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What Would Happen if Federal Farm Subsidies Were Eliminated? Evidence for Colusa and Tulare Counties

by

Sandra Gonzalez, Rachael E. Goodhue, Peter Berck and Richard E. Howitt

The abolition of federal farm program payments would significantly affect regions in California that primarily produce federal program crops, have limited opportunities to produce substitutes and are highly dependent economically on agriculture.

Due largely to its agricultural diversity, California has historically drawn a very small share of traditional federal commodity subsidies, relative to its status as the nation's largest agricultural state. In 2000, California received three percent of federal conservation, disaster and commodity payments but accounted for 12.8 percent of the total value of U.S. agricultural production. Only nine percent of California's more than 74,000 farms received federal commodity subsidies, conservation payments or disaster payments between 1995 and 2002. Many observers believe that a reduction in commodity payments, or even the complete abolition of federal commodity subsidies, will have a negligible effect on California. However, federal subsidies are very important for certain California commodities, such as rice, cotton and dairy. Because of the geographic concentration of production, subsidies may have an important effect on regional economies within California.

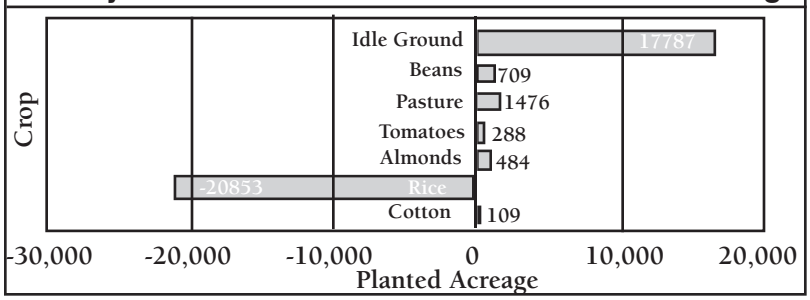
We examine the effects of federal farm program spending on two county economies: Colusa County and Tulare County. We estimate how growers' crop production decisions could change in response to the elimination of farm subsidies, by integrating two types of economic models. The first was a calibrated production function model using the positive mathematical programming values to measure the different costs between regional crops. This model was used to predict the shifts in acreage for major crops when federal farm aid was eliminated. The second model was a social accounting matrix, which calculated the effect of one additional dollar in crop production on county economic output and employment. The results from the two models were combined in order to estimate the effect of the changes in acreage predicted by the non-linear optimization model on county output and employment.

The non-linear approach allowed us to model how growers will change their use of land, fertilizer and other inputs, rather than limiting their response to a change in acreage. This flexibility is important because changes in input use and yields, not only changes in crop acreage, will affect growers' contribution to the local economy. In order to assess how these changes will affect employment and total economic activity, we used employment and economic activity multipliers, specific to each county, that are adjusted to reflect the use of inputs for the production of selected crops. Economic multipliers measure the effect of an additional dollar received by agricultural producers, who spend most of this additional dollar for agricultural inputs and personal consumption. Employment multipliers measure the number of additional workers needed in other sectors to meet the needs of an additional worker employed in agriculture.

Colusa County's economy is heavily dependent upon the agricultural sector, with agriculture accounting for 34 percent of total employment in 2000. In turn, the agricultural sector is heavily dependent upon federal farm programs. In 2000, federal payments equaled 22 percent of the county's total value of agricultural production. The Colusa County crops selected for this study were cotton, rice, almonds, tomatoes, pasture and beans. Rice received the majority of federal farm program payments, and accounted for 46 percent of the county's total agricultural value. Cotton is the only other analyzed crop that received federal funding, however it accounted for only three percent of the county's agricultural value and 3.7 percent of federal farm program payments. The other products selected for this study contribute significantly to the county's agricultural value although they are not recipients of any pre-determined federal farm aid.

Tulare County ranked as the second largest producer of agricultural products in 2000, among all counties nationally, with gross agricultural receipts in excess of $3.068 billion. In spite of its large value of production, agriculture accounted for only 26 percent of total county employment. We analyze six crops: cotton, oranges, raisins, alfalfa, almonds and milk. Milk, oranges, grapes and cattle were the top four commodities in terms of the value of production in 2000. Cotton is the largest commodity crop that receives federal funding. Tulare

Figure 1. Net Change in Planted Acreage in Colusa County in Absence of Federal Farm Subsidies Funding



County is one of the largest California dairy counties, and its number of dairy farms has increased substantially over the last ten years.

Results

In Colusa County, baseline federal farm program payments were estimated to be over $58 million in 2000. (This estimate differs slightly from actual program payments, due to modeling assumptions.) In the absence of these payments, the county economy would decrease by $73.5 million. Nearly one of every three agricultural jobs within Colusa County is sustained by federal farm program payments. County agricultural employment would decrease by 30 percent to 4,241 persons, according to the model.

Rice responds the most dramatically to the elimination of payments. The model estimates that the value of rice production declines by nearly 54 percent from base case revenues. The majority of this change is due to the loss of payments, since planted rice acreage declines by only 14 percent and yields per acre increase. Due to limited crop alternatives for land used for rice production, and the significant investment in equipment required for rice production that has limited or no alternative uses, the model predicts that producers will chose to reduce planted acreage and farm the remaining acreage more intensively rather than switching from rice to other crops (Figure 1). Rice yields would increase from 4.27 to 4.79 tons per acre as a result of increases in the use of non-land inputs (Figure 2). The production function model predicted that expenditures per acre on other inputs increase as the acres of rice farmed are reduced. Chemical expenditures increase by 48 percent, labor expenditures by 31 percent and machine expenditures increase by 61 percent.

Cotton is also predicted to sustain a significant loss in output value. However, the effects are not as large, due to cotton acreage of only 10,820 in the base year. The model predicts that production decisions do not respond significantly to the elimination of federal farm program payments: Neither planted acreage nor yields were predicted to change significantly.

Crops which do not directly receive federal farm program payments are not directly affected by their abolition but may be affected indirectly due to reallocation of acreage. Although predicted pasture output would increase by 80 percent, total acreage is small–less than 2,500 acres. Predicted crop values, acreage planted and crop yields would not change significantly for almonds, tomatoes or beans (Figure 1).

One reason that other crops are not predicted to be affected by the abolition of federal farm program payments is that since rice requires clay soils that are not suitable for other crops, growers have limited opportunities to substitute away from rice production. Most of the farmland that is predicted to be taken out of rice production would remain out of agricultural production completely. Indeed, if federal farm program payments were cut to 50 percent of the 2000 base year value, our analysis predicts that producers would begin to fallow agricultural land. In turn, this behavior implies that marginal rice land has no value in production in the absence of farm program payments, given our assumptions and baseline values.

In Tulare County, baseline federal farm program payments were projected to be $23 million. In the absence of payments, total economic activity in this county is actually predicted to increase by nearly $2 million. Consistent with the increase in economic activity, estimated agricultural and total employment would increase slightly, by less than 1,000 people, which is less than a one percent change in employment. These changes are driven by growers' reallocation of acreage from cotton to alfalfa. Alfalfa has the highest employment multiplier effect of all the crops in the planting mix in Tulare County. When compared to cotton, alfalfa production generates almost seven times the agricultural jobs and over three times the total jobs that cotton generates for every million dollars of output.

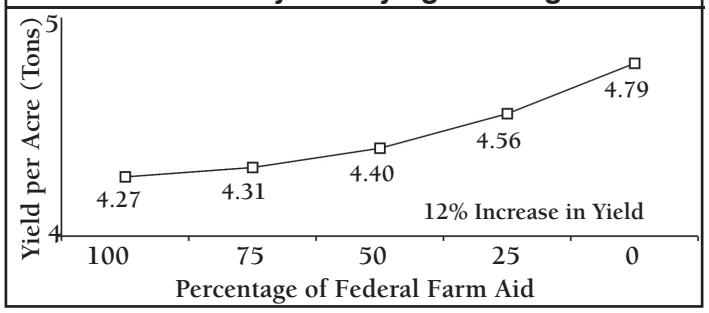
As the crop with the largest acreage eligible for payments, the model predicted that cotton would be affected the most by the elimination of federal farm program payments. Total output value and planted acreage levels were estimated to decrease by 68 percent and 44 percent, respectively. Predicted yields were largely unchanged, showing that 24 percent of the reduction

in value of cotton is due to the loss of payments. Production budgets collected for all major crops in Tulare County indicated that alfalfa was the most profitable crop in the Tulare County crop mix. Alfalfa generated a profit level that was nearly $200 per acre greater than cotton, even though it does not receive federal farm program funding. Given the complete elimination of federal farm program payments, alfalfa realizes a 20 percent increase in planted acreage, while yields remain constant. This prediction is sensible given that a producer can generate a higher profit level by planting alfalfa where cotton was once planted.

Federal farm program payments to the Tulare dairy sector were calculated to be roughly $10.2 million, which represents less than three percent of the total farmgate value of milk production in 2000. Effects on the industry were correspondingly negligible. However, this analysis did not incorporate commodity purchases of milk products by the USDA, so it may understate the effects of all federal agricultural support programs on the dairy industry. The orange, almond and milk industries all exhibited less than a five percent estimated increase in total output values. The output value of raisins was predicted to increase by six percent in the absence of federal farm program payments to cotton and milk.

Unlike Colusa County, where the model predicts that growers began to fallow land when federal farm program payments were 50 percent less than the baseline value, the model predicted that all of the available farmland in Tulare County was planted even in the absence of federal farm program payments. Because the model predicted that all farmland was planted, we were able to use the results of the non-linear optimization model to calculate the effect of federal farm program payments on land values. At the 100 percent federal farm program funding level, this calculation indicates that $43.10 of federal farm program benefits were capitalized into every acre of farmland in Tulare County. This figure represents a wealth transfer of $23 million from American taxpayers to Tulare County farmland owners.

Figure 2. Projected Rice Yields in Colusa County at Varying Funding Levels



Conclusion

Our analysis illustrates the influence of federal farm program payments on the use of resources within regional agricultural systems. The importance of the elimination of federal farm program payments on regional economies depends on the importance of agriculture to these economies. Because agriculture accounts for a larger share of employment and economic activity in Colusa County than it does in Tulare County, changes in subsidy payments have a larger economic effect in Colusa.

In Tulare County, according to our analysis resources reallocated from cotton production in the absence of farm program payments would increase employment, because they would be reallocated to the production of more labor-intensive crops. However, these effects are relatively small, accounting for less than a one percent change in total employment. In Colusa County, more resources per acre are expended on rice production than would be the case in the absence of subsidies. Subsides induce producers to plant rice on land that would not be cropped in the absence of these payments. Growers would use more non-land inputs and achieve higher yields. Agricultural employment in Colusa was predicted to decline by 30 percent. Overall, our analysis suggests that the elimination of federal farm payments would significantly affect regions in California that primarily produce federal program crops, have limited opportunities to produce substitute crops and depend on agriculture as a primary source of economic activity.

For additional information, the authors suggest the following source:

Gonzalez, Sandra. *Economic Impacts of Federal Farm Assistance Programs Upon Regional California Economies.* Department of Agricultural and Resource Economics, University of California, Davis. M.S. thesis. 2003.

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