

ANALYSIS OF EXPORT GROWTH OF MEAT AND DAIRY PRODUCTS

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Since joining the E.E.C., Ireland has experienced very rapid expansion in its exports. In the late 1970's this country's exporting performance, in terms of growth, matched or exceeded the performance of all other members of the E.E.C. While manufactured goods made the largest contribution to growth in recent years, the exports of the food sector were also very significant, with growth in the exports of meat and dairy products dominating the food sector.

The purpose of this article is to examine recent trends in export growth with particular emphasis on the meat and dairy products sectors. Of particular interest is the attempt to trace the sources of growth which have occurred and to identify the major factors giving rise to the growth. The focus is on export growth trends in the period immediately before and after Ireland's accession to the E.E.C. and attention will also concentrate on the post-E.E.C. entry period. Hence, it will be possible to make a number of useful comparisons and develop implications for decision and policy makers in the food industry. The following analysis relies entirely on secondary data and the application of a market share model which is described in greater detail in a later section.

Background to the Study

As Ireland's food industry prepares to enter the 1980's it is appropriate that the major trends of the last two decades be reviewed. Of particular importance is the exporting activity of the food sector. During the 1960's the prospect of joining the E.E.C. was held out as being of tantamount importance to the food industry. New and expanding markets were seen as providing the stimulus necessary to develop Ireland's food industry to its full capacity. Throughout the period there was much discussion of the need to identify and develop new markets. Frequent references were made to the need for value-added products in regard to the food industry and concern about new markets and new products has not abated since. Two factors dominate development in

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the food industry: the role played by the E.E.C. and the inherent leadership provided by individual firms within the industry. Much has been said concerning both, but little evidence has yet been provided in regard to the effects of either. This article attempts to throw some light on the former of the two issues. Other more detailed studies will be required to assist in resolving the second issue.

The recent and continuing debate concerning the E.E.C. system of intervention-buying raises serious questions about the future growth of the Irish food industry, especially the meat and dairy sectors. As long as the Common Agricultural Policy exists in its present form Ireland has an assured market for a number of products from these sectors. However, current disquiet concerning the cost and economic implications of continuing to provide an assured market means that some curtailment of the intervention system is very likely. Such a curtailment, it has been argued, would provide a serious blow to the Irish food industry.¹ While any curtailment in E.E.C. support for the meat and dairy products markets is likely to be painful in the immediate term, it is not altogether clear that excessive dependence on intervention-buying is a good thing for the development of the meat and dairy products sectors. The food industry in Ireland accounts for about one third of national output and in 1978 was directly responsible for 34 per cent of Irish exports. Hence, it is still a significant sector in terms of its contribution to the national economy. Advocates of further developments in the food industry refer to the potential for 'downstream' activities arising as a result of activities in the meat and dairy products sectors. Indeed, many new products have been developed and launched which can be directly attributed to enterprise in the industry. However, the continuing market assurances provided by the EEC buying system means that no great incentive exists within the industry to devote substantial resources to new products or new market developments. The three major organisations involved in the promotion of food products in overseas markets, Coras Trachtála (CTT – the Irish Export Board), Bord Bainne (The Irish Dairy Board) and CBF (The Irish Livestock and Meat Board) have had considerable success in opening up new markets; however, they remain stymied by the realities facing the individual food manufacturer in that no adequate incentive exists which would give the manufacturer a permanent franchise in the market place for existing and new products. Nonetheless, it must be recognised that marketing is not about performance on any dimension. Marketing concerns change and the management of change. During the late 1960's and early 1970's it was argued that entry to the EEC would provide the stimulus necessary for Irish food manufacturers to produce new value-added products and develop new markets in the faster growing regions of the enlarged EEC. During the years immediately prior to Ireland's accession to the EEC and in the years since, exports of meat and dairy products have increased in volume and their composition has

diversified. In this context it is important to examine this growth and diversification relative to the performance of competing exporters of meat and dairy products while at the same time taking account of the benefits accruing to exporters as a result of joining the EEC about mid-way through the review period.

Recent Trends in Meat and Dairy Products Exports

In 1978 total exports from Ireland were valued at £2,959 million, which compares with £869 million in 1973. This represents an increase of 241 per cent in current terms or 67 per cent in real terms. Exports of the food, drink and tobacco sector increased by 71 per cent in real terms during the same period, while the real increase in the exports of manufactured goods was 86 per cent. During the five year period there were also a number of changes in the geographic distribution of Ireland's exports. Twenty one per cent of all exports went to the E.E.C. in 1973 compared with 30 per cent in 1978. The U.K. and North American markets declined in relative importance during the period. In regard to food, drink and tobacco exports the share absorbed by the EEC jumped from 24 per cent in 1973 to 35 per cent in 1978, while the share taken by the U.K. declined by four per centage points. For manufactured goods a similar pattern obtained (Table 1).

Table 1: Destination of Irish Exports in 1973 and 1978

MARKET	PRODUCT GROUP							
	Manufactured Goods		Food, Drink and Tobacco		Other Exports		Total Exports	
	1973	1978	1973	1978	1973	1978	1973	1978
E.E.C.	%	%	%	%	%	%	%	%
North America	18	28	24	35	25	26	21	30
United Kingdom	16	12	7	1	3	3	11	7
Other Markets	52	43	54	50	66	59	55	47
Total (%)	14	17	15	14	6	12	13	16
(£ million)	100	100	100	100	100	100	100	100
	429	1,611	291	1,013	149	335	869	2,959

The growth markets for meat and dairy products in the period 1968-77 were the E.E.C., Japan and a number of other smaller markets scattered throughout the world but mainly in the developing regions. The United Kingdom, United States and a number of other European markets declined in relative importance during the same period. In 1968 the E.E.C. absorbed 28 per cent of world exports of meat and dairy products. By 1977 the E.E.C.'s share had increased to nearly 48 per cent. During the same period the share absorbed by Japan more than doubled while the United Kingdom's share declined from nearly 25 per

cent to 13.5 per cent. Other European markets and the United States both declined in relative importance as customers for world exports of meat and dairy products (Table 2).

In 1968 the United Kingdom absorbed 75 per cent of Ireland's exports of meat and dairy products, but by 1972 this share had declined to 71 per cent. During the same five year period the share taken by the E.E.C. increased from 5.7 per cent to 16.3 per cent. However, since Ireland joined the E.E.C. the changes in the market distribution of meat and dairy exports have been much more significant. Between 1972 and 1977 the share of Irish exports of meat and dairy products going to the United Kingdom declined from 71 per cent to 43 per cent, while the share absorbed by the E.E.C. increased from 16 per cent to 45 per cent (Table 2).

Other changes occurred during the 10 year period which cannot directly be attributed to Ireland's membership of the E.E.C. While not very significant in absolute terms, Japan's share of Irish exports has increased dramatically during the period 1968-77. At the same time, the significance of the United States and other European markets, with respect to meat and dairy products exports, has greatly declined. The importance of the 'Rest of the World' as a market for Irish food products, particularly for a number of dairy products, is also clearly in evidence (Table 2).

Table 2: Destination of World and Irish Exports of Meat and Dairy Products 1968, 1972 and 1977						
Market	World Exports			Irish Exports		
	1968	1972	1977	1968	1972	1977
	PER CENT					
E.E.C.	28.03	37.70	45.70	5.74	16.29	45.39
United Kingdom	24.98	19.00	13.50	75.42	70.57	43.09
Other European	12.54	10.10	7.90	0.80	2.35	0.46
United States	14.37	12.20	8.10	13.69	3.13	1.95
Japan	2.43	4.00	5.90	0.32	0.39	1.49
Rest of World	17.65	17.00	18.90	4.03	7.27	7.62
Total	100.00	100.00	100.00	100.00	100.00	100.00

By examining trends in imports of meat and dairy products during the period 1968-77 it will be possible to judge which markets have been dynamic and which have lagged. This analysis will assist in a subsequent section of this article, where Ireland's relative export performance is examined in greater detail. In 1968 the E.E.C. imported \$1,599,762,000 worth of meat and dairy products which was 27.7 per cent of world imports in that year. The United Kingdom absorbed 24.7 per cent of

total imports while Japan imported 2.4 per cent of the total and the United States absorbed 14.3 per cent of world exports. By 1977 the situation had changed significantly. In that year the E.E.C. absorbed 41.5 per cent of total world imports but the United Kingdom's and United States' shares declined to 12.3 per cent and 7.3 per cent, respectively. Japan's share increased to 5.3 per cent and the rest of the world now took 26.4 per cent of total imports of meat and dairy products (Table 3).

Table 3: Total Imports of Meat and Dairy Products into Selected Markets 1968, 1972 and 1977						
MARKET	1968		1972		1977	
	\$1,000 U.S.	%	\$1,000 U.S.	%	\$1,000 U.S.	%
E.E.C.	1,599,762	27.7	3,938,938	37.7	8,442,564	41.5
United Kingdom	1,424,587	24.7	1,977,854	18.9	2,495,275	12.3
Other European	710,466	12.3	1,054,507	10.1	1,462,140	7.2
United States	823,171	14.3	1,338,808	12.8	1,494,245	7.3
Japan	140,650	2.4	422,187	4.0	1,086,303	5.3
Rest of World	1,070,517	18.6	1,721,346	16.5	5,368,217	26.4
Total	5,769,153	100.00	10,453,640	100.0	20,348,744	100.0

The E.E.C. and Japan are the two most important markets when growth in imports is considered. These two markets were the fastest growing in the period 1968-72 and were joined by the 'Rest of the World' in the period 1972-77. The other markets have declined in importance in terms of growth. During the same period the expansion of Irish exports to the growing markets and the contraction of this country's exports to the weaker markets, particularly in the latter

Table 4: Comparison of Growth Rates of Total Imports and Imports from Ireland into Selected Markets 1968-77				
MARKET	Relative Import Growth Index ^a			
	Total Imports		Imports from Ireland	
	1968-72	1972-77	1968-72	1972-77
E.E.C.	180	120	507	879
United Kingdom	48	27	84	96
Other European	59	41	527	-90
United States	78	18	-175	100
Japan	247	165	143	1,265
Rest of World	75	223	278	6,963

^aDerived as follows: per cent increase of total imports into selected markets divided by per cent increase in world imports using data in Table 3 above and Appendix Table 3.

period, is clearly in evidence. Using a growth index as an indicator of market growth it is seen that Ireland has concentrated on the growing markets and in relative terms began to neglect the weaker markets (Table 4).

In the discussion so far general trends have been established, but it is now necessary to delve deeper to determine some of the contributory factors to the changes seen above. Interest will centre on identifying the sources of the growth in exports and on developing policy implications of the findings.

Constant Market Share Analysis of Export Growth

An examination of the export performance of the meat and dairy products sectors of Irish agriculture involves identifying the demand existing in export markets for these products and separating that demand into its constituent components — those which are determined exogenously and those determined by the marketing companies engaged in the exporting activity. The theoretical and statistical difficulties inherent in the direct and indirect estimation of a country's import and export demand have been discussed by many writers.² As an alternative, others have suggested using a market share approach in assessing the degree of competitiveness between a country's product and foreign competitors' products in an importing market.³ In following the market share approach the examination focuses on the country's export performance relative to the world average for the same product. A country's exports may fail to grow as rapidly as the world average for three reasons: (1) exports may be concentrated in products for which demand is growing relatively slowly; (2) exports may be going primarily to relatively stagnant markets; or, (3) the country in question may have been unable or unwilling to compete effectively with other sources of supply.

An attractive method of disentangling these effects is known as a Constant Market Share analysis and would seem to be appropriate in the context of examining the export growth of meat and dairy products from Ireland. An underlying assumption of the model is that a country's share in world markets should remain unchanged over time. The difference between the export growth implied by this constant share norm and the actual export performance is attributed to effect of competitiveness and the actual growth in exports is divided into competitiveness, product composition effects and market distribution effects. The application of this model to the exports of the meat and dairy products sector for the ten year period 1968-77 would seem to be very appropriate, particularly since the model permits a separate examination of the data for the period immediately before entering and for the period subsequent to entry to the EEC. Details of the model

and its application and extensions are contained in the Appendix. The Constant Market Share (CMS) approach and the notation used in this paper follows well established practice.⁴

Sources of Data

The data utilised in this study and reproduced in the Appendix were derived from a number of published sources.⁵ Unlike many other analytical models the CMS approach requires large volumes of data of a very detailed nature. The nature of the data requirements means some sacrifice in terms of currency, comprehensive data were available only for the period up to and including 1977. Earlier, some more recent data are presented, but the body of the analysis refers to two periods; the period immediately prior to this country's entry to the EEC, 1968-72, and a period of similar length immediately subsequent to joining, 1972-77.

Markets, Products and Time Periods

For the purpose of the study most of the products listed under SITC (Standard Industrial Trade Classification) 01 and SITC 02 were examined. In all, 17 separate product groups were examined at the SITC four digit level. In terms of the CMS model outlined $i = 1, 2, \dots, 17$. A description of the meat and dairy products included is given later (Appendix Table 1.)

The relevant market groups for Irish meat and dairy products were considered to be the EEC (Six), the United Kingdom, Denmark, Other European Markets, the United States, Japan and the rest of the World. These groupings include markets which were considered to be relatively slow-growing and relatively rapid-growing, but all were considered central markets for meat and dairy products from this country. The inclusion of Denmark as a separate market is necessary since that country became part of the enlarged EEC at the same time as Ireland and it is a direct competitor for a number of the products being studied. In terms of the CMS model, $j = 1, 2, \dots, 7$.

It is emphasised here that the CMS approach treats the data at an extremely detailed level. The growth in the exports of each of the 17 product groups to each of the seven markets in respect of this country and the competition must be computed separately to fit into the analysis. Particularly troublesome is the derivation of values for r_i and r_{ij} . Hence, the model is expensive in its data requirements and computation procedures. A detailed study of the model will demonstrate the nature of these difficulties (see appendix).

The CMS model was applied at two stages. The first stage involved an

examination of growth in meat and dairy products exports during the period 1968-72, a period which corresponds with this country's last five years outside the EEC. The second stage involved an examination of the growth in meat and dairy products exports during the five year period after Ireland's accession to the EEC.

Details of world exports and Ireland's exports for the 17 product groups to the seven market areas are contained in the Appendix (Tables 2-4).

Findings and Policy Implications

The Constant Market Share model is very useful in identifying the sources of growth in the exports of meat and dairy products. It is interesting from a policy point of view to know how much of the growth is determined by the principal actors involved, the meat and dairy products exporters. It is also interesting to note how much of the growth is determined exogenously, and how much would have materialised independent of the action of the exporters. It is of central importance for exporters and policy makers to know how important product development and market selection are to the success of the exporting activity. The CMS model allows a number of calculations to be made which throw light on these issues. The results for each of the two periods examined are reported separately below and the reader is referred to the appendix for details of the calculations.

STAGE I: 1968-1972: During the first of the periods under review the growth in world trade dominated the growth in Ireland's exports of meat and dairy products. Very little of the export growth can be attributed to entrepreneurial activities in the area of product development. Furthermore, a concentration of marketing efforts in slow-growing and declining markets resulted in a reduction in growth due to this factor.

Between 1968 and 1972, 86.2 per cent of the growth in Ireland's exports of meat and dairy products was due entirely to the growth in world trade and therefore virtually independent of activities in this country. This means that from the point of view of the management of exports in the food industry, growth was almost completely autonomous and little of it can be attributed to the activities of the principal actors involved, the meat and dairy exports (Table 5).

The second area examined which comes more directly under management control is that of new product development, one of the most important decision areas in marketing. In attempting to establish a franchise in the market, companies develop, commercialise and launch new products. This is no less true in the food sector and particular in re-

gard to exporting activities where the competition tends to be keener and also more diversified. In regard to the present study it was shown that only 5.2 per cent of total export growth was due to entrepreneurial activity on the part of exporters in the area of product development (Table 5). While the product development contribution is positive it is very small especially when public statements in regard to the need for the development of value-added products in the food exporting sector are taken into account.

The third area examined was the effect on Ireland's food export development of the type and range of markets served by exporters. An active seeking-out of new and growing export markets is an essential ingredient to success in an open economy and particularly so in the food industry, which is itself beginning to feel the effects of competition from imports. In terms of actual markets Ireland performed poorly in relative terms, during the review period. Because of this country's concentration in relatively slow-growing markets such as the United Kingdom and the United States, this factor was responsible for a negative contribution to export growth. The nature of the markets served by Irish meat and dairy products exporters brought about a 2.2 per cent decline in export growth during the period (Table 5).

As was seen above, the CMS model allows a separation of the effects on export growth of product development, market selection and the effect of growth in world trade itself. The model also allows for the computation of the effect of changing competitiveness on the food exporting industry. Competitiveness factors include those of price and other marketing factors not already accounted for in the analysis, i.e. competitiveness is treated as a residual. During the review period increased competitiveness was responsible for 10.8 per cent of the growth in exports of meat and dairy products. This is in marked contrast to the effect of the other factors examined. An increase in competitiveness

Table 5: Sources of Export Growth for Meat and Dairy Products in Ireland, 1968-1972

Source of Export Growth	Pre-EEC Entry 1968-72 ^a
	Per cent
a) Due to Increase in World Trade	86.2
b) Due to Change in Product Mix	5.2
c) Due to Change in Market Distribution	-2.2
d) Due to change in Competitiveness	10.8
Due to All Factors	100.0

^aThe figures in this table are derived as a worked case in Appendix: Table 6.

can come about in a number of ways. In the present case the explanation for increased competitiveness is likely to be found in improved production efficiency and growing protection in the markets served. It must be remembered that Ireland's performance is being measured against the constant market share norm; consequently, the trends derived give an accurate picture of movements in that relative position and the factors contributing to that position (Table 5).

STAGE II: 1972-77: During the second period changes in Ireland's competitiveness vis-a-vis other suppliers dominated the growth which occurred in meat and dairy products exports. Undoubtedly, Ireland's entry to the protected EEC market at the beginning of the period is the principal explanatory factor in this instance. However, the growth in world trade was again a critical factor in explaining the export growth which occurred. The two micro-marketing variables, product development and market distribution, again proved disappointing.

Between 1972 and 1977 increased competitiveness accounted for 55.7 per cent of the growth in exports of this country's meat and dairy products. The protection afforded by the EEC and the availability of market outlets were the two principal factors giving rise to this situation. Such protection places the Irish exporter in a favoured position vis-a-vis traditional suppliers to EEC markets (Table 6).

During the same period the increase in world trade accounted for 53.8 per cent of the growth in meat and dairy products exports. In marked contrast, changes in the product mix and market distribution resulted in negative contributions to growth (Table 6).

In the protected environment of the EEC, conditions prevail which do not encourage exporters to develop new or improved products or seek

Table 6: Sources of Export Growth for Meat and Dairy Products in Ireland, 1972-1977

Source of Export Growth		Post-EEC Entry 1972-77 ^a
		Per cent
a)	Due to Increase in World Trade	53.8
b)	Due to Change in Product Mix	-4.9
c)	Due to Change in Market Distribution	-4.6
d)	Due to Change in Competitiveness	55.7
	Due to All Factors	100.0

^aThe figures in this table are derived as a worked case in Appendix: Table 6.

to identify and develop new market opportunities. While there is no firm evidence in the data used in this study to indicate precisely why this should be the outcome it is suspected that the protection provided by the managed market system operated by the EEC is a disincentive to new product and new market development. Irish exporters of meat and dairy products are not forced to seek ways of developing value-added in the product mix exported since they face a relatively captive EEC market and may benefit from intervention buying. Under present CAP arrangements some beef products, butter and skim milk are protected, but processed foods must compete on the open market. In addition to market-related barriers to growth, meat and dairy products exporters also face difficulties relating to the steady supply of raw materials in both sectors. Supply problems, while extremely important, were not the subject of this study. ✓

CONCLUSIONS

The CMS model would seem to be an appropriate approach to analysing broad changes which have occurred in the exports of meat and dairy products. It is particularly appropriate when adequate data are available and the intention is to make comparisons with a base period such as the start of some new marketing arrangement e.g. Ireland's entry to the E.E.C. The model seems quite adequate in making comparisons in a 'before and after' framework and was shown to be successful in decomposing export growth into a number of important and relevant contributory factors, the identity of which is of interest to decision and policy makers in the industry.

The CMS model is very expensive in terms of data requirements and its greatest limitation is that it requires consistent and comprehensive data for each time period being reviewed. A much greater limitation of the present study was the lack of detailed product-specific data which would have permitted the analysis to proceed at the product level rather than the product group level. Nevertheless, a number of valuable results were obtained which point to the need for a closer examination of product and market development in the food industry.

Trends in world trade are still of great importance to the growth of meat and dairy products. Of greater significance is the emerging trend of EEC protection, which is beginning to dominate the growth of this country's food exports. The protection provided by the EEC should be used imaginatively by availing of the opportunity to develop new products and new markets and by moving away from a commodity approach to marketing. While it is recognised that a number of institutional barriers still remain which prevent a rapid development in this area, it is nevertheless essential that initiatives be taken at the micro level.

The implications for decision makers within the two sectors being examined and for policy makers in general are clear. For two sectors, which contribute so significantly to national output and to export earnings, to allow product and market development efforts to slip to the extent that both can cause a reduction in growth is a matter of immediate concern. While this is not the forum to argue the pros and cons of a macro marketing audit of the Irish food industry this is clearly what is required. In relation to the norm of a constant market share assumed by the CMS model the policies regarding product and market development have failed and much of the growth was due to the protection of the EEC and higher prices thereby obtained. The longer term viability of the meat and dairy products sectors will depend on a reversal of the trends evidenced in this paper.

APPENDIX

Description of Constant Market Share Model of Export Growth

The Constant Market Share model of export growth used in the paper is described below, using an approach and notation which is already well developed in the literature. The description begins by describing a simple demand model for an exported product and develops into an analysis of export growth using a constant market share model.

Demand for exports in a given market from two competing sources of supply may be described by the following:

$$\frac{q_1}{q_2} = f\left(\frac{p_1}{p_2}\right) \quad (1)$$

where q_1 and p_1 are the quantity sold and price of the product from the i th source. The above relationship may be altered by multiplying by p_1/p_2 to obtain

$$\frac{p_1 q_1}{p_2 q_2} = \frac{p_1}{p_2} \times f\left(\frac{p_1}{p_2}\right) \quad (2)$$

which implies

$$\begin{aligned} \frac{p_1 q_1}{p_1 q_1 + p_2 q_2} &= \left(1 + \frac{p_2 q_2}{p_1 q_1}\right)^{-1} \\ &= \left(1 + \left[\frac{p_1 f(p_1/p_2)}{p_2}\right]^{-1}\right)^{-1} \\ &= g\left(\frac{p_1}{p_2}\right) \end{aligned} \quad (3)$$

which indicates that Country 1's share of the market in question will remain constant except as p_1/p_2 varies. This establishes the validity of the constant share norm and suggests that the difference between export growth implied by the norm and the actual export growth may be attributed to price changes. The discrepancy between the constant share norm and actual performance has been dubbed the "competitiveness" effect. The constant share norm allows several calculations to be made which are necessary to further analysis. In this context the following definitions are used:

- V_i = Value of A's exports of Product i in Period 1
- V'_i = Value of A's exports of Product i in Period 2
- $V_{.j}$ = Value of A's exports to Market j in Period 1
- $V'_{.j}$ = Value of A's exports to Market j in Period 2
- V_{ij} = Value of A's exports of Product i to Market j in Period 1
- r = Percentage increase in total world exports from Period 1 to Period 2
- r_i = Percentage increase in world exports of Product i from Period 1 to Period 2
- r_{ij} = Percentage increase in world exports of Product i to Market j from Period 1 to Period 2

It follows from the above definitions that for Period 1

$$\sum_j V_{ij} = V_i \text{ and } \sum_i V_{ij} = V_{.j} \quad (4)$$

and similarly for Period 2. In addition, the value of Country A's exports in Period 1 is given by

$$\sum_i \sum_j V_{ij} = \sum_i V_i = \sum_j V_{.j} = V_{..} \quad (5)$$

The application of the constant share norm will depend on the nature of the market assumed when writing (1) above. At the first level of analysis exports may be viewed as being completely undifferentiated as to product composition and market destination, i.e. exports are viewed as a single product destined for a single market. If A maintained its share in this market, then exports would increase by $rV_{..}$, and the following identity may be written:

$$V'_{..} - V_{..} \equiv rV_{..} + (V'_{..} - V_{..} - rV_{..}) \quad (6)$$

The relationship (6) above divides export growth of A's exports into a part associated with the general increase in world exports and an unexplained residual – the competitiveness effect. However, it may be argued that exports are in fact quite a diverse set of products and in writing (1) above a particular product group is assumed. For the i th product an expression analogous to (6) above may be written:

$$V'i. - Vi. \equiv ri Vi. + (V'i. - Vi. - riVi) \quad (7)$$

which may be aggregated to

$$\begin{aligned} V'.. - V.. &\equiv \sum i ri Vi. + \sum i (V'i. - Vi. - riVi) \\ &\equiv (rV..) + \sum i (ri-r) Vi. + \sum i (V'i. - Vi. - riVi) \quad (8) \\ &\quad (a) \quad (b) \quad (c) \end{aligned}$$

Equation (8) represents a two level analysis in which the growth of A's exports is divided into parts attributed to (a) the general rise in world trade (b) the product composition of A's exports in Period 1 and (c) an unexplained residual indicating the difference between A's actual export increase and the hypothetical increase if A had maintained its share of the exports in each product group.

The product composition effect in identity (8) requires further comment. It has been defined by:

$$\sum i (ri - r) Vi. \quad (9)$$

and is meant to indicate the extent to which A's exports are concentrated in product classes with growth rates more favourable than the world average. Thus, if world exports of product i increased by more than the world average for all products, $(ri-r)$ is positive. This positive number will receive a heavy weight when added to the other terms if $Vi.$ is relatively large. Accordingly the sum indicated by (9) would be positive if A had concentrated on the export of products whose markets were growing relatively fast and would be negative if A had concentrated in slowly growing product markets.

So far no allowance has been made for the fact that some countries have easy access to rapidly growing markets while others are surrounded by relatively slow growing neighbours. This was particularly true in the case of Ireland when prior to joining the E.E.C. the dominant market for meat and dairy products exports was the United Kingdom, a slow growing market in comparison to the faster growing markets within the E.E.C. Hence, it is necessary that the analysis be extended to account for the fact that exports are differentiated by market destinations as well as by product type. To account for this extra dimension the appropriate norm becomes a constant share of exports of a particular product group to a particular market. The identity analagous to (6) and (7) is:

$$Vi'j - Vij \equiv rij Vij + (Vi'j - Vij - rij Vij) \quad (10)$$

which when aggregated yields:

$$\begin{aligned}
 V'_{..} &\equiv \sum_i \sum_j r_{ij} V_{ij} + \sum_i \sum_j (V'_{ij} - V_{ij} - r_{ij} V_{ij}) \\
 &\equiv rV_{..} + \sum_i (r_i - r) V_{i.} + \sum_i \sum_j (r_{ij} - r_i) V_{ij} \\
 &\quad \quad \quad (a) \quad \quad \quad (b) \quad \quad \quad (c) \\
 &\quad \quad \quad + \sum_i \sum_j (V'_{ij} - V_{ij} - r_{ij} V_{ij}) \quad (11) \\
 &\quad \quad \quad \quad \quad \quad \quad \quad (d)
 \end{aligned}$$

The identity in (11) represents a three-level analysis in which the increase in A's exports is divided into parts attributed to (a) the general rise in world exports, (b) the product composition of A's exports, (c) the market distribution of A's exports and (d) a residual reflecting the difference between the actual export growth and the growth that would have occurred if A had maintained its share of the exports of each product to each market.

The market distribution term in (11) may be interpreted in the same manner as the product composition effect. It is defined by:

$$\sum_i \sum_j (r_{ij} - r_i) V_{ij} \quad (12)$$

and would be positive if A had concentrated its exports in markets that experienced relatively rapid growth. The term would be negative if A had concentrated in more stagnant markets.

The interpretation of the competitiveness residual is not as straightforward as the other terms. A negative residual reflects a failure to maintain market shares. If export demand is described by relationship (1) above then this residual is necessarily associated with a rise in relative prices, p_1/p_2 . However, as already inferred, the relationship (1) ignores many other influences that will affect the export marketing of a country's products. Besides the differential rates of export price inflation just mentioned, the general competitiveness residual may reflect, on the supply side, differential rates of quality improvement and the development of new exports not accounted for in the data and differential rates of improvement in marketing efficiency among the countries being studied. Unfortunately, the CMS analysis does not permit a further disentangling of the contributory factors to export growth. It would seem to be very important that a way to disentangle a number of those effects subsumed in the competitiveness term as listed above should be further examined. Despite this reservation the CMS analysis poses an interesting and important question. This concerns the extent to which a country's exports are concentrated in products and markets which are relatively slowly or rapidly expanding and what the nature of expansion of exports has been in a particular context.

**Table 1: Details of Product Groupings and Trade Classifications
Used in Study**

In order to maintain strict comparability in the statistics for the imports and exports of the products studied it was only possible to work at the four digit SITC level. The following is the list and description of the 17 product groups drawn from the 01 and 02 classifications which were used in the study:

SITC Description	SITC Description
0111 Fresh, Chilled or Frozen Meat of Bovine Animals	0141 Meat Extracts and Meat Juices
0112 Fresh, Chilled or Frozen Meat of Sheep and Goats	0142 Sausages
0113 Fresh, Chilled or Frozen Meat of Swine	0149 Other Prepared or Preserved Meat
0114 Fresh, Chilled or Frozen Poultry Industry Offals (excluding liver)	0221 Evaporated or Condensed Milk and Cream
0115 Fresh, Chilled or Frozen Meat of Horses, Asses, Mules and Hinnies	0222 Milk and Cream in Solid Form, Blocks or Powder
0116 Fresh, Chilled or Frozen Edible Offals of Animals	0223 Fresh Milk and Cream
0118 Other Fresh Chilled or Frozen Meat & Edible Offals	
0121 Bacon, Ham & Other Dried, Salted or Smoked Pigmeat	023 Butter
0129 Meat and Edible Offals NES, Dried, Salted or Smoked	024 Cheese and Curd

**Table 2: World Exports of Meat and Dairy Products to Selected Markets
1968, 1972, and 1977.**

MARKET	1968	1972	1977
		\$1,000 U.S.	
E.E.C. (6)	1,593,914	3,628,180	8,909,106
United Kingdom	1,421,288	1,828,526	2,631,793
Denmark	11,508	19,248	38,990
Other European	702,013	952,758	1,501,097
United States	817,097	1,174,106	1,579,076
Japan	138,101	384,953	1,150,191
Rest of World	1,003,542	1,636,048	3,684,508
Total	5,687,463	9,623,819	19,494,761

Table 3: Irish Exports of Meat and Dairy Products to Selected Markets
1968, 1972, 1977 and 1978

MARKET	1968	1972	1977	1978
	\$1,000 U.S.			
E.E.C. (6)	10,972	56,028	455,207	564,020
United Kingdom	144,052	242,672	432,128	613,406
Denmark	64	95	656	1,331
Other European	1,471	7,991	4,006	6,023
United States	26,140	10,780	19,526	13,429
Japan	616	1,332	14,984	9,736
Rest of World	7,694	24,990	76,456	90,507
Total	191,009	343,878	1,002,963	1,298,452

Table 4: Irish Exports of Meat and Dairy Products 1968, 1972, 1977 and 1978

Product (SITC)	1968	1972	1977	1978
	\$1,000 U.S.			
0111	87,437	153,030	524,955	625,623
0112	11,346	14,474	13,636	58,724
0113	5,555	21,723	22,556	16,990
0114	318	2,511	5,271	4,319
0115	0	0	5,592	4,971
0116	4,452	7,922	25,149	33,393
0118	0	0	260	280
0121	19,534	27,272	35,014	39,916
0129	237	346	126	247
0141	54	54	2	17
0142	498	225	1,049	3,737
0149	9,457	12,042	35,345	35,137
0221	1,150	1,443	9	15*
0222	10,495	22,555	158,585	157,665*
0223	1,758	4,383	3,106	4,956
023	23,999	45,117	105,414	225,309*
024	14,719	30,781	66,894	87,153*
Total	191,009	343,878	1,002,963	1,298,452

*Because of a change in the classification system between 1977 and 1978 it was necessary to estimate these figures. Note, however, that the data for 1978 are not used in the CMS model described in the text.

Table 5: Sources of Export Growth for Meat and Dairy Products in Ireland 1968-77

Computation Procedure	Pre E.E.C. Entry 1968-72		Post E.E.C. Entry 1972-77	
	£	%	£	%
Irish Exports	343,878		1,001,937	
Irish Exports	191,009		343,878	
Increase in Exports	152,869 =	100.00	658,059 =	100.00
(a) Increase in Exports due to Increase in World Trade $\Sigma^{17} i r Vi$	131,796	86.21	354,194	53.82
(b) Increase in Exports due to Change in Product Mix $\Sigma^{17} i r i Vi - \Sigma^{17} i r Vi$	7,963	5.21	-32,533	-4.94
(c) Increase in Exports due to Change in Market Distribution $\Sigma^{17} \Sigma_j^7 r_{ij} Vij - \Sigma^{17} i r Vi$	-3,382	-2.21	-29,966	-4.55
(d) Increase in Exports due to Changes in Competitiveness $\Sigma^{17} i \Sigma_j^7 Vij - \Sigma^{17} i \Sigma_j^7 Vij - \Sigma^{17} i \Sigma_j^7 r_{ij} Vij$	14,240	10.79	366,364	55.67

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