A STUDY OF THE IMPACT OF COMMON AGRICULTURAL POLICY OF EU ON PRODUCTION OF COTTON IN GREECE: IMPLICATIONS FOR U.S. COTTON EXPORTS

Final Report: Cotton Inc. Project #12-228

Srinivasa Konduru, Department of Agricultural Business; Fumiko Yamazaki & Mechel Paggi
Center for Agribusiness; Jordan College of Agricultural Sciences and Technology; California State University, Fresno, CA

Abstract

Greece is the largest producer of cotton in Europe and sixth largest exporter worldwide in 2010 (FAOSTAT). Cotton constitutes about nine percent of the total value of agricultural production in Greece. Currently Greece exports about three quarters of its cotton production and they have increased by an average of almost ten percent in the period 2002-09. In this context, it is important to understand whether the changes in Common Agricultural Policy (CAP) of European Union are going to impact Greek cotton sector and whether area under cotton cultivation is going to change in future. The overall objective of this paper is to assess the competitiveness of Greek cotton producers and potential implications for Greece as a competitor in the world cotton market. The focus was on developing an updated estimate of the costs of production in Greece and developing a representative farm model for cotton production in Greece. These models are further utilized for understanding the impact of direct payments under Common Agricultural Policy (CAP) of Europe and ultimately on the competitiveness of Greek cotton in international markets. The results demonstrate that the net income of the cotton farmers represented from this study group will decrease considerably without the presence of direct payments. The results also show that the probability of earning a loss increases, whereas the probability of earning a higher net income decreases when direct payments are discontinued. This may lead to a shift in cultivation patterns of cotton farmers and they may shift to other crops.

Introduction

Greece is the largest producer of cotton in Europe and sixth largest exporter worldwide in 2010 (FAOSTAT). Cotton constitutes about nine percent of the total value of agricultural production in Greece. Currently Greece exports about three quarters of its cotton production and they have increased by an average of almost ten percent in the period 2002-09. Though Greece may be small in terms of production and export of cotton compared to that of US and that the production of cotton in Greece is going down in the last few years, it is an important competitor to US as it is the second largest supplier of cotton to neighboring Turkey, which is also a major market for US cotton and second largest export market after China (FAOSTAT). In this context, it is important to understand whether the changes in Common Agricultural Policy (CAP) of European Union are going to impact its cotton sector and whether area under cotton cultivation is going to change in future, thereby impacting its exports to Turkey. The overall objective of this paper is to assess the competitiveness of Greek cotton producers and potential implications for Greece as a competitor in the world cotton market. The focus will be on developing an updated estimate of the costs of production in Greece and develop representative farm models for cotton production in Greece. These models will be utilized for understanding the impact of direct payments under Common Agricultural Policy (CAP) of Europe and ultimately on the competitiveness of Greek cotton in international markets. The results further can be used to understand the potential impact on US cotton sector and its competitiveness in international markets.

In the following section, a brief description of the cotton sector of Greece and Common Agricultural Policy of European Union is presented. The third section provides a discussion of the data collection and methodology for this study. The final section discusses results and provides conclusions.

Cotton Sector in Greece

Cotton is an important crop for Greece as it is only one of the two countries producing cotton in European Union along with Spain. The cotton harvested in Greece accounts for only about 0.5% of the total agricultural production of European Community (LMC international, 2007). The main cotton growing areas of Greece are Thessaly and Macedonia. Cotton constitutes 60 percent of the arable area in Thessaly, whereas in Macedonia, it is about half of the total arable land. Most of the cotton is grown in small, highly specialized farms (Tsaliki, 2005). In 2012, cotton was grown in about 260,000 ha of land producing about 1.15 million bales and exporting almost 90 percent of it (see table 1). The majority of cotton farmers in Greece grow between 5 and 12.5 acres of cotton, whereas the average cotton growing area is 11.25 acres in 2005 (LMC international, 2007). Almost all the cotton crop is grown under

irrigated conditions, though the availability of irrigation water is more in Thessaly than in Macedonia. There are approximately 30 ginning companies in Greece and the top 5 companies handle about 60 percent of ginning capacity. The Greek cotton sector was plagued by low production, bad quality, defaults, and delivery problems in 2009, but it regained its status by 2011-12 (Gain Report, 2012).

The Common Agricultural Policy (CAP) of European Union (EU) has undergone various changes and the present policy focuses more on direct support for farmer's incomes rather than on price and production support for specific crops. So, following this principle, most aid to farmers became 'decoupled', meaning that the farmers receive a single payment not linked to the production of a specific crop (LMC international, 2007). But, cotton is one of the crops in which some aid remained coupled, meaning linked to production of the crop, as single farm payment would bring significant risk of production disruption to cotton producing regions. So, the decoupled single area payment was set up at 65 percent of the national share of aid available to producers and the remaining 35 percent remained coupled to cotton but calculated on the basis of a per hectare payment.

Table 1. Area, Production and Exports of Cotton in Greece 1995-2012

	Area Harvested	Production	Exports
1995	440	2067	1450
1996	420	1506	1200
1997	388	1698	1000
1998	412	1783	964
1999	430	2021	1080
2000	410	2035	1424
2001	410	2093	1000
2002	355	1715	1150
2003	363	1530	1225
2004	375	1800	1170
2005	358	1975	1350
2006	370	1550	1250
2007	340	1550	1299
2008	280	1150	800
2009	200	940	875
2010	230	940	750
2011	285	1330	1000
2012	260	1150	1000

Notes: Area Harvested in thousand hectares, Production and Exports in thousand 480lb bales. Source: FAS, USDA

Changes in Common Agricultural Policy (CAP) of EU

As the EU makes strategic choices for the long-term future of its agriculture and rural areas, the CAP needs to operate within the context of sound economic policies and sustainable public finances contributing to the achievement of the objectives of the EU. In order to link with Europe 2020 strategy of having smart, sustainable and inclusive growth, the European Commission organized an extensive public debate in 2010 to determine the future CAP. The discussions have indicated that in order to achieve Europe 2020 objectives, the future CAP should contain a greener and more equitably distributed first pillar and a second pillar focusing more on competitiveness and innovation, climate change and the environment. In order to achieve the objectives of future CAP namely, viable food production, sustainable management of natural resources and climate action and balanced territorial development, three broad policy options have been proposed (CAP 2020).

The first option would focus on adjustments and improvements in the area of the most significant criticism to the CAP, i.e. the issue of equity in the distribution of direct payments between Member States. This option would ensure continuity and stability with the current CAP, thus facilitating long-term planning for operators along the food chain. The second option makes major overhauls in order to ensure that it becomes more sustainable, and that the balance between different policy objectives, farmers and Member States is better met. This would be done through more targeted measures which would also be more understandable to the EU citizen. This option would imply greater spending efficiency and greater focus on the EU value added. The third option would be a more far reaching reform of the CAP with a strong focus on environmental and climate change objectives, while phasing out gradually the income support and most market measures. This paper analyses the impact of third policy option as the first policy option ensures continuity of current CAP and the second policy option is difficult to quantify for an economic analysis (CAP 2020).

Figure 1: Map of Greece

Data Collection and Methodology

Data Collection

Data was collected in two cotton producing regions of Greece namely Thessaly and Macedonia. Rapid Rural Appraisal (RRA) methodology has been adopted to collect information, where in a multidisciplinary team conducted focus group discussions in various villages to get information and develop hypotheses. In each state, information was collected from focus groups in different villages and the information was aggregated. There were a total of five focus group discussions conducted with three in Thessaly and two in Macedonia in summer of 2012. Each focus group constituted about 5-7 farmers and a survey instrument was used to provide structure to the discussion. Table 2 provides summary information on the cost of cultivation collected in all the focus group discussions. The cost of production of cotton in Thessaly is 6 percent higher than Macedonia due to differences in irrigation, pest control and land preparation expenses. In focus group discussions, the average yield of seed cotton that was reported in Thessaly is 1.6 tons per acre compared to only 1.3 tons per acre in Macedonia due to more irrigation in Thessaly. The gross profit in Thessaly is 25 percent more than in Macedonia demonstrating the importance of higher yields prevalent in Thessaly. The gross profit excludes returns to family labor and managerial compensation. The cost of production in the above table does not include transportation expenses from farm to processor. In all the locations, the buyer/broker who buys cotton from the farmers is responsible for the transportation and he also performs quality checking at the time of transaction. Almost all the transactions of the farmers are with private dealers who in turn may represent cotton ginners. The data gathered from the two regions is aggregated by giving appropriate weights according to their share in the total cotton acreage in Greece to obtain a country wide representative cotton model. The results can be seen in the last column of table 2.

Table 2. Cost of Cotton Cultivation and Gross Profit in Greece ($ per Acre)

	Thessaly	Macedonia	Greece
Land Preparation	162	150	157
Seeds & Planting	93	83	89
Fertilizers	150	153	151
Pest Control	124	75	104
Irrigation	107	150	124
Weed Control	74	50	64
Defoliants	33	33	33
Harvesting	113	113	113
Total Costs	**852**	**805**	**833**
Yield(tons/acre)	1.60	1.30	1.48
Price ($/kg)	0.63	0.65	0.64
Market Revenue	**1000**	**845**	**938**
Govt. Support	**375**	**375**	**375**
Total revenue	**1375**	**1220**	**1313**
Profit	**523**	**415**	**480**

Methodology

Stochastic simulation models are used to generate a large random sample of outcomes for a dependent variable where that dependent variable is a function of some selected set of explanatory variables. A unique feature of these types of models is that there is an explicit recognition that the independent variables have some probability distribution around their mean values.

The forecast of the dependent variable is thus a function of the probability distributions of the explanatory variables as well as their mean value. The simulated distribution of the dependent variables thus captures the variability or risk associated with forecasting the dependent variable that cannot be obtained by using simply the mean value of the explanatory variables. If the explanatory variables are uncorrelated an appropriate univariate probability distribution is chosen (e.g. normal, Poisson, empirical, etc).

It is also possible to capture the joint variability of two or more correlated explanatory variables on the dependent variable. The joint variability can be captured by determining the multivariate probability distribution (e.g. multivariate normal, multivariate empirical, etc.) for the two or more correlated explanatory variables. The multivariate probability distribution is developed much the same as the univariate probability distribution but includes information in the correlation matrix to account for the correlation between the independent variables. The determination of the appropriate probability distributions and the construction of stochastic models are followed from Richardson (2010).

The simulated forecast of dependent variables using either univariate or multivariate probability distributions of the explanatory variables is very useful in informing decision makers of the variability or risk in the dependent variable forecast, the skewness of the forecast, and the probability of a specific outcome for the dependent variable. Most stochastic simulation models have more than one dependent variable. The dependent variables in a stochastic simulation models are often referred to as Key Output Variables (KOV's).

From the sample of farms in the rapid assessment study, the impact of fertilizer subsidies and minimum support prices (MSP) on the profitability of Indian cotton farms can be analyzed. Two Indian cotton representative farm simulation models have been developed for the states of Gujarat and Maharashtra using information collected through focus groups. Representative farm models are stochastic simulation models that are used to analyze the impacts of current and changing market conditions and government policies on a number of KOV's. Examples of KOV's in a representative farm models are yearly net income, cash flow position, financial ratios such as debt to equity or liquidity, and net present values of net income.

These models can be used for several purposes. They simulate the producer's income statement, statement of cash flows, and balance sheet as well as any financial indicator calculated from those three statements. From there we can analyze the impact a new policy may have on a producer's net income or net present value prior to implementation. They can also determine the impact a change in production practices may have on the producer's financial statements prior to actually changing practices. In other words, these models act as a decision making tools. The models are constructed in a way that allows for easy analysis of several variables.

By using a stoplight chart, one of the graphical capabilities of the model, we can compare probabilities for one or more alternatives for the target values of net present values of net income. In order to generate the stoplight chart, two value targets, lower and upper, are chosen from observed returns. The stoplight function calculates the probabilities of: (a) exceeding the upper target (green), (b) being less than the lower target (red), and (c) observing values between the targets (yellow). In this study, the stochastic simulation models are used to analyze the impact of direct payments on the net income of the representative cotton farm in Greece. The analysis forecasts the net income for a period of two years from 2013-14.

Results and Conclusion

As direct payments from CAP constitute a major proportion of the total income received by cotton farmers in Greece, a counterfactual scenario forecasts the net income of Greek farmers without the direct payments for a two year period from 2013-14. In the counterfactual scenario, the revenue received by Greek cotton farmers is only from the market and the direct payment from EU to farmers of about $375 per acre is not considered. The total revenue without direct farm payments is incorporated into the representative farm model of cotton to get the results of the counterfactual scenario.

The results of the simulations of baseline model and counterfactual model are analyzed for any differences in the cost of production, net income and net present value of sum of income streams of both years 2013 and 2014. The two year forecast shown in Table 3 estimates that the net income of the farmers decreases by about 30 percent in both the years. Charts 1A and 1B in Figure 2 provide a comparison of the simulated probability distributions of net present value of sum of net income after taxes per acre in years 2013 and 2014 with and without subsidy. The removal of direct payments reduces the probability of earning a net income of more than $375 per acre by 60 percent and the probability of earning a positive net income of less than $375 also decreases by 15 percent, whereas the probability of earning a loss increases by 74 percent.

Table 3. Comparison of Results with Baseline Forecast.

($ Per Acre)	**Baseline**		**Without Direct Payments**	
	2013	**2014**	**2013**	**2014**
Net Income	306	383	-73	5
Production Cost	841	770	841	770
Net Present Value (Sum of Income Stream 2013-2014)	620		-64	

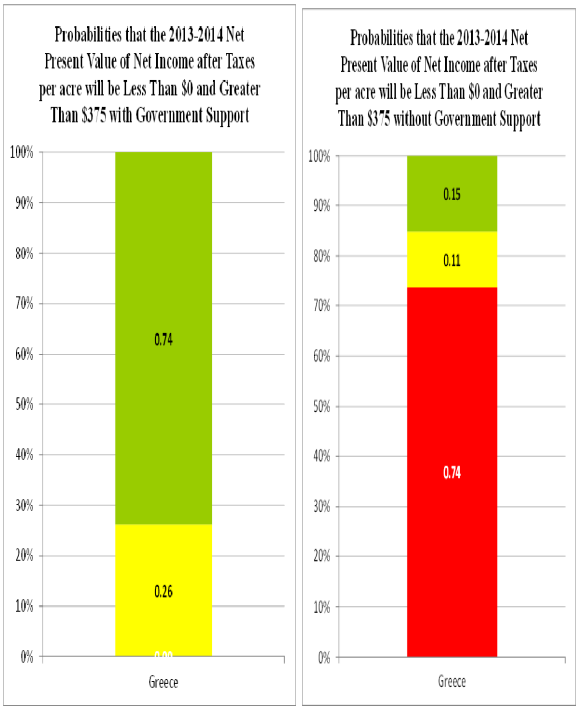

Chart 1A Chart 1B

Figure 2. Stop-light Charts 'With' and 'Without' Direct Payments

Conclusion

In this paper we have analyzed the impact of direct payments under CAP of EU on the net income of Greek cotton farmers. We have used information collected from focus group discussions of farmers in two cotton growing regions of Greece. EU provides various kinds of support including direct farm payments of $375 per acre to cotton farmers in Greece to improve the profitability of their farming enterprises and to increase their living standards. But, due to the growing fiscal deficit in EU and the move towards free markets, EU is changing the CAP and started discussing about decreasing the support payments. This study analyzes the impact on removal of direct farm payments on the profitability of Greek cotton farm. This study analyses the profitability of cotton farms in Greece with and without the direct payments. The results demonstrate that the net income of the cotton farmers represented from this study group will decrease considerably without the presence of direct payments. The results also show that the probability of earning a loss increases, whereas the probability of earning a higher net income decreases when direct payments are removed as shown in the stop light charts. This may lead to a shift in cultivation patterns of cotton farmers and they may shift to other crops. But, as the direct farm payments support every other crop as well, the shift in cropping patterns may be very minimal. The crops where direst payments do not constitute a major proportion of total revenue would be candidates for an increased allocation of land at the expense of cotton. In order to understand more details about the shift in cropping patterns, we need to understand the profitability of other substituting and competing crops of cotton in those areas. In this scenario, the results suggest that the US cotton farmers may benefit from decreasing export competition as cotton production declines in Greece and US may have more access to cotton markets to Turkey.

Acknowledgements

The authors like to acknowledge the financial support given by Cotton Incorporated, support and participation of Dr. Jeanne Reeves in the project, cooperation and logistical support given by Dr. Theofanis Gemtos of University of Thessaly and Dr. Sakis Gertsis of American Farm School, and Center for Agribusiness (CAB), Fresno for supplemental funding.

References

CAP towards 2020 (2010). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee of the Regions, European Commission, Brussels.

FAPRI, 2010. U.S. and World Agricultural Outlook 2010, FAPRI, Ames, Iowa.

Food and Agriculture Organization Statistics (FAOSTAT), Accessed in Jan 2013. http://faostat.fao.org/site

LMC International (2007). Study on the Cotton Sector in the European Union, European Commission, Brussels.

Richardson, James (2010). Simulation for Applied Risk Management. Texas A & M Univ., College Station, TX.

Tsaliki, Elleni (2005). Cotton Situation in Greece, NAGREF, Cotton and Industrial Plants Institute, Thessaloniki, Greece.

United States Department of Agriculture, 2012, GAIN Report, No. GR1201, Foreign Agricultural Service, U.S. Department of Agriculture, Washington, D.C.