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PORTUGAL'S ENTRY INTO THE EC:  
THE CHALLENGE FOR SMALL FARMERS

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## ABSTRACT

Portuguese farmers face product price declines of 15 to 30 percent because of the country's entrance into the European Economic Community (EC). Simulations suggest that technological changes can compensate for price declines on large farms. Medium farms may suffer because they cannot achieve sufficient scale nor cannot earn enough off-farm income.

## Biographical Sketch

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INTRODUCTION

Portugal became a member of the European Economic Community (EC) on January 1, 1986. Although positive long-term gains are expected for the economy as a whole, the agricultural sector will experience a significant challenge because of the changes Portugal must make in product pricing to align its policies with the rest of the community. Portuguese agriculture has benefited from subsidized production inputs and policies that maintained many product prices above world and EC prices. Most input subsidies were eliminated during the past few years, but prices paid to farmers are still relatively high. Furthermore, many EC prices are high compared to the rest of the world and GATT negotiations currently underway suggest that future EC prices may fall. If these negotiations succeed, Portuguese prices will have to fall even further.

Adjustments to price changes will be particularly difficult in northwest Portugal, a region dominated by small and poor farms. Recent studies suggest that many farming systems will experience reduced private profitability with EC prices (Carvalho et al.; Finan; Finan and Fox). To date, however, no one has modeled typical farming systems with projected prices, and systematically tested alternative ways to restore the farm income lost by price declines. The purpose of the study summarized here was to analyze the impact of alternative farm level adjustments to compensate for lower commodity prices. The study consisted of two main parts. The first involved detailed projections which were the source of most of the future Portuguese product prices used in the second part (Avillez et al.). The second involved

development of farm level models to analyze the impact of price changes and the alternative scenarios simulated (Henriques).

#### NORTHWEST PORTUGAL

The Entre Douro e Minho region in northwest Portugal is the study area for this research. It contains about 850,000 hectares and produces 13 percent of the national agricultural GNP. The region consists of a narrow coastal plain in the west, a transitional zone with increasing altitude, and in the east a mountainous area with terraces and high valley agriculture. Much of the agricultural land is irrigated. An average size farm in the region in 1980 earned only about one-half of the nationwide average farm income.

Farms are small averaging about 2.3 hectares and are typically composed of several parcels. The very small (less than 3 hectares) and small (3-5 hectares) farms together represent 94 percent of the farms but only one-half of the total farm area. Large farms (over 50 hectares) account for only 0.5 percent of the farms, and almost one-quarter of the area. The very small and small farms produce about three-quarters of the region's livestock and crop GDP, and 30 percent of the forestry products. Wine, vegetable crops, beef, potatoes, corn and milk, in that order, are the region's most important commodities. The very small and small farms produce between 70 and 90 percent of the total production of these commodities.

Milk is particularly important as the region produced almost 30 percent of the nation's raw milk in 1981. Most producers have less than 10 cows and half of the farms have a daily production of less than 10 liters (Carvalho et al.). Most farms have vineyards with fewer than 0.5 hectares and produce less than 5,000 liters of wine annually (Finan et al.). Like wine, potatoes are usually grown on small plots largely for home consumption.

The region's farming systems are traditional, especially for the small farms. Most farm labor is provided by the wife because many males have off-farm employment. Power and specialized machinery ownership is generally limited to larger farms which frequently provide custom hiring for small farms. Milk is often produced by traditional breeds of cows that are also used as work animals. Many small farms do not have modern milking facilities so milking is done in cooperative milking parlors. Although regional crop yields are fairly high by Portuguese standards, they range from a low of about one-third of EC levels for oats and rye to 85 percent for corn. Milk production per cow is about three-quarters of the EC average. Wine production per hectare, on the other hand, is higher than the EC but there are doubts about the competitiveness of Portuguese wines in the EC market<sup>1</sup>. There may be good export prospects for Portuguese fruits and vegetables but many are produced outside this region and these markets have yet to be developed.

#### THE EC AND FUTURE PORTUGUESE PRICES

The future profitability of farm enterprises and, consequently, the level of farm income in Northwest Portugal will depend on two factors. One factor will be the changes in factor and product prices that will occur as Portugal adopts the Common Agricultural Policy (CAP). The second will be the technological change that may occur because of the investments to be made with national and EC funds derived from the structural component of the CAP.

The evolution in future Portuguese product prices will be determined by four factors. The first factor will be the procedure used to harmonize Portuguese institutional prices with the EC. The process depends on the length of the transition period (maximum of ten years), the initial price level at the date of accession, and the alternative strategies available to

Portugal. Second, EC prices will change with the evolution in world prices and possible internal and Gatt inspired reforms in the CAP. Third, Portuguese prices will be determined by the evolution of the "Green Rate"<sup>2</sup> reflecting exchange rate policies of Portugal and the EC. Fourth, agricultural markets will evolve between Portugal and its trading partners, in and out of the EC, because of the gradual opening to external markets and Portuguese integration into the mechanisms regulating EC Common Market Organizations.

Future factor prices, on the other hand, will be affected by EC limitations on farm subsidies and by the expected competition from imported inputs entering Portugal as it opens its markets. Primary goods prices will also be affected by the rate of economic growth in Portugal compared to other EC countries, by the expected increase in labor mobility, and by improved access to EC investment funds provided to Portugal.

Considering these factors, models were developed to project product prices using the following assumptions:

1. Adjusting institutional prices using either a) the terms established in the Accession Treaty or, b) when Portuguese flexibility is permitted, extrapolating from the trends observed in Portugal's adjustment strategies during the past two years;
2. Average real EC price decreases of 2.5 percent per year until the 1990/91 market year, and 1.5 percent per year thereafter until the end of the transition period;
3. Devaluation of the Green Rate to maintain purchasing power parity in relation to other EC currencies, maintenance of the actual agrimonetary policy, and the adoption of a Green Rate relatively favorable to Portuguese consumers.

The results of the price projections for 1996 (Table 1) show a sharp overall downward trend with variations among commodities that will affect price relationships, future production options and real farm income. Given the greater uncertainty in making input price projections, a simplifying assumption was made to hold them constant, recognizing the bias this produces in favor of enterprises that use fewer purchased inputs.

#### MODELING ALTERNATIVE SCENARIOS

The modeling component of this study employed a four-step research methodology to analyze policy options: 1) four representative farming systems were identified from survey data (DRAEDM), 2) a linear programming model was developed and verified for each system, 3) optimum solutions were obtained for each model using 1986 and projected 1996 product prices, and 4) alternative scenarios were tested in a comparative static framework as means to compensate for the farm income lost through product price declines. Models for small, medium and large dairy farming systems were developed because of the importance of milk in the region. The fourth model represented small diversified farms with less dependency on milk<sup>3</sup>.

The objective function maximized returns to family labor and management. Four production periods were established to capture observed seasonality in production and input use. Activities were included for production, buying and selling, hiring in and out labor, and interperiod resource transfers. Estimates for home consumption, minimum area for vineyards and potatoes, and fixed costs were based on survey results. Constraints were specified for various types of land, family and hired labor, and machinery hours. Input-output coefficients were obtained from survey and other data.



The income effects of introducing 1996 product prices are shown in Table 2. The values show the percentage decline in household net income for each farming system comparing the optimum model solutions for 1986 prices with the solutions using 1996 prices. Two values are reported. The first shows a decline ranging from 25 to 250 percent when off-farm employment is not permitted. The second shows declines from 11 to 247 percent when it is assumed that unlimited off-farm work is available at the minimal agricultural wage rate. These two approaches capture the range in loss of household income that occurs depending on the success that a particular household has in obtaining off-farm work. The medium and large farms experience negative net farm income because of high levels of fixed costs relative to small farms.

Two important points can be seen from the results in Table 2. First, the relative income declines are greatest for the largest farms because they produce the most and are most affected by product price declines. Off-farm work does not compensate for lower prices because the family labor is fully employed on the farm where returns to labor are highest. Second, small farms derive a relatively large amount of household income from off-farm work so price declines affect a smaller part of their total income.

Income losses of this magnitude present a serious challenge for Portuguese policy makers. These farmers are already some of the poorest in the country. Many medium and large farms have received subsidies the past few years to specialize in dairying. Large income declines will make it impossible for them to service their debts, maintain current capital stock and cover fixed costs. The challenge is to identify the alternatives that Portugal can undertake, consistent with CAP regulations, to make the best use of the transition period to ease the adjustment process.

Table 1  
Prices for Agricultural Commodities  
in 1986 and 1996

Item	Units	1986 (Escudos) <sup>a/</sup>	1996	Percent Change
Beef <sup>b/</sup>	kg	508	431	-15.1
Sheep <sup>b/</sup>	kg	663	572	-13.7
Corn <sup>b/</sup>	kg	41	27	-34.1
Rye <sup>c/</sup>	kg	41	28	-31.7
Beans <sup>d/</sup>	kg	100	100	0.0
Potatoes <sup>d/</sup>	kg	20	20	0.0
Feeder Calf <sup>d/</sup>	calf	25,000	21,200	-15.1
Milk <sup>b/</sup>	liter	45	30	-33.3
White Wine <sup>c/</sup>	liter	36	37	2.7
Red Wine <sup>c/</sup>	liter	33	34	3.0
Brandy <sup>d/</sup>	liter	150	150	0.0

Source: <sup>a/</sup> The exchange rate during 1986 averaged 150 escudos = U.S. \$1.00.  
<sup>b/</sup> Adapted from Avillez, 1987.  
<sup>c/</sup> Adapted from Tangerman and Josling, 1985.  
<sup>d/</sup> Values collected in the region.

Table 2  
Effect of 1996 Product Prices on Net Farm Income

Farming System	Percent Decline in Income	
	Without Off-Farm Work	With Off-Farm Work <sup>a/</sup>
Small Diversified farms	25	11
Small Dairy Farms	46	33
Medium Dairy Farms	159	107
Large Dairy Farms	252	247

<sup>a/</sup> At the prevailing minimum agricultural wage rate.

Two sets of simulations testing policy alternatives are reported here. One reflects the possible impact of technological changes that may occur in crop and dairy production considering the agronomic alternatives currently available. The second alternative reflects the crucial role of improved off-farm job availability.

The data in Table 3 report the simulation results assuming that 1996 product prices prevail in all cases. The first two columns show the effects of technological change when unlimited off-farm work is available at the minimum agricultural wage. The next four columns report the results using the minimum industrial wage rate (15 percent higher) assuming: a) one full-time job, and b) unlimited industrial work providing an equal number of hours are worked each period.

Improved technology leads to an expansion in output of forage and milk, with a reduction in potatoes and wine. The impact of technology increases with farm size so this alternative alone is able to restore income on large farms to 1986 levels. On the other hand, technology makes only a limited impact on small farms so they continue to allocate much of their labor to off-farm work. One off-farm industrial job per household at existing wages does not, however, improve income for those farms that already have unlimited employment in the farm sector. Even the alternative which offers more industrial employment but requires that work to be evenly distributed throughout the year does not resolve the income problem.

The income problem is especially serious for the medium sized farms caught in a technological trap. On the one hand, dairying is the most profitable enterprise but even with technological change these farms cannot achieve a sufficient scale of operations to lower unit costs as do the large

TABLE 3

Alternative Scenarios with 1996 Prices

Farming System	Unlimited Farm Employment		Industrial Employment			
	Without Technology Change	With Technology Change	Without Technology Change		With Technology Change	
			Full Time	Limited Seasonality	Full Time	Limited Seasonality
Projected Income as a Percent of 1986 Income						
Small Diversified Farms	88	94	79	89	87	95
Small Dairy Farms	67	85	66	70	85	84
Medium Dairy Farms	-108	44	-9	-8	35	38
Large Dairy Farms <sup>a/</sup>	-247	105	N.S.	N.S.	N.S.	N.S.
Percent of Labor Spent on Farm						
Small Diversified Farms	30	55	48	26	51	34
Small Dairy Farms	32	71	59	27	58	52
Medium Dairy Farms	51	58	52	50	57	62
Large Dairy Farms <sup>a/</sup>	79	97	N.S.	N.S.	N.S.	N.S.
Major Farm Enterprise Changes Compared to 1986 Optimum Combination						
Small Diversified Farms	Decreased winter crops & beef	Increased beef	No Change	Decreased winter crops & beef	Increased beef	Decreased winter crops & beef
Small Dairy Farms	Decreased winter crops & milk cows	Increased milk productivity	Decreased milk cows	Dairy eliminated, increased beef	Decreased milk cows	Decreased milk cows
Medium Dairy Farms	Increased forage & milk cows, decreased wine	Increased forage & milk cows, decreased potatoes & wine	No Change	Increased forage & milk cows, decreased potatoes	Increased forage & milk cows, decreased potatoes	Increased forage & milk cows, decreased potatoes
Large Dairy Farms <sup>a/</sup>	Increased forage & milk cows, decreased potatoes & wine	Increased forage & milk cows, decreased wine	N.S.	N.S.	N.S.	N.S.

<sup>a/</sup> The industrial employment alternatives were not simulated for the large dairy farms.

farms. On the other hand, medium farms have insufficient labor to earn enough off-farm wages to compensate for lower farm income.

#### CONCLUSIONS AND IMPLICATIONS

Farmers in Northwest Portugal face a sharp decline in farm income when the country fully adjusts to EC product price levels by 1996. Medium and large dairy farms will likely experience negative net farm income because of their high levels of fixed costs associated with investments they were encouraged to make in recent years to modernize Portuguese dairying. Small farmers will face proportionately lower declines in family income because a large amount of their total labor supply must be employed off the farm. Projected 1996 product prices result in decreased production of winter crops, potatoes and wine.

Technological changes expected in the dairy, forage and field crop enterprises result in increased milk production in the optimum enterprise combinations for dairy farms. The value of this production on large farms is sufficient to fully restore the income lost due to price declines. Technological changes plus off-farm work in the agricultural sector can produce almost enough income on small diversified and dairy farms to compensate for their income loss. Medium dairy farms are caught in a squeeze, however. They do not have enough land to achieve the economies experienced by large farms as they adopt new technology. On the other hand, their family labor supply is needed for farm enterprises so they cannot earn as large amounts of off-farm wages as do small farmers. Therefore, medium farms will earn less than half of their 1986 family income even if they adopt new technology and have access to jobs paying the minimum wage.

Industrial employment, although simulated at a 15 percent higher wage rate, does not provide the solution to low farm incomes if adequate agricultural work is available. One full-time industrial job per family actually lowers family income. Industrial work which exceeds the amount provided by one worker but requires an equal number of hours worked per period is also no better than unlimited farm work.

Some fairly clear directions emerge for agriculture in Northwest Portugal. The future income and welfare of small farmers will be extremely dependent upon their success in obtaining off-farm work, either in the agricultural or industrial sectors. Due to their small size, technological change in current farm enterprises is not an effective alternative to restore income lost due to price declines. Policies affecting industrial location, rural transportation and job training will be important in determining their employment success. Large farms, on the other hand, have a large enough scale of operations to maintain their income through technological changes. The future success of medium size farms, however, is closely linked to the future of the land market. These farmers must be able to rent or buy more land to get maximum benefit of the new technology and spread their high fixed costs over more units of production. It will be important for Portugal to carefully allocate the funds entering the country during the transition period to the most promising economic enterprises and to facilitate the structural changes that must occur.

#### FOOTNOTES

1. The wine produced in the region is the "vino verde" type which is consumed mostly in Portugal.
2. Special EC exchange rate used for conversion of agricultural prices.
3. A detailed description of all the models, the coefficients used for each activity, and the results for all simulations can be found in Henriques.

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