EC Expansion: The Effects of Accession on Spanish Grain Markets

by

Michael D. Helmar*

A paper submitted for the 1987 AAEA annual meeting, August 2-5, 1987, Michigan State University

*The author is a Research Associate, Center for Agricultural and Rural Development, Department of Economics, Iowa State University Ames

Abstract

A model is developed which describes Spanish grain production and use. This model is then used to evaluate the effects of Spain's entry into the EC, by projecting a baseline and an EC accession scenario. Production of grain changes very little, with the major impacts occurring on the demand side.

Introduction

The inclusion of Spain and Portugal in the European Economic Community (EC) in early 1986 will not only diversify the economic and industrial composition of the EC, but will alter the structure of Spanish and Portugese agriculture. These nations will adopt the Common Agricultural Policy (CAP) of the EC with its system of prices and accompanying import levies and export restitutions, making them somewhat less accessible as markets to other countries. It is this development which has caused concern among "free traders", particularly the U.S., and has resulted in threats of retaliation against the EC by imposing import taxes on such items as French wines, Danish cheeses, and other agriculturally related products. These threats of retaliation are based on the belief that Spain and Portugal, under the CAP, will substantially reduce imports of U.S. agricultural products, particularly feed grains.

As a member of the EC, Spain will become subject to the CAP, which will introduce a new system of prices and price supports for grains. In some cases, the support prices under CAP will mean substantially higher prices for Spanish farmers, and in other cases, such as for soft wheat, the price to farmers will change very little, but the effects will be felt through change in the relative prices of competing crops on the supply side, and substitutes on the demand side. In order to maintain this pricing system, import levies or export restitutions are applied. This introduces or increases trade barriers between Spain and the world market, but eliminates them between Spain and the rest of the EC, possibly changing trade flows.

The Spanish government has influenced grain production since the establishment of the National Wheat Board in 1938. The major objective has been to influence which types of grains were produced through price manipulation (3). Changes in relative prices of grains are used to encourage

changes in production of certain grains relative to others. This allows adjustments to be made in the case of surplus or deficit of a certain grain.

Spain has used a system of prices aimed at creating a balance between production and consumption of grains. This system includes:

- Guaranteed producer prices for wheat, barley, oats, and rye with monthly increases to adjust for storage;
- Guaranteed producer prices for corn and sorghum;
- Selling prices for wheat, barley, oats, and rye at a fixed margin above producer prices, including monthly adjustments;
- Selling prices for corn and sorghum, aimed at keeping the monthly average within two percent of the threshold price;
- Threshold prices for imported corn, sorghum, and barley with monthly adjustments. The corn threshold price is generally about ten percent below the guaranteed producer price, such that use of domestic corn is subsidized.
- With the threshold price, a variable levy similar to that used by the EC was employed in order to protect the domestic price system.

The Spanish market intervention system relied on this price system, stock management, and government control of foreign trade. Timing of accumulation or release of stocks and control of foreign trade were key elements in the effective operation of the Spanish pricing system (2). In order to ensure the smooth operation of the policy, SENPA (Servicio Nacional de Productos Agrarios, the National Agricultural Products Service) bought, handled, and stored commodities, and kept records of transactions required by government policy. SENPA also imported and transported commodities. SENPA was the only buyer and seller of wheat, and played a major role in the handling of feed grains.

The objectives of the grain policies and methods used to achieve these objectives in Spain were similar to those employed by the EC. A major difference, however, is that under the EC, no state control of trade as existed in Spain is allowed. Other differences include levels of price supports, and relative prices. While soft wheat prices in Spain were only slightly below those in the EC in most recent years, and were occasionally higher, EC feed grain intervention prices were substantially higher than those in Spain, especially for barley. These prices are compared in Table 1 for the years 1975/76 through 1984/85, along with EC threshold prices. Wheat prices in Spain were an average of 2.9 percent below those in the EC, barley was 30.7 percent lower, and corn was 4.0 percent less over this period. This adjustment of producer and consumer prices will be the major force behind changing Spain's production and consumption of grain under the CAP. This study quantifies the effects of the CAP on Spanish grain production, consumption, and trade, and focuses primarily on wheat, barley, and corn.

Procedure

In order to address the issue of the impact of Spain's accession by the EC, some specific objectives must be met.

- Develop a model incorporating the price response behavior of Spanish producers and consumers of grain and simulate a baseline scenario in which Spain retains its former agricultural policy structure.
- Repeat the model simulation, using grain prices for the EC under the CAP.
- Compare these two scenarios and evaluate them in terms of changes in production, use and trade of grains by Spain.

The Model

The model developed for this study consists of 27 equations, of which 21 are estimated behavioral equations, and the remaining six are identities. There are five basic sectors in this model: wheat, barley, corn, soymeal, and a livestock (cattle, hogs, and poultry) component. Each of the three crop components are structured in a similar fashion, generally represented by equations (1) through (6):

Area Harvested:	$AH = (AH_{t-1}, P_{t-1}, PC_{t-1})$	(1)
Production:	$PRD = AH * YLD$	(2)
Feed Use:	$FE = (P_t, LV, PC_t)$	(3)
Food Use:	$FO = (P_t, INC)$	(4)
Ending Stocks:	$ES = (ES_{t-1}, P_t, PRD)$	(5)
Net Imports:	$NM = FE + FO + ES - PRD - ES_{t-1}$	(6)

where P is own price, PC is price of competing or substitute crop or feed, YLD is yield per hectare, LV is livestock units, and INC is income.

Each of the crops components also contains an equation linking the price received by producers to the support price. The soymeal component consists of two equations, one for feed use similar in structure to equation (3), and an equation linking the soymeal price to the U.S. soymeal price at Decatur.

The livestock component consists of five equations, two each for cattle and hogs, and one for poultry. The cattle and hog equations are for price and end-of-year animal numbers. The poultry equations estimate slaughter as a proxy for numbers. This was used for poultry, as much shorter production cycles make production and slaughter in a given time period more closely related than for either hogs or cattle. The livestock equations are generally specified as equations (7) and (8).

Animal numbers: $LV = f(LVP, FP, INC)$ (7)

Price: $LVP = f(LV, FP)$ (8)

where FP is price of grain fed , and INC is income. The livestock equations do not capture cyclical behavior of herds, but rather describe the long-term expansion of livestock numbers in Spain over the estimation period.

The model was estimated by ordinary least squares (OLS) over the period 1966/67 through 1984/85. Because of the simultaneous nature of the livestock component, a more elaborate technique which would account for errors across equations might have produced better results. The use of OLS in this situation causes the estimates to be inconsistent. Two-stage least squares would have provided consistent estimates, but was not available on the microcomputer econometrics package used. However, all signs were consistent with a priori expectations, with reasonable levels of significance. Space constraints prevent full documentation of the model here, but the relevant supply and demand elasticities are found in Table 2.

The Simulation

In order to evaluate the effects of entry into the EC on Spanish grain markets, a baseline scenario was obtained by simulation of the model. The baseline assumed no entry into the EC by Spain, and was run over the period 1985/86 to 1990/91. Forecasts of the exogenous macroeconomic variables were obtained from Wharton Econometric Forecasting Associates (WEFA). Yields were based on trend over the estimation period, and Spanish support prices were linked to the GDP deflator and self-sufficiency ratio of the particular grain. The model was then simulated using the Gauss-Seidel technique. This procedure was repeated, with support prices being replaced by EC intervention

prices, and demand side prices by threshold prices, in order to obtain the impact of Spain's entry into the EC.

Results

Under the baseline scenario, area harvested in wheat, barley, and corn is projected to increase from 6.7 million hectares (ha) in 1985/86 to 6.95 million ha in 1990/91, an increase of 3.8 percent. Practically all of this increase is in wheat area. Wheat production increases are projected to outrun wheat use slightly, and after rebuilding stocks following the poor 1986/87 crop, Spain will again export wheat. Wheat exports in 1990/91 are projected to be similar to those of 1985/86 at around 200 thousand metric tons (tmt), in spite of a 14 percent increase in domestic consumption over the same period.

Barley production increases over the forecast period to 9.35 million metric tons (mmt), in spite of virtually no increase in area. Because of large yields in 1985/86, this is a slight decrease by the end of the period. Barley use changes very little over the projection period, allowing exports to increase to 700 tmt in 1990/91. However, these levels are only half of the barley exports of 1985/86.

Corn area harvested remains stable throughout the period, at just over one-half million ha. Production is expected to dip in 1987/88 after two years of unusually large yields. After this, however, production will begin to climb due to increases in yields, and is projected to reach 3.4 mmt by 1990/91, approximately the same levels as 1985/86. Corn use increases at approximately the same rate, leaving corn imports at 2.4 mmt per year.

The differences between the baseline and the EC accession scenario is presented in Table 3. Under the EC accession scenario total area harvested increases to 6.95 million ha, showing no change from the baseline. Wheat area, however, does not account for all the area growth under this scenario,

as it did in the baseline. Barley, and to a small degree, corn have also increased area harvested. Wheat production is below the baseline by 100 tmt, or 1.7 percent by 1990/91. Wheat use is virtually unchanged, translating into a reduction in wheat exports of 100 tmt in the final year.

Barley area increase by over 50 thousand ha by the end of the projection period, all at the expense of wheat. Production is up by 175 tmt, an increase of 1.9 percent. Use declines by 700 tmt or 8.2 percent by 1990/91. These two impacts act together to increase barley exports to nearly 1.6 mmt, more than double the baseline export levels.

Corn production increases slightly over the baseline, by 50 tmt in the last year of the projection. Domestic use, however, drops by 18 percent, or more than 1 mmt, causing corn imports to decrease by 46 percent.

Discussion of Effects

Under the EC accession scenario, the relative support prices of grains changed in favor of feed grains, particularly barley. However, due to Spain's terrain and climate, expansion of a crop is slow, and often at the expense of another crop. For this reason, production changes were relatively small, as shown in Figure 1. Also contributing to this is the fact that the previous Spanish price supports were well above world prices. The adjustment to the EC policy prices on the supply side was not a severe change, and in fact was almost no change at all for wheat, four percent for corn, and eleven percent for barley in the last year of the projection. Entry into the EC is not likely to make Spain a major feed grains producer. It would seem reasonable then, that entry into the EC will affect the Spanish grains sector from the demand side more than from the supply side.

In the case of wheat, there was virtually no effect on domestic consumption. Feed demand is a relatively small part of total demand, and the

relative price of wheat in relation to barley actually decreased. Food demand for wheat is generally quite inelastic, and has proven to be very stable over time in Spain. The net effect is a small impact on the wheat sector.

The impact on barley use was felt mostly by the livestock sector, with minor changes occurring in food use. Higher input prices reduced hog numbers over the projection period in relation to the baseline, in spite of higher livestock prices. This was dampened to a small extent by the increase in corn price. The net effect was to shift demand for barley to a lower level.

Corn is the grain suffering the largest impact on the demand side. One reason for this is that soybean meal is substitutable for corn more than for the other grains. Meal had no price change (although import levies on soybeans and meal have been suggested as a possibility by the EC), making corn relatively more expensive in relation to its substitutes than barley. Corn is also heavily used in poultry feeds. Under this scenario, poultry numbers dropped 5 percent by the final year, and hog numbers by 6 percent.

It is likely then, that Spain will produce slightly more grain under the CAP, but will export substantially more than under the baseline scenario. Less grain will be used domestically, implying loss of value-added industry. Whether this also means increased imports of meat, or reduced meat and livestock products consumption by the Spanish people, or both, is beyond the scope of this study, but depends on the effect on the markets for meat and livestock products.

Another major effect is on the grain trade position of Spain. Under the baseline, Spain was a net importer of almost 1.5 mmt of wheat, barley, and corn in 1990/91 (Figure 2). However, under the CAP, Spain would become a net exporter of 400 tmt, of which 300 tmt would be in corn and barley, as a whole. This translates into a decrease of two mmt of feed grains imports per year. It is this effect that has caused concern by the U.S. However, it is doubtful

that a decrease of two mmt of grain imports by Spain will substantially impact world grain trade.

With the decrease in imports would come reduced revenues from import levies as existed under the former policy. Increased barley exports would mean increased export restitution payments. Both would mean fewer funds in Spain's treasury, but how much of this would be absorbed by the EC is not clear.

U.S. feed grains exports have been projected to be 53 mmt by 1990/91 (6). Even if the U.S. were to absorb the full reduction each year, this would amount to less than 4 percent of U.S. exports of feed grains. However, over the long run, world price adjustments would probably increase other nations' imports slightly and reduce competitors' exports somewhat, so that the full effect of Spain's entry into the EC would not rest solely on the U.S.

Conclusion

The effects of Spain entering the EC on the Spanish grain markets will be relatively minor from the point of view of grain production. Price changes will be substantially larger on the demand side, however, and domestic use of grains, especially feed grains will decrease significantly. This could put Spain into the position of being a small net exporter of wheat and feed grains, by reducing corn imports and expanding barley exports. This would be accompanied by reduced livestock production, therefore, the loss of some value-added production.

Although decreasing grain imports by two mmt by 1990/91 might be a relatively significant change for Spain, when viewed in relation to the world grain markets, it would probably be barely noticeable. Even from the perspective of the U.S., two mmt of corn and barley (between 80 and 90 million bushels) is not an overwhelming amount. It is probable that Spain's entry into the EC will not greatly affect world trade of wheat and feed grains.

Table 1. Policy Prices in Spain and the EC

Year	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85
					(Pesetas/MT)					
Wheat										
Spain Support	9320	10800	12200	14200	15500	16750	18340	20400	21940	22650
EC Intervention	11080	10870	14450	13792	13955	15544	18252	21631	22784	24426
EC Threshold	12006	13990	18673	18084	18472	20861	24915	29636	31653	33960
Barley										
Spain Support	6980	7500	8400	10000	11200	12300	14000	16500	18750	20950
EC Intervention	9763	10870	14450	13792	13955	15544	18252	21631	22784	24426
EC Threshold	10911	12659	17090	16365	16737	18897	22645	26940	28781	30915
Corn										
Spain Support	8100	9400	12000	13500	15000	16650	18500	20300	21750	22650
EC Intervention	9101	10513	14205	13792	13955	15544	18252	21631	22784	24426
EC Threshold	10858	12659	17090	16365	16737	18897	22645	26940	28781	30915

Table 2. Supply and Demand Elasticities in the Spain Grains Model

Price	Wheat	Barley	Corn	Soymeal	Cattle	Hog	Income
Equation							
Wheat							
Area	0.61	-0.23					
Feed Use	-1.40	1.30					
End Stocks	-1.07						
Barley							
Area	-0.54	0.18					
Feed Use		-0.84	0.31		0.16		0.19
Food Use		-0.23					1.48
Corn							
Area			0.20				
Use			-0.84	0.33			0.45
Soymeal							
Feed Use	0.11			-0.30		0.33	1.07

Table 3. Impacts of Entry into the EC on Spanish Grains

	85/86	86/87	87/88	88/89	89/90	90/91
			(1000 mt)			
Wheat						
Production						
Baseline	5326	4453	5564	5789	5896	6067
EC Scenario	5326	4297	5335	5565	5763	5963
% Change	0.0	-3.5	-4.1	-3.9	-2.3	-1.7
Domestic Use						
Baseline	5040	5764	5571	5643	5677	5724
EC Scenario	5040	5759	5551	5611	5664	5717
% Change	0.0	-0.1	-0.4	-0.6	-0.2	-0.1
Exports						
Baseline	211	-1119	-162	-44	81	212
EC Scenario	211	-1261	-333	-189	-49	97
% Change	0.0	12.6	105.4	331.4	-159.7	-54.0
Barley						
Production						
Baseline	9443	6757	8845	8998	9192	9351
EC Scenario	9443	6817	9068	9244	9394	9528
% Change	0.0	0.9	2.5	2.7	2.2	1.9
Domestic Use						
Baseline	8663	8958	8571	8594	8617	8650
EC Scenario	8663	8184	7879	7905	7915	7942
% Change	0.0	-8.6	-8.1	-8.0	-8.1	-8.2
Exports						
Baseline	1369	-1278	202	371	560	694
EC Scenario	1369	-475	1134	1314	1468	1582
% Change	0.0	-62.8	462.1	254.2	162.2	127.9
Corn						
Production						
Baseline	3410	3355	3153	3247	3347	3451
EC Scenario	3410	3355	3162	3268	3381	3501
% Change	0.0	0.0	0.3	0.6	1.0	1.4
Domestic Use						
Baseline	5469	5292	5555	5598	5750	5837
EC Scenario	5469	4703	4840	4754	4800	4790
% Change	0.0	-11.1	-12.9	-15.1	-16.5	-17.9
Imports						
Baseline	2179	1537	2402	2351	2403	2386
EC Scenario	2179	948	1678	1486	1420	1290
% Change	0.0	-38.3	-30.1	-36.8	-40.9	-46.0

FIG 1. GRAIN PRODUCTION IN SPAIN

(WHEAT AND FEED GRAINS)

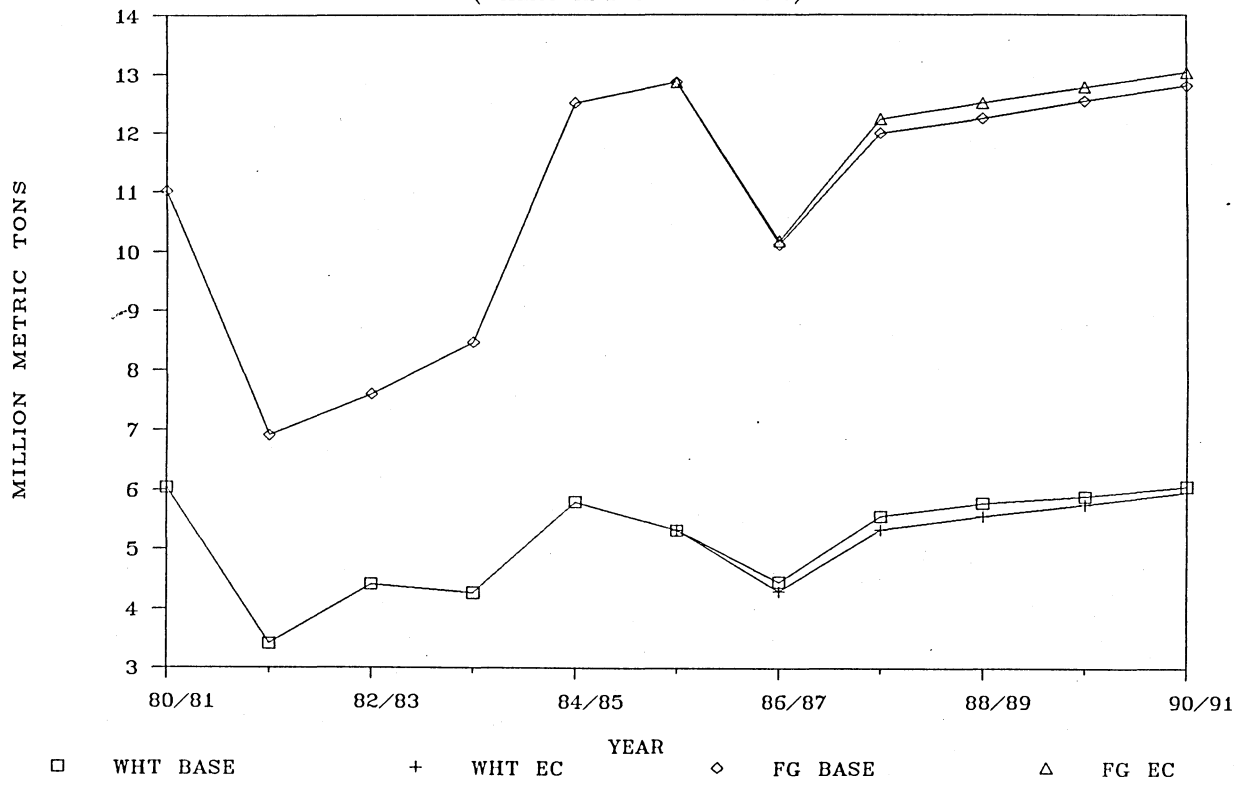
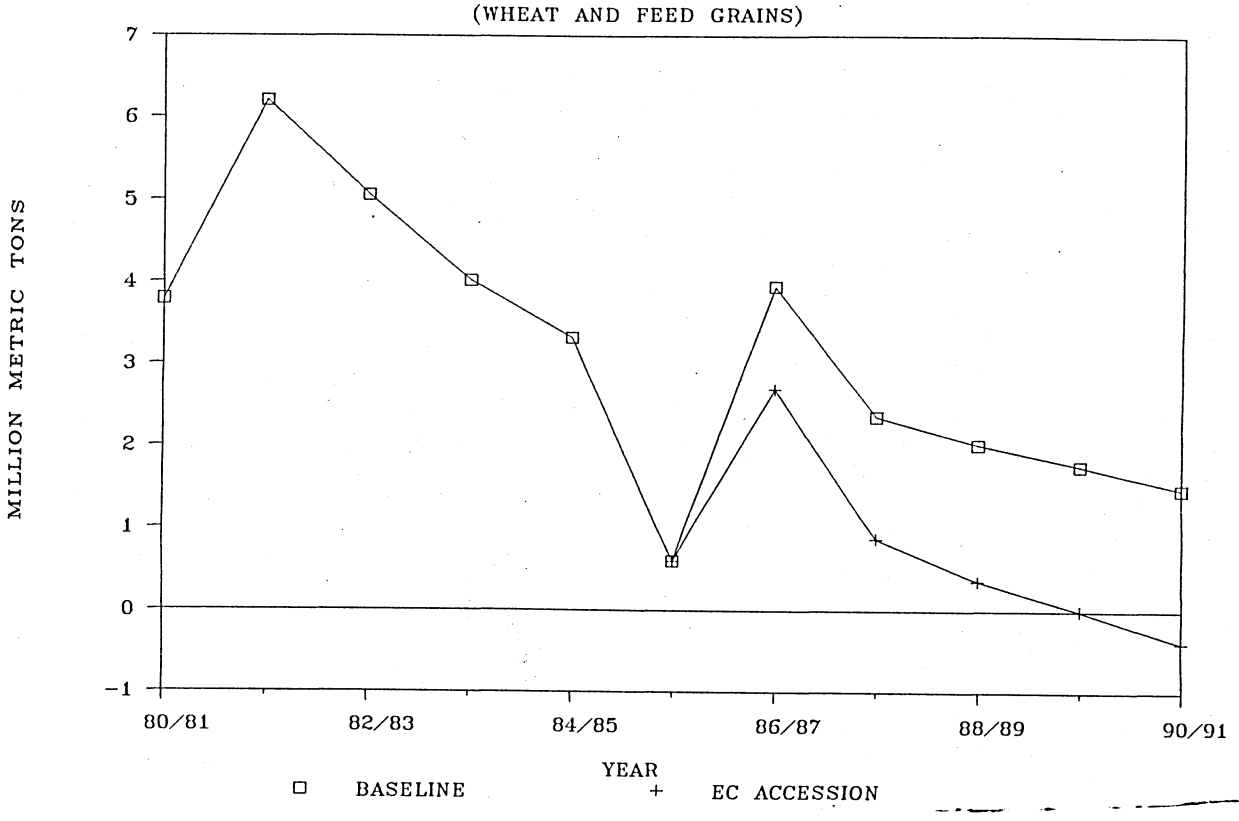


FIG 2. GRAIN NET IMPORTS BY SPAIN

(WHEAT AND FEED GRAINS)



References

1. Johnston, J. Econometric Methods. 3rd Ed., McGraw-Hill Book Company, New York. 1984.

2. Kelch, David R. "Structural and Commodity Policies of Spanish Agriculture." IED, ERS, USDA. Foreign Agricultural Economic Report No. 174. 1982.

3. Peterson, E., Albert Pelich Paniker, Harold M. Riley, Vernon L. Sorenson. "Spain's Entry into the European Community: Effects of the Feed Grain and Livestock Sectors." IED, ERS, USDA. Foreign Agricultural Economics Report No. 180. 1983.

4. Tawil, Natelie, Athena Hyson, Janet Sayre, Stephen W. Hiemstra. "Selected Agricultural Statistics on Spain, 1970-82." IED, ERS, USDA. Statistical Bulletin No. 742. 1986.

5. USDA. "Selected Agricultural Statistics on Spain, 1965-72." ESCS, USDA. Statistical Bulletin No. 630. 1980.

6. Wharton Econometric Forecasting Associates. "Long-Term International Agricultural Outlook." Philadelphia. Winter 1986.

7. Wharton Econometric Forecasting Associates. "World Economic Outlook." Vol VIII, No. IV. Philadelphia. December 1986.