A static partial equilibrium analysis of Malta's entry in the EC: The case of agriculture

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in

Busuttil S. (ed.), Lerin F. (ed.), Mizzi L. (ed.).
Malta: Food, agriculture, fisheries and the environment

A Static Partial Equilibrium Analysis of Malta's Entry in the EC: The Case of Agriculture[1]

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Abstract. *The paper analyses the economic effects of Malta's accession to the EC and the implications on the Maltese economy of an eventual participation in the Common Agricultural Policy. The methodology used is a partial-equilibrium model composed of three sub-models: a demand, a supply and a trade model. Empirical evidence shows that accession is going to affect adversely both consumers and producers while the agriculture trade deficit will widen further. Both consumption patterns and production structures will undergo significant structural changes in order to adapt to the new situation. Certain fiscal and/or monetary measures will have to be gradually introduced to control a potential upsurge in the consumer price level and the trade deficit. Current agricultural policies will have to be radically restructured if the sector is to meet the challenges as well as any opportunities that entry into the EC will give rise to.*

Titre. Une analyse d'équilibre statique partiel de l'adhésion de Malte auprès de la CE : le cas de l'agriculture.

Résumé. Il s'agit ici d'analyser les effets économiques de l'entrée de Malte dans la CE et les implications sur l'économie maltaise d'une éventuelle participation à la politique agricole commune. La méthodologie d'équilibre statique partiel utilisée comprend trois sous-modèles concernant : la demande, l'offre et le commerce international. On peut prévoir que l'adhésion affectera plutôt négativement les consommateurs et les producteurs alors que le déficit commercial agricole ira en augmentant. Les modèles de consommation ainsi que les structures de production connaîtront des changements structurels importants en raison de l'adaptation à cette nouvelle situation. Certaines mesures fiscales et/ou monétaires devraient être introduites progressivement afin de contrôler une augmentation potentielle des prix à la consommation et du déficit commercial. Face à de nouvelles situations occasionnées par l'entrée de Malte dans la CE, les politiques agricoles actuelles doivent être radicalement restructurées.

Keywords. Malta – Partial equilibrium analysis – Linear approximate almost ideal demand system (LA/AIDS) – Econometric model – Common Agricultural Policy.

I. – Introduction

Entry and participation in the EC is undoubtedly one of the main issues currently being discussed on the Maltese political scene and the gradual application of the CAP mechanism features rather dominantly in the debate between the two main political parties.**[2]**

The relations between Malta and the EC find their institutional origin in the Association Agreement signed between the two parties in 1970. Since then several Financial Protocols have emerged even though these were quite detached from agricultural matters. Nevertheless, Malta benefited from certain tariff reductions and the elimination of the fixed component element on certain agricultural imports. Initially the Association Agreement stipulated the passage towards a Customs Union. However, this option seems to have been set aside by the two political parties and since the Conservative Government applied for full membership in July 1990, the objective is full participation in the Community's institutional framework.

This paper will be subdivided into two main parts, the first providing a detailed insight into the Maltese agricultural sector and its specific characteristics, the second discussing the implications that will spill over the Maltese economy with the immediate application of the CAP. It should be stated from the outset that the model did not seek to consider the transitional period (which will largely depend on the outcome of the negotiations) and only **static** economic effects are considered. The hypothetical year of entry is 1995.

II. – The Agricultural Sector in Malta

1. Sectoral contribution

The Maltese agricultural sector has always been considered as one of the main pillars of the economy in successive Development Plans. However its current role can in no way be contrasted to other Mediterranean countries. In accordance with planned development objectives and priorities, the manufacturing industry, most particularly the textile and clothing subsector (and more recently the semiconductors industry) and the services sector—tourism, transhipment and offshore—have set the pace to Malta's recent development process leaving the agriculture sector lag behind. *Table 1* shows the sectoral contribution of agriculture and fisheries to Gross Domestic Product (GDP).

Table 1. Sectoral Contribution to GDP

	1986	1987	1988	1989	1990	1991	Jan/Sept 1992
GDP at factor cost Lm million[3] <A>	461.8	495.4	542.6	596.8	649.6	710.0	567.2
Agriculture and Fisheries <B>	20.4	21.4	21.1	22.4	22.5	23.5	17.5
Sectoral contribution <B>/<A> x 100	4.4	4.3	3.9	3.8	3.5	3.3	3.1

Source: *National Accounts of the Maltese Islands* (1990).
Economic Survey January-September 1992.

2. Structure of holdings and agricultural labour force

A major technical and institutional obstacle to agricultural development in Malta centres around the structure of holdings. The traditional land tenure system, which has promoted the fragmentation and dispersion of holdings, resulted in an average farm size of less than 1 ha.

Besides the constraints of land availability and size, the Maltese agricultural sector is also confronted with a general decline in the gainfully occupied population engaged in agriculture and fisheries, an aging working population and an industry which is becoming all the more dominated by part-timers. In 1992, the gainfully occupied population within this sector constituted only 2.5% of the total.

3. Structure of Production

Agricultural production in Malta has maintained a stable upward trend over the past years particularly under the impetus of drip-irrigation techniques in vegetable production and artificial insemination in the

case of animal husbandry. However unlike other Mediterranean countries, Maltese agricultural production is mainly composed (in value terms) of animal products (65%) followed by vegetables (21%), forage crops (8%) and fruit (6%).

Total meat production in 1992 is estimated at 17.2 thousand tonnes valued at some Lm 15.0 million. Swine production constitutes 50% of the principal meats (in tonnage) followed by poultry (40%) and beef (10%). Malta has reached a level of relative self-sufficiency for pork and chicken although the country resorts to imports of processed pigmeat and specialized fowl. Furthermore during the period 1990-91, some 800 tonnes of pork had to be imported as the pig industry could not cope with increased domestic demand. Malta reached complete self-sufficiency in eggs and fresh milk, although due to temporal deficiencies, the country has to resort to temporal importation. Milk production has reached 35,762 tonnes during 1991 (valued at nearly Lm 5.1 million) while egg production reached 8.9 thousand tonnes (assuming 5.8 kilogrammes per 100 eggs).

Data relating to fruit and vegetable production is rather lacking and in the absence of an agricultural census (the Central Office of Statistics launched one and the data is currently being processed) the best proxy available is that of the quantities sold at the *Pitkali*, *i.e.* the centralized wholesale market. However, an important proportion of fresh fruit and vegetables is sold directly off-the-farm and all estimates remain rather subjective. Vegetable production is mainly characterized by spring potatoes—the main export crop—followed by tomatoes, cauliflowers, cabbages, carrots and onions. The main fruits produced are stone fruit, particularly cherry plums and peaches, strawberries, melons and grapes. Grape production has been on the continuous decline over the past years and in effect the local wine industry has to resort to periodic importation.

4. Agricultural Policy

Besides the general constraints of land availability, water resources and the lack of agricultural investment (only 2% of total Gross Fixed Capital Formation (GFCF) is channelled in agriculture), the generally poor state of Maltese agriculture is the legacy of a long period during which there was no coherent policy for agricultural development. Inspite of continued calls for a strengthened role of this sector within the national economic structure, few serious measures have been taken in hand to rectify the situation and it is only recently that experts from FAO have been brought over to make an evaluation of the situation.

As Delia (1990) highlights "(local agricultural policies) do virtually nothing to reduce costs of inputs, support farm prices directly or induce structural reform". The only form of direct intervention is the **Beef Intervention Scheme** which guarantees the price of beef in order to contain any ensuing problems that a gradual fall in red meat consumption may have on the milk industry. Middlemen guarantee the minimum price of fresh beef while Government buys the forequarters of the carcass considered as inferior meat. It is important to highlight that in Malta the beef industry is actually constituted of "dairy beef".

Tripartite consultation with Government as arbitor involving also the Milk Producers' Cooperative (KPH) and the Dairy (Malta Dairy Products Co. Ltd.) sets the price of milk and the management of a global quota.

Production quotas exist also in the case of pork and in effect this has been increased to take into account higher consumption levels. The national quota for Malta and Gozo is 2,310 pigs per week. On recommendations of the Poultry Advisory Board, the production quota on broilers was suspended in December 1990.

There is no state regulation of prices for fresh fruit and vegetables and prices are solely determined by market forces.

Imports of agricultural produce are subject to low import duties while no form of export subsidies or intervention (except for beef) exists. Since 1989 agricultural trade has been further liberalized although special levies on processed agricultural products have been introduced in order to protect local agro-industry. There is full prohibition of import competition in the case of bread, cakes and pastries while the beverages subsector is highly protected through rather prohibitive tariffs.

The Department of Trade has been gradually liberalising trade through the further curtailment of import licensing controls and public procurement through the Bulk Buying Scheme. Several agricultural commodities were until 1992, still administered under the Scheme and included grains, (wheat—soft and hard, barley and maize) sugar, evaporated milk, frozen meat and soyabean oil. As from 1993, only grains will remain administered. Grains are imported by a parastatal company—Medigrain—which has as its objective the stabilization of wheat and feed prices.

5. Agricultural Trade

Despite all efforts towards partial self-sufficiency, Malta still remains a net importer of agricultural products. The average rate of cover of imports by exports (agricultural) currently stands at around 9.5% compared to 59% for total trade which is very low when contrasted to other Mediterranean countries. If one were to exclude processed foods, beverages and tobacco, the rate of cover in agricultural trade would be **considerably** lower. It is anticipated that the agricultural trade rate of cover ratio will decline further as a result of further pressures from the tourist industry and a growing population.

Table 2. Total Trade and Agricultural Trade

	1986	1987	1988	1989	1990	1991*
						(Lm million)
Total Trade						
Imports	347.9	392.9	447.4	515.8	620.5	683.2
Exports (inc. re-exports)	194.6	208.6	235.9	294.4	357.9	405.0
Trade balance	-153.3	-184.3	-211.5	-221.4	-262.6	-278.2
Rate of cover (%)	56.0	53.1	52.7	57.1	57.7	59.3
Agricultural Trade						
Imports	48.3	49.8	54.7	60.9	64.8	73.0
Exports (Domestic)	6.7	5.8	5.9	5.8	6.3	6.9
Total exports[1]	7.2	7.6	7.7	7.9	10.0	10.3
Trade balance	-41.1	-42.2	-47	-53	-54.8	-62.7
Rate of cover (%)[2]	13.9	11.6	10.8	9.5	9.7	9.5

* Provisional.Data since 1990 is not directly comparable with past years as information has started being classified according to the **Harmonized Tariff System**.
(1) Includes re-exports which however are not purely of agricultural origin (mainly duty-free beverages and tobacco). Exports of manufactured tobacco are not included.
(2)The rate of cover is estimated on domestic exports **only**.

Source: Trade Section, Central Office of Statistics.

Malta's main agricultural imports are live animals and meat preparations, dairy products particularly cheese and evaporated milk, all types of grains, fruit, namely apples, oranges and bananas as well as potatoes. The EC remains the main supplier of Maltese agricultural imports with the exception of certain meats, fish and fish preparations and wheat. Since 1990, Malta has been benefiting from the US Export Enhancement Programme (EEP) through which the US undertakes to export to Malta some 50,000 MT of grains at preferential world market prices. On the other hand, both EC-originating maize and barley benefit from the CAP's export subsidies.

Agricultural exports represent just 2.3% of total Maltese domestic exports compared to 26% in the 1960-70 period. Exports of Spring potatoes to the Netherlands reached 7,620 MT during April-May 1992 compared to 2,985 MT during the year-earlier period although the price paid to the Maltese farmer in 1991 was the highest ever reached—Lm 200.5 per MT. Other exports include cut flowers and horticultural plants (UK), fish (Italy, UK, Japan) and food preparations (Near and Middle East).

6. Conclusion

Maltese agriculture is characterized by features which although prevailing in other Mediterranean countries are quite typical to island states—limited agricultural land, water constraints, intensive production methods, hence pressures on ecosystems. The gradual application by Malta of the different common market organisations of the CAP is certainly bound to have significant effects on the whole economy and this is the subject matter which will be tackled in the next section.

III. – Economic Implications of the CAP on the Maltese Economy

Alternative approaches used in the quantification of the introduction of a particular agricultural policy or the liberalisation of agricultural trade

Various researchers within the Mediterranean region have ventured into analyzing the *ex ante* and *ex post* effects of the introduction of the CAP mechanisms on their economy. In the case of Greece, the studies of Christou and Sarris (CS) (1980), Catrivesis and Hitiris (1982), Georgakopoulos (1986, 1988), Caraveli-Ioannidis (1987), Demoussis and Sarris (1988) and Zioganas (1990) are amongst the most popular while in Portugal the authors who have contributed widely on this subject matter were Lobao (1979), Brito Soares (1985), who used the same approach as CS, and Avillez (1987). Ritson *et al.* (1982) were commissioned by the Cypriot Government to evaluate the implications of a Customs Union between Cyprus and the EC within the context of the CAP while Mizzi (1988) utilized the same approach —based on the alignment of prices and assumed elasticities—to quantify the implications of a Customs Union between Malta and the EC on each agricultural subsector and from different viewpoints—the consumer, producer and the exchequer.

The alternative approaches which have been designed to analyze particular aspects of economic integration and, more recently, the process of agricultural trade liberalization are numerous. L. Alan Winters (1987) presents four main approaches to estimate the *"deadweight loss"* of agricultural support policies:

1. **Computable General Equilibrium Models (CGE)**
2. **Intersectoral studies**
3. **Multisectoral studies**
4. **Single-sector studies**

The main dichotomy lies between CGE models and the other approaches which apply partial equilibrium methodology. For our analysis we have chosen the latter. Besides the fact that CGE models have been mainly developed for economies with agricultural structures far different than Malta's, building a model with the objective of estimating the resource competition and income effects of changes in agriculture on the rest of the economy and on macroeconomic variables is not viable when one considers the role of the agricultural sector within the Maltese economy. Another major constraint which has inhibited us from analyzing intersectoral economy-wide effects was the unavailability of data. As yet, there does not exist an input-output matrix for the Maltese agricultural sector while few in-depth sectoral studies have been undertaken with the exception of the dairy industry and the poultry industry.

IV. – Model Specification

The methodology used in our analysis is similar to the one used by CS and Brito Soares in the case of Greece and Portugal respectively although there are certain basic differences. In our study, three sub-models have been constructed—a demand, a supply and a trade model. However, in the case of the demand model we have estimated the price and income elasticities through the Linear Approximate Almost Ideal Demand System (LA/AIDS) instead of the Frisch method. In the absence of already-estimated supply elasticities, we have decided to utilize elasticities estimated for Greece and Portugal. It would have been more relevant to utilize elasticities estimated for Mediterranean island-economies like Madeira, Crete or Cyprus; however, these were not available. Subsequently, we undertook sensitivity analysis in order to ascertain whether variations in the magnitudes of the supply elasticities had an effect or otherwise on the producer surplus/loss. For the trade model, we have utilized exactly the same methodology as CS namely taking as a base the international, the EC and Maltese prices and estimating the extent of trade diversion/creation.

An extension to CS's study was the estimate made for the Structural Funds which will be channelled to Malta prior and after EC entry on the basis of the forecasts made until the end of 1992 (over 14 billion ECUs available for the 12 EC Member states) and a *time trend analysis*. The Maltese Government gives priority to the potential utilization of such funds and although most of the funds would be channelled into infrastructure and industrial development, an important portion will also benefit the Maltese agricultural and agro-industrial sectors.

1. The Demand Model

The demand model is based on Deaton and Muellbauer's Almost Ideal Demand System (1980a, b). The AIDS or LA/AIDS (due to the utilization of Stone's price index as a proxy for the real price index) has become quite popular in recent years in the domain of applied demand analysis. One can mention, for example, the studies of Blanciforti *et al.* (1986), Eales and Unnevehr (1988), Fulponi (1989), Mergos and Donatos (1989), Haden (1990), Green and Alston (1990) and Ingco (1990). Referring to Green and Alston's article about the formulae used for the LA/AIDS variant, we have made use of Chalfant's formula for the estimation of the uncompensated price elasticities.

The category of products for which the elasticities were estimated are: (a) bread and cereals, (b) meat, (c) dairy products, (d) oils and fats, (e) fruit and vegetables, (f) sugar, (g) other food and (h) non food. The analysis also employed a two-stage budgeting procedure by assuming direct weak separability in order to disaggregate the group elasticities of meat, dairy products and fruit and vegetables. We could have either chosen the Armington approach, *i.e.*, assuming a Constant Elasticity of Substitution (CES) or else construct three sub-models within the general LA/AIDS using AIDS once again. We have decided to choose the latter methodology and we imposed the theoretical restrictions of homogeneity and symmetry.

It is beyond the scope of this paper to discuss the results ensuing from the general AIDS model and the sub-models for meat, dairy products and fruit and vegetables. For an exhaustive discussion on the elasticities and the methodology see Mizzi (1991). The parameter estimates are at the base for calculating the new quantities to be consumed and the consumer surplus/loss. We made use of the concept of compensating variation using the integral in the Taylor series as the standard Marshallian consumer surplus.

Table 3. Consumer surplus/loss

Product	New Qty▲ (tonnes)	ECU/tonne Pmalta (1)	Pec (2)	Lm million
Wheat	51413	135.4	292	-2.83
Maize	64266	113	236	-2.78
Barley	35017	106	223	-1.44
Beef	5363	2520*	5285*	-3.26
Pork	9400	1756	1308*	+2.68
Chicken	4800	2010	1400*	+2.76
Eggs	8024	1460	1096*	+1.04
Milk	31092	357	300	+0.72
Sugar	20000	324	661	- 2.70
Potatoes	27314	157	205	- 0.58
Tomatoes #	8710	202	300*	- 0.39
Grapes #	830	450	352*	+0.03
Oranges	8846	374	226	+0.54
Peaches	1857	335	489*	- 0.12
Net Loss				**- 6.33**

* weighted between base price and reference price.
(1) Pmalta = Maltese price; (2) Pec = EC price.
▲ new quantities to be consumed following entry.
\# part of produce used for direct consumption, *i.e.*, no processing.

It should be highlighted that the loss of Lm6.33 million is expected and the main categories which have been negatively affected are cereals, sugar and beefmeat although there is a partial compensation from other animal products, namely pork and chicken as well as oranges.

Malta will have to confront the EC's high threshold prices in the case of cereals and sugar while the current subsidized frozen beefmeat from EC sources or South America will have to be replaced by the highly protective beefmeat regime which currently prevails within the EC. The loss in potatoes may be debatable as there is no common market organisation for this product while in the case of oranges, EC reference prices are lower than current c.i.f. import prices.

It was subsequently important to translate this consumer loss into an "equivalence effect" on the consumer price level. The trend which has set in since the trade liberalization process was embarked upon risks in persisting with Community entry at least in the short/medium term. *Table 4* shows the evolution of the Retail Price Index since 1983.

Table 4. Retail Price Index

	Vital items (62.1)	Other items (37.9)	All items (100.0)
1983	100.0	100.0	100.0
1984	99.41	99.93	99.56
1985	98.89	100.03	99.32
1986	101.15	101.65	101.34
1987	101.92	101.50	101.76
1988	102.78	102.63	102.73
1989	102.54	105.37	103.61
1990	105.98	107.86	106.70
1991	107.25	112.97	109.41

Source: *Economic Survey 1991.*

The approach used is quite simple. We have taken the price index which appears in the National Accounts of the Maltese Islands (which was also used in the LA/AIDS models), the weighting of each product category in the calculation of the Retail Price Index (as per Household Budgetary Survey 1983) and the weight of food consumption in overall total private consumption expenditure, the latter averaging 29.1% during the period 1986-89. Price increases offsetted price reductions so that the overall food prices increased by 12% causing a **first-round increase** in the general price level of about 3.5%. The evolution of prices after 1995 will largely depend on the economic policies followed at that time and the fiscal and/or monetary measures introduced to contain any potential inflationary pressures. It should be pointed out that the prevailing annual rate of inflation in Malta is around 1.7% (as at September 1992).

The effective control of inflationary pressures is imperative given that the Incomes Policy Agreement decided among the three social partners in December 1990—Government, the Employers' Association and Unions is based on what is known as the "cost-of-living adjustment" (COLA). As from January 1992, a new Index based on a Household Budgetary Survey, carried out in 1988-89, has been launched.

2. The Supply Model

The adoption of the CAP mechanisms by Maltese agricultural producers will imply, amongst others, that Maltese agriculture will have to adapt itself to a new price determination system and market regulation. The CAP will affect present production structures and farmers' incomes, particularly very small producers and those engaged in animal husbandry.

At present the CAP is oriented towards the protection of the so-called "northern" products as contrasted to southern Mediterranean products. Although the first signals of the proposed CAP reform point towards a gradual reduction of protection levels for products like cereals and beef and more emphasis is being given to the "accompanying measures"—the agri-environmental action programme, the afforestation of agricultural land and the early-retirement scheme coupled with direct aid payments—the future of Maltese farmers remains rather bleak.

A main assumption in our analysis is that the available land in 1995—the hypothetical year of entry in the EC—will remain the same as in 1991. One does not anticipate any major reductions over a five-year term though the risk of further urban sprawl and land marginalisation will remain quite prevalent.

The supply model has three main objectives:

    (a) the estimation of the new quantities which will be produced with the adoption of the CAP,

    (b) the estimation of the variation in producer surplus and,

    (c) the identification of the agricultural sub-sectors which are the most fragile and those having a certain degree of potential development.

We are knowledgeable of the inherent difficulties existing in the estimation of the parameters on the supply side, particularly within the Maltese context where data is very lacking. Our decision to resort to the supply elasticities estimated for countries like Greece and Portugal can also be criticized on the basis that their agricultural sectors are more dominant in the overall economic structure, the average size of agricultural holdings is 4 ha (this is the size in Greece wherein agricultural holdings are the smallest within the whole EC) and production is more oriented towards fruit and vegetables rather than animal products. However, we have already highlighted earlier on the specificities of Maltese agriculture and it is impossible to find a resemblance with any other Mediterranean or EC country.

As in the case of CS, the construction of a multi-product transformation function from which one could estimate (via the elasticities cf substitution) the new product mix was impossible due to data constraints. In a fully-fledged study concentrating on the supply side, one can envisage the utilization of Nerlovian models, normalized quadratic profit functions or linear programming techniques. Nerlovian models, which

remain quite popular in empirical applications, do not have a solid theoretical and empirical base and one of the best approaches in supply analysis remains that designed for the Turkish Agricultural Sector Model—TASM (Baeur J. and H. Kasnakoglu, 1988).

We have utilized four main sources for our supply elasticities—Askari and Cummings (1976), CS (1980), Brito Soares (1985) and Baltas (1990), although the estimates reproduced by Baltas are more appropriate as 34 different products classified in 7 broad categories were analysed.

The total change in the quantities produced is approximated by the following equation in the case of animal products:

$$\delta Q_i = e_i Q_i/p_i \, (\delta S_i + \delta p_i)$$

and for crop products (occupying land) it is:

$$\delta Q_i = e_i A_i Y_i/p_i \, (\delta S_i + \delta p_i)$$

where δS_i = change in factor subsidy
Q_i'= new quantity produced
Q_i = quantities produced (1987-90)
$\delta Q_i = Q_i' - Q_i$
e_i = price elasticity of supply
A_i = area under production (ha)
Y_i = yield per ha
p_i = current producer price
p_i'= price after entry
$\delta p_i = p_i' - p_i$

In the case of crop products, we assumed an amelioration in yields by projecting past yields via linear time trends. We undertook a similar analysis in the case of milk yields. *Tables 5 and 6* show the new quantities produced of crop products and animal products respectively.

Table 5. Crop Products

Product	Elasticity (supply)	Area (ha)	Yield (MT/ha)	ECU/MT (δp)	Tonnes (δQ_i)
Potatoes (spring)	1.57	1300	17.6	-60	-7800
Tomatoes	0.81	570	35.1	-30	-1800
Onions	1.0	200	17.0	-107	-1200
Cauliflowers	0.5	230	37.4	138	2580
Grapes	1.5	350	10.0	-155	-1628
Peaches	0.9	150	10.0	-448	-680
Oranges	0.2	70	13.0	-180	-60
Forage Crops	0.5	5500	n.a.		
Cabbages	0.53	150	40.3	-57	-812
Melons	n.a.	400	13.0	n.a.	

n.a.= not available.
In the case of forage crops, prices are not comparable because in Malta these are transformed into hay. The cost of hay is 156 ECU/t. The actual yield of cereals in Malta is around 2 MT/ ha.

Table 6. Animal products

Product	Production (MT)	Elasticity (δp)	ECU/MT (δp)	δQ_i (MT)
Milk	33000 38000*	0.7	-50	-3300 -3800
Beef	1536	0.7	-185	-55
Pork	7828	1.6	-375	-2723
Chicken	3150	1.6	-460	-1160
Eggs**	7600	2.5	-250	-3520

* assuming an increase in the yield
** 100 eggs = 5.8 kgs

The products analyzed in the above two tables cover more than 80 % of total agricultural production. The main exclusions are melons and watermelons. The significant reduction in production is immediately noticeable particularly in the case of animal products, thus reflecting the major constraints of the local agricultural sector—the inexistence of scale economies and high input costs due to the very intensive modes of production.

In order to translate these reductions in changes in producer rents, we will use the following general formula:

$$\delta PR_i = Q_i [1+1/2\ e_i\ (\delta S_i+\delta p_i)/p_i)]\ (\delta S_i+\delta p_i)$$

where   PR = producer rent

The total change in producer welfare δPR is found by summing δPR_i over all products i.

Table 7. Change in Producer Welfare - All Products

Animal Production	(Lm 000)	
Milk	- 658	
Eggs	- 580	
Beef	- 210	(includes the dismantlement of the Beef Intervention Scheme)
Pork	- 962	
Chicken	- 470	
Vegetable production		
Potatoes	- 460	
Tomatoes	- 216	
Grapes	- 165	
Oranges	- 56	
Peaches	- 206	
Net effect	**- 3983**	
% of agricultural revenue =	**18**	

The selected fruit and vegetables cover 32% of the total fruit and vegetable production. If we were to include also onions and cabbages the loss would have been greater although this would have to be compensated by the potential gain registered on off-season products and cauliflowers.

In the 1991 study we have also discussed the issue of the evolution of input prices after entry. Although the price of maize and barley is currently low (75% of that prevailing in Greece), these prices will eventually have to increase after the application of the EC threshold prices with further negative implications on local farmers' incomes. In the case of concentrated feeds, prices prevailing in Malta are at the same level or even higher than in Greece (where the cost of inputs are amongst the lowest within the EC). This subject matter, however, requires a further in-depth analysis as the spillover effects of an increase in input prices may have considerable implications on production as well as consumption patterns.

The results of the sensitivity analysis showed that changes in the elasticity magnitudes do not have major implications on the producer rent. The loss in producer surplus ranged from Lm 3.9 million to Lm 4.8 million, the latter representing over 21% of total current farmers' incomes. These estimates are more conservative than those estimated by Mizzi (1988) when the producer loss was estimated at 25% of total farmers' revenues.

The implications of membership on agricultural producers are quite negative. Entry will gradually result in a reallocation of resources from animal to vegetable production within which there seems to exist more scope of specialization particularly within "*niche*" markets. No reference has been given to the dynamic positive implications that entry will give rise to—investment in new agricultural structures, irrigation schemes and direct aid. Vegetable production will also be positively affected by the Solid Waste Composting Plant.

The priority over the short-term will be to identify those products, namely in the horticultural subsector, within which there exist export potentialities and the introduction of a standardization regime for fresh fruit and vegetables on the same lines as the OECD or the ECE/UN regime. Furthermore, the Ministry for Food, Agriculture and Fisheries has to step up efforts to promote the exportation of horticultural products not only through the setting up of Export Marketing/Promotion Boards but also through the provision of subsidies on certain government-induced costs, most notably freight charges.

Before discussing the trade effects of the CAP on the Maltese economy, it is worth briefly analysing the effects of entry on the Exchequer and the amount of Structural Funds which will be channelled, assuming that the momentum to give a certain degree of priority to the **"economic and social cohesion"** aspect of the Single European Act (SEA) persists.

3. The Exchequer and Structural Funds

Given that the Maltese Government does not subsidize in any way the local agricultural sector, no savings from subsidy expenditures will be forthcoming after entry except on the Beef Intervention Scheme. The loss registered from the customs duties (the majority of which are imposed on EC sources) will be compensated for by the gradual adoption of the Value Added Tax (VAT). It is beyond the scope of this analysis to discuss in detail the VAT base and the VAT rate to be imposed on agricultural products. However, our estimate is that a VAT rate of 4-6% on food will be both revenue-neutral as well as neutral on the consumer's well-being. The Report published by the EC Directorate (Malta, Department of Information, 1990) also provides that "those who are negatively affected (by the introduction of VAT) can be always compensated through income tax reductions or the social security system".

Regarding structural funds, Malta will undoubtedly be considered a less-favoured region similar to Greece, Portugal, the South of Italy and Ireland. Moreover the specific handicaps of an island-economy —limited available land, water resource constraints and a fragile environment—are all additional considerations for special aid schemes to Malta.

The main assumptions made in order to forecast the amount of structural aid until the year 2000 are the following:

(a) In the light of the announced commitments by the EC Commission to strengthen structural and regional policies over the coming years, we have projected the available funds until the year 2000 through a **time trend analysis**,

(b) The distribution of the funds will be as follows:

  • Regional Fund (ERDF): 75% of which Objective 1: 85%
  • Social Fund (ESF): 20%
  • European Agricultural Guarantee and Guidance Fund (EAGGF): Guidance Section: 5%

We have also taken into account the amounts received by Greece and Portugal, two countries which have GDP per capita levels which are broadly similar to the Maltese level. *Table 8* also demonstrates two different scenarios—one assuming that Malta will become a full member by 1995 (this is also the "expected date of entry" of the EFTA countries) and the other, more realistic, is that full membership will take place in 1998 and Malta will benefit from pre-entry aid.

Table 8. Distribution of Funds by Objective (million ECUs)

	Total	Scenario 1 Objective			Scenario 2
		1	5	2+3+4	
1995	83.6	53.3	4.2	26.1	
1996	87.5	55.8	4.4	27.3	(Pre-entry aid 1993-97: 47.5)
1997	91.4	58.3	4.6	28.5	
1998	95.3	60.8	4.8	29.7	1998-2000
1999	99.2	63.2	5.0	31.0	(same as Scenario 1)
2000	103.1	65.7	5.2	32.2	

After having analysed the effects of entry on each of the economic actors, the final section will analyze the extent of trade diversion/trade creation that a Customs Union between Malta and the EC entails.

4. Trade Model

The degree of commerce between the EC and Malta, and Malta and the rest of the world (ROW) over the coming decade has to be viewed within the context of several factors: an increase in population (+0.7% per annum), higher expectations by locals for quality products (particularly imported ones) and a tourist industry which remains a principal moving force of the Maltese economy and which necessarily has significant pressures on both local food production as well as the trade balance.

These factors give rise to a certain degree of concern, namely the risk of a widening of the trade gap due to increased imports and the gradual alignment of Maltese prices to EC threshold and reference prices in the case of products for which Malta is a net importer. *A priori* one expects a trade diversion effect in the case of cereals and imported frozen meat. The difference between the world price and the EC prices will be channelled to FEOGA or to EC producers in the case of products which already originate from EC sources but which currently benefit from the EC's export subsidies.

The change in the balance on trade on each product will be calculated using the following formula:

$\delta BTi = pi'(Qi'-Xi')-pwi (Qi-Xi)$

where   pi'= new EC price
        Qi'= new quantity produced
        Xi'= new quantity consumed
        pwi= world price
        Qi = current quantity produced
        Xi = current quantity consumed

A positive (negative) aggregate δBT indicates an improvement (deterioration) in the balance of Maltese agricultural trade.

As in CS's study, a difficult part in the application of the model was to estimate the average prices for the various products. In the case where Malta is a 100% net importer, the EC price used was the threshold or the reference price depending on the regime. In the case of products where there is a certain degree of self-sufficiency a weighted average was estimated to take account of the amounts imported and those produced locally. Thus for example in the case of beefmeat, the EC price was arrived at by weighting the intervention and reference prices (as well as the variable levy) in the proportion of 25% and 75% respectively. *Table 9* below demonstrates the balance on trade effect on each individual product.

Table 9. Balance on Trade Effect

Product	EC price ECU/MT	Prod. 1995 (t)	Cons. 1995 (t)	World price ECU/MT	Prod. 1989 (t)	Cons. 1989 (t)	Lm 000
Wheat	292	0	51413	131	0	49920	- 3362
Maize	236	0	64266	113	0	62400	- 3221
Barley	223	0	35017	106	0	34000	- 1669
Beef	5286	1480	5360	2520	1536	7658	- 2017
Pork	1100	4990	9400		no imports		- 1964
Chicken	1150	2000	4800		no imports		- 1278
Eggs	910	4100	8024		no imports		- 1417
Milk	300	31300	31092		no imports		+ 25
Sugar	661	0	20000	324	0	19380	- 2754
Potatoes	205	13800	27314	157	21600	25000	- 888
Tomatoes #	776	6020	8710		no imports		- 828
Grapes #	490	470	830	450	850	760	- 86
Oranges	226	850	8846	374	900	8100	+ 352
Peaches	716	820	1857	335	1500	1700	- 268
					Total Loss		**- 19375**

t/MT = metric tonnes
quantities destined for direct consumption.

The loss of Lm 19.4 million is quite considerable, however this is expected in the case of a net importer like Malta which has to bear the brunt of higher EC prices on the one hand while, on the other, the full exploitation of the benefits that the CAP gives rise to are very limited due to low production and export potential. Furthermore, any existing potential does not exist for products which benefit from high protection levels. It is pertinent to point out that even in the case of major agricultural producers like Portugal and Greece, entry had several negative implications on the agricultural balance on trade. As Georgakopoulos (1986) demonstrates in his article, Greece's accession to the EC produced a serious deterioration in the balance of agricultural trade with the EC with the surplus prior to 1981 turning into a deficit after entry.

The balance on trade loss registered by Malta represents more than 30% of total Maltese agricultural imports (1989) and 15% of the total consumer goods imported in 1990. This loss will reduce further the rate of import cover and it is estimated that, *ceteris paribus*, this rate will fall to 5-6% after full membership.

A sectoral analysis of the balance on trade effect shows that the sectors which will be most adversely affected by entry will be cereals, meats and sugar. The loss on meat products will be to the tune of Lm 5.3 million, *i.e.*, 27% of the total loss. Notwithstanding reduced beef consumption levels, the loss is still significant due to the imposition of the variable levy. The loss on eggs is due to the substitution of local production by imports while the effect on milk is negligible.

The loss registered on refined white sugar of Lm 2.8 million will be practically entirely channelled to EC's beet producers who supply more than 90% of Malta's sugar requirements. In the case of other vegetable products, the main losses will be registered on tomatoes and potatoes although the loss on the latter should be partially compensated for by the benefits accruing from duty-free exports of spring potatoes to the Netherlands.

The exclusion of other agricultural products from the above analysis—bananas, apples, pears, cheese, skimmed milk powder and oils and fats (margarine, sunflower and soya bean oil, butter) will probably result in a further widening of the trade gap. The products which will mostly affect adversely the Maltese balance on trade will be butter, cheese and other milk products. In the case of tropical fruit and beverages, trade is regulated by the Lomé Convention and the quantities and values imported should not be significantly different from present levels.

The magnitude of the balance on trade loss will vary with the outcome of the Uruguay Round negotiations or if the Community itself decides to reform **radically** its CAP. The indications show that in the medium-term, EC prices will fall and hence the "potential" balance on trade loss will be lower. In the light that it would be very difficult to obtain significant general derogations such as trade at "special" or "reduced" prices, the next best alternative would be maintaining Medigrain as well as the constitution of a Sugar Authority.

V. – Conclusion

The general application of the CAP and its related measures will undoubtedly have significant implications on the Maltese economy in general and the agricultural sector in particular. The results ensuing from our model demonstrate that no economic actor is going to benefit from entry with the exception of Government (if one were to include the inflow of structural funds). The balance on agricultural trade is expected to continue worsening with the gradual application of Community threshold and reference prices. Even consumers are expected to be worse off notwithstanding price declines on several animal products. Maltese agricultural producers risk bearing the brunt of mounting competition from their Mediterranean counterparts and the only option available is the identification of quality, out-of-season products suitable for export together with some form of rural tourism. A further decline in the gainfully occupied population engaged in agriculture will have severe negative repercussions on the environment.

Two main limitations of the study are the **static** and **partial** nature of the model. On the demand side, the incorporation of rationing (several commodities in Malta were rationed until the mid-seventies) in the LA/AIDS may affect the magnitude of the estimated elasticities while in the supply sub-model it is suggested that a linear programming model be undertaken on the same lines as TASM-MAFRA to estimate own price elasticities.

What are the options open to Malta and how will the above results differ under a **reformed** CAP? Full membership with no specific derogations is bound to destructure the local economy in the short to medium-term; however, the options available hardly imply brighter prospects. A Customs Union will mean that Malta will have to confront the costs of full membership without either benefiting from the Structural Funds or from the participation in the Community's decision-making process. Participation in the European Economic Space (EES), culminating in the establishment of an industrial free trade area with the EC, may be quite an interesting option; however countries like Sweden and Austria have not been that enthusiastic due to the limited degree of participation in policy-making. Maintaining the status quo or the "further strengthening of the present Association Agreement" risks Malta's marginalisation on the international scene and is probably the worst of all options.

The present Government is determined to proceed with its efforts—both political and economic—so that Malta becomes a full member of the EC. However this is a long process and if during 1993 the Commission pronounces a positive opinion on Malta's application, full entry is not expected to be achieved prior to 1997-2000.

Indicators point that, until that date, the CAP would probably have been reformed. The EC Commission anticipates that the announced reductions on cereals, milk, beefmeat as well as pork, sugar, eggs and processed goods will start coming into effect in 1996. This will imply a reduction in the "potential" Maltese national welfare loss. As a net importer, Malta has an interest (if it is to become a full member) for a reduction in EC protection levels and a gradual alignment of EC prices with international price levels.

Notwithstanding the inherent limitations of micro-states, entry into the EC and full participation in the common organization of markets will be a challenge to the entire Maltese community. The difficulties and problems which will be encountered by the local agricultural sector as well as Maltese agro-industry are not insignificant and their future viability will largely depend on their resilience to adapt to the new situation.

Notes

1. This article is an abridged version of Mizzi (1991).
2. There are two main political parties dominating the local scene: the Malta Labour Party (MLP) which is against full membership and favours a free trade association and the Nationalist Party (NP) which is the party in power.
3. 1 Lm = 2.5 ECU (exchange rate used for estimates) — Exchange Rate January 1993: 1 Lm = 2.22 ECU

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144

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✧