reduction in gross income under each scenario).

This reduction in consumption expenditures will lead to a reduction in demand for consumer goods and services (clothing, health services, entertainment, etc.). Since there will be less demand for these products, the firms that supply these products will need fewer employees resulting in a further reductions in incomes and expenditures for consumption goods which will, in turn, trigger another ripple effect, and so on.

How will these changes affect the overall Mississippi economy? In order to address this question, the IMPLAN input–output model was employed [4, 5]. Input–output models allow economic researchers to conduct impact analysis taking into account transactions that occur among the various sectors within an economy. The IMPLAN model is based on 1992 data (the latest data available).

The estimated reductions in consumption expenditures by farm households under Scenario's I through III was inputted into IMPLAN which calculated the sum of the subsequent ripple effects throughout the economy. Depending on the scenario, the ARA was found to induce reductions in consumption expenditures that would lead to a reduction in state domestic product of between $15.2 million and $18.1 million and a loss of between 460 and 549 jobs (Table 2).

The reduction in state domestic product is less than the reduction in consump-tion expenditures because Mississippi consumers purchase some goods and services produced outside the state. Of course, it is also true that consumers in other states purchase goods and services produced in Mississippi. To the extent that the ARA reduces consumption expenditures in other states this would be expected to cause a further reduction in Mississippi's state domestic product and further job losses in Mississippi — impacts that can not be measured by a state-level model. So the Mississippi input–output model likely under-estimates reductions in state domestic product and jobs. However, this may be offset somewhat by the assumption of an 85 percent marginal propensity to consume — which is probably a little high.

If, as a result of the ARA, Mississippi farmers take acres out of production or shift from high input crops, such as cotton, to lower input crops, such as corn, there will be additional impacts on the state economy. Farm supply stores will see their sales decrease with subsequent ripple effects back through the entire agricultural input sector. Workers will be laid off or find their work hours reduced. Because their incomes have fallen these workers will spend less on consumer goods and services creating additional ripple effects through the economy. These potential impacts were estimated by reducing the demand for products produced by an aggregated agricultural input sector within the IMPLAN model. Specifically, the demand for agricultural inputs was reduced by 5, 15, and 25 percent. Table 3 shows that a reduction in agricultural input demand of 5 percent will cause an additional estimated loss of $16.1m in state domestic product and 404 jobs. A reduction in agricultural input demand of 25 percent would cause an additional estimated loss of $80.2m in state domestic product and 2,019 jobs.

While these numbers are significant it is important to consider them within the context of the entire state economy. Taking the Table 2 results related to Scenario III and adding the Table 3 results related to a reduction in agricultural input demand of 25 percent, we get a maximum estimated total impact from the ARA of $98.3m reduction in state domestic product and 2,568 jobs lost. According to the 1992 IMPLAN data, total state domestic product is $43,014m and total state employment is 1,249,564 jobs. Thus, the maximum estimated total impact from the ARA is a 0.2 percent reduction in state domestic product and employment. If Scenario I or II holds instead of Scenario III and/or if the reduction in agricultural input use is less than 25 percent, the impact would be even less.

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Table 1 Estimated Effects of the ARA on the Gross Farm Income Assuming No Changes in Production.

	Change in Gross Farm Income
Scenario 1: Adoption of ARA	- $29.2m
Scenario 2: ARA with Baseline Cotton Prices 12% Higher	- $27.9m
Scenario 3: ARA with All Baseline Crop Prices 12% Higher	- $33.6m

Table 2. Estimated Effects of the ARA on the Mississippi Economy Assuming no Changes in Production.

	Scenario I	Scenario II	Scenario III
Estimated Reduction In:			
Gross Farm Income	$29.2m	$27.9m	$33.6m
Consumption expenditures by farm households (assuming an 85% marginal propensity to consume)	$24.8m	$23.7m	$28.6m
Resulting Estimated Reductions In:			
State domestic product	$15.9m	$15.2m	$18.1m
Jobs (full- and part-time)	481	460	549

Table 3. Additional Estimated Effects of the ARA on the Mississippi Economy if Production Changes Occur.

Agricultural Input Demand Reduced By:	5%	15%	25%
Resulting Estimated Reduction In:			
State Domestic Product	$16.1m	$48.1m	$80.2m
Jobs (full- and part-time)	404	1,211	2,019