

SOME ASPECTS OF MONOPOLY AND MONOPSONY IN ANGLO-DANISH TRADE 1921-38¹⁾

By W. BECKERMAN

THE trade between the United Kingdom and Denmark in the period 1921—38 provides an interesting specimen of a market in which the sellers enjoyed to a large extent a potential monopoly position and the buyers a potential monopsony position. The word potential is used here to indicate that (a) while Danish exports to the U.K. constituted a large proportion of total U.K. imports of the products concerned, the existence of a monopoly position would depend on the co-ordination of policies by the numerous Danish units of supply, and on the other hand (b) a similar co-ordination of policy by the various independent units of U.K. demand would be necessary in order to exploit the fact that a high proportion of Danish exports was consumed by the U.K.

British imports from Denmark consisted almost entirely of bacon, butter and eggs, with butter and bacon together forming just over 80 % of the total by value and eggs forming just over 10 %. Danish bacon supplied about 48 % of total U.K. bacon consumption, butter about 30 % and eggs 16 %. Taken together, these three goods formed about 40 % by value of total U.K. imports of the same items. It might appear that even before making allowance for U.K. home production these proportions are not sufficiently large — except perhaps in bacon — to constitute even a potential monopoly position. But the structure of the British supply and marketing arrangements contributed to the strength of the Danish position.

In bacon, home-produced supplies were both irregular, and, relative to Denmark, inefficient. This arose chiefly from the dependence of the pig market on pork production — only the residue being supplied to bacon factories²⁾. There was also a differentiation in the product arising out of the difference in the method of curing.

¹⁾ In this article I have presented some of the results contained in a thesis accepted by Cambridge University for Ph. D. It will thus not be possible in such a condensed form to include all the detailed evidence for many of the conclusions stated therein, though in such cases the main sources of information are cited.

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In butter, home-produced supplies were more important so that Danish butter formed only about 30 % of total U.K. consumption. But the U.K. market in butter was subject to various »zonalising« influences. Home-produced supplies tended to be consumed almost entirely in the regions of production and rarely reached the larger urban areas: the markets for imported butter tended to be grouped round the ports of entry (so that Danish butter was sold largely in the North East of England); and in addition »tastes« for butter appeared to become so closely attached to customary brands that little substitution between brands was possible.¹⁾

As for eggs, the proportion of total U.K. consumption supplied by Danish eggs was considerably smaller than with the other two commodities, and there is no evidence that any other factors intervened to maintain a separate market for Danish eggs. But, as has been seen, eggs were of relatively minor importance in the trade between the two countries.

But while the supply of Danish products to the U. K. *taken as a whole* may have contained elements of monopoly or oligopoly, the actual organisation of the supply was sufficiently unco-ordinated to dispel any possibility that Denmark could have carried out a monopolistic policy in the 1920's.

In spite of the existence of co-operative organisations, the product was still sold under fairly competitive and independent conditions, mainly through numerous commission agents²⁾. It does not appear that the existence of the Danish Bacon Company constituted any significant reduction in the competitiveness of the trade in the 1920's.

Facing this situation of potential monopoly; the British purchasers of Danish products *taken as a whole* were in a position of potential monopsony due to the high proportion of Danish supplies which they consumed. Denmark's total exports of the three products examined above formed well over half of Denmark's total exports of all goods; and, on the average, of her total exports of these goods about 80 % went to the U. K. This also constituted about 70 % of total production of these goods.

The situation as regards U. K. exports to Denmark was completely different. U. K. exports to Denmark were spread over a much larger range of items, amongst which only coal and coke and to a much lesser extent

1) See Min. of Agric. and Fisheries «Report on the Marketing of Dairy Products in England and Wales», Economics Series, No. 30, 1932.

2) See P. A. Moltesen «Meddelelser vedrørende vore Landbrugsprodukters Afsætning paa det engelske Marked» in «Landbrugsraadets Meddelelser», 1932; K. Skovgaard and A. Pedersen «Survey of Danish Agriculture». I have also been aided by information from Mr. H. Bang, U. K. Representative of the Bacon Board of the Danish Ministry of Agriculture, Mr. G. Dunnett, Secretary of the Commonwealth Economic Committee, and Mr. E. M. H. Lloyd, Economic Adviser to the Ministry of Food.

cotton piece-goods, and iron and steel goods, constituted a significant proportion of Danish supplies. Similarly there was no centralised selling arrangements for these products in the 1920's. Furthermore U. K. exports to Denmark were of relatively very small importance in total U. K. exports. The overall situation is summarised in Table I below.

TABLE I

Distribution by value of trade of U.K. and Denmark: %age of total imports and exports of each country from, and to, the other country.¹⁾
(yearly average)

Period	Denmark's trade		U.K.'s trade	
	% imports from U.K.	% exports to U.K.	% imports Butter, Bacon and Eggs from Denmark	% exports to Denmark
1921-'24	19.7	57.6	42.0	2.2
1925-'28	13.2	56.0	42.3	1.7
1929-'32	16.6	60.1	45.9	2.7
1933-'36	32.7	59.2	40.4	4.7
1937-'38	36.4	54.2	36.0	4.8

¹⁾ Computed from Danish and U. K. annual trade accounts.

The factual and statistical information relating to the U. K. market for Danish products suggests then the following two main conclusions:

(1) Given that the demand for this particular kind of product is likely to be fairly inelastic in general, then the U. K. demand for the Danish supplies is also likely to be inelastic.

(2) U. K. consumers as a whole (e. g. if represented by governmental agencies) could carry out a monopsonistic policy in respect of purchases of Danish goods, while at the same time the Danish market for U. K. goods was of relatively small importance for the U. K.

To add confirmation to the first conclusion, various calculations were made of the elasticities of U. K. demand for Danish products and also the corresponding elasticities of substitution.

In general the form of demand equation used was as follows: —

$$q_d = aY^{\alpha} \frac{Pd^{\beta}}{\pi} \frac{Pd^{\gamma}}{P_o}$$

where q_d = quantity imported from Denmark; Y = U. K. Real National Income; Pd = retail price Danish supplies; P_o = retail price all non-Danish supplies of same product consumed in the U. K.; and π = U. K. cost of living index.

First differences of the logs of the variables were used throughout and the period covered was 1921—32 with half yearly data (corrected for seasonal variation) incorporated over the period 1927—'32.

For the elasticity of substitution calculations the formula used is the same as that used by Tinbergen, namely:

$$\text{elasticity of substitution} = \sigma = \frac{d \log \left(\frac{q_d}{q_o} \right)}{d \log \left(\frac{Pd}{P_o} \right)}$$

where q_o = quantity of non-Danish supplies of some product consumed in the U. K. It is assumed that there is no question here of "inferior" products so that differences in income effect between the alternative sources of supply can be ignored.

The results are summarised in Table II below.

TABLE II
Elasticities of U.K. demand for Danish products.

Commodity	(1)	(2)	(3)	(4)	Elasticity of substitution		\bar{R}
	Weight in total U.K. imports from Denmark of Butter, Bacon and Eggs.	Income Elasticity	Price Elasticity	Residual trend (per annum)	Excluding U.K. supplies	Including U.K. supplies	
Bacon	51.4%	+ .923	— .787	+ 5.25 %	— 2.656	— .83	.850
Butter	37.8%	+ .702	— .314	+ 2.26 %	— 1.094	— .85	.710
Eggs	10.8%	+ 1.219	— 1.036	—	— 0.836	— .51	.555
Weighted Average . . .				— .64			

From the above table it can be seen that

(a) the price inelasticity of U. K. demand for Danish goods is confirmed¹⁾ (to the extent of ones confidence in multiple correlation analysis).

1) Professor J. Pedersen in "En Analyse af det engelske Smørmarked" also finds that, in the short period at least, the British demand for Danish butter is inelastic; but, unless I have misunderstood the technique employed therein to eliminate the role of income, the estimates are only valid on the assumption that the income—elasticity of U. K. demand for Danish butter is unity—an assumption which could be an interesting subject for speculation.

(b) the elasticities of substitution are smaller when U. K. supplies are included — indicating that the lack of substitutability which existed in the market was due more to rigidity with respect to U. K. supplies than to entrenched preferences as between Danish and other imported supplies, and

(c) in the two most important items there appeared to be an overall upward shift in the British demand curves for these items (column (4)) during the period 1921—32.

As will be shown below, conclusion (a) is of considerable importance for the problem of fluctuations in the trade, and conclusion (c) is of importance for assessing the use to which the British monopsony position was finally put.

Attempts to calculate the elasticities of Danish demand for U.K. goods were less successful owing chiefly to the fact that as these goods are mainly raw materials from the point of view of Danish industry, and not final consumers' goods, the »ideal« data is in practise impossible to obtain and the investigator must use very inferior approximations. The equation obtained for the combined Danish demand for the four classes of goods mentioned above over the period 1921—32 yielded the following results: — income elasticity = + 2.76, price elasticity = — 2.418 and substitution elasticity = — 0.064. With a multiple correlation coefficient of only .479 however, not much significance can be attached to this result. Owing to the statistical insignificance of the substitution elasticity its upper limit as given by its standard error was used in calculating the residual trend, the value obtained for the latter being — 12,7 % per annum (exponential trend).

While no significance can be attached to the actual size of this downward shift in the Danish demand, it serves to add a certain amount of confirmation to the hypothesis that such a downward shift did exist — a hypothesis which had been revealed by the factual evidence of the period in which reports of various bodies¹⁾ had drawn attention to the growing substitution by Denmark of non-U.K. for U.K. sources of supply of many commodities. Graphical examination of the series relating to the ratio of Danish imports of each of the four goods concerned from non-U.K. to Danish imports of the same goods from the U.K. also leaves little doubt that there was a tendency to substitute non-U.K. for U.K. sources of supply over and above any substitution that could be ascribed to changes in the corresponding price ratios.

¹⁾ e. g. Trade Report issued by committee of the "Merchants Guild" in Denmark in 1927; Board of Trade Overseas Economic Report on "Denmark", 1929; and "The Economist" 1930; ii, p. 1003.

Thus we have that on the one hand there was an upward shift in the British demand for Danish products and on the other hand a probable downward shift in the Danish demand for U.K. products due to a definite substitution in favour of non-U.K. supplies. It appears that as a result of these shifts in demand the Danish balance of trade with the U.K. during the period 1921—30 showed a favourable trend — both in money terms and in real terms. That is to say, there was an upward *trend* in the Danish favourable balance of trade with the U.K. This was sufficiently strong, in fact, to more than offset the upward trend in the Danish adverse balance with the rest of the world over the same period, with the net result that Denmark's total adverse balance of trade with the whole world showed a falling trend over the period concerned both in real and in money terms.

But in 1931 the whole situation was radically changed. Great Britain had suffered severe unemployment during the slump — the severity of which was particularly marked in traditionally basic industries such as coal and textiles. At the same time the drastic fall in the world prices of agricultural produce had caused a further deterioration in the economic position of British agriculture. Thus the early 1930's saw the re-introduction of a protectionist policy by the United Kingdom in a variety of forms. One popular device which also served to stimulate U.K. exports was the conclusion of bilateral agreements with suppliers of agricultural products to the U.K. under which the U.K. undertook to limit the amount of protectionist restrictions on imports in return for assurances that the partners to the agreements would take steps to increase their imports of certain U.K. products, chief amongst these being the type of product exported by the U.K. to Denmark. 1931 was also the year of the Ottawa Agreement in which the U.K. agreed to give preference to Dominion supplies in the U.K. market for various agricultural products, especially dairy products.

The first step taken to control the imports of dairy products into the U.K. was the encouragement of a »voluntary« agreement among the main suppliers of bacon to the U.K., in 1931, to restrict the amounts of their bacon which they exported to the U.K. This was followed in 1933 by the conclusion of the Anglo-Danish Trade Agreement in which the Danish bacon quota was confirmed and quotas for butter and eggs also introduced. As well as being handicapped by quotas, the tariffs imposed on U.K. imports of Danish butter and eggs under the Ottawa Agreement constituted a considerable advantage to Denmark's chief competitor, New Zealand. In fact, from the point of view of U.K. imports from Denmark, the 1933 Agreement did little more than assure Denmark that no conditions worse than those which had already arisen out of the preceding Ottawa Agreement and bacon restrictions would be imposed. In return for this apparent

leniency, Denmark undertook (mainly in an attached protocol) to increase the proportion of her imports bought from the U.K.

Criticisms, from British sources, that in view of the strength of the U.K. monopsony position the U.K. had been too lenient (especially in regard to the bacon arrangements which resulted in a considerable increase in the price of the bacon) were perhaps ill-founded. For in the 1930's the U.K. was very eager to expand coal and iron and steel exports. If the U.K. had »squeezed« Denmark too tightly as regards imports from Denmark, then she could not, at the same time, have obtained agreement to expand the sale of U.K. goods in Denmark. In other words, when the monopsonist is also a seller, then he should bear in mind that the demand curve for his goods is not independent of the extent to which he exploits his monopsonistic buying position. Thus the apparent British leniency may have been, in effect, merely Machiavellian foresight.

Certainly the effects of the governmental intervention in the trade were beneficial to the U.K. On the one hand the proportion of U.K. to non-U.K. imports into Denmark — which had been falling prior to 1930 — showed a rising trend in the following decade. This reversal of the preceding trend was so marked that the percentage by value of Danish imports from the U.K. to total Danish imports, which had been about 16 % in the 1920's, had risen to 38 % by 1937. And on the other hand, the upward trend in the British demand for Danish goods was completely checked. The result of these two changes was that the trend in Denmark's favourable balance of trade with the U.K. which had been increasing during the 20's was sharply reversed in the remaining years. While this was accompanied by a reduction in Denmark's adverse balance with non-U.K. the fall in this balance was not sufficient to offset the deterioration vis à vis the U.K., so that the total Danish balance of trade ceased to follow the favourable trend of the 20's and showed a slight deterioration.

The inelasticity of British demand for Danish goods taken into conjunction with the fact that Danish export prices showed a much greater correlation with Danish money income than with the income of her export markets¹) is also of interest for the problem of fluctuations in the balance of trade. For a rise in Danish income caused a rise in Danish export prices and given an inelastic demand this would increase the receipts from exports; and conversely when Danish income fell. Thus one would expect marked fluctuations in the Danish balance of trade as U.K. income fluctuated on the assumption that Danish income would be highly sensitive to changes

¹ The *partial* correlation coefficient of Danish export prices on Danish money national income with export markets' combined income taken into account was found be +.568; and on combined export markets' income with Danish money income taken into account was +.447.

in U.K. income owing to the importance of exports to the U.K. in the Danish National Income.¹⁾

While, however, it was possible to verify in certain years the tendency for the value of Danish exports to increase when *Danish income* increased even when there was no concomitant improvement in U.K. income, it was not possible to substantiate any simple model relating the Danish balance of trade to U.K. income. This was fundamentally due to the fact that the assumption suggested above, namely that Danish income would be highly geared to U.K. income, was found, in practice, to be rather unjustified.²⁾

There were three main reasons for this. In the first place, owing to the technological nature of the Danish exports to the U.K., an increase in U.K. demand for these goods always meant a large increase in Danish imports of feeding stuffs — so that a significant part of the increased income from exports would be immediately offset by increased imports into Denmark, thus damping the foreign-trade multiplier effect. Secondly, in many years Danish export prices moved in the opposite direction to U.K. National Income, and given inelasticity of U.K. demand for Danish products this would tend to make the value of Danish exports move in the opposite direction to that induced by the British marginal propensity to imports. Thirdly, insofar as changes in U.K. income had some effect on Danish export prices this would usually be offset by corresponding changes in the prices of Danish imports. Thus, for example, whilst a rise in U.K. income might in some years have beneficial effects in the form of a rise in Danish export prices, this would often be counterbalanced by a rise in Danish import prices. In fact the neutralising influences tending to insulate the Danish economy from fluctuations in U.K. income (except major movements such as the 1930 slump) were found to be so powerful that although the relationship that did exist between Danish and U.K. income was not very strong, it seemed nevertheless to be more than justified. The explanation for this appeared to be the sensitivity of Danish home investment to changes in economic conditions abroad. That is to say, even if the normal foreign trade multiplier effect was severely damped due to the neutralising factors mentioned above, Danish investment would react — to some extent purely psychological reactions — to changes in economic conditions abroad

¹ See my forthcoming article in »Economica«, »Price Changes and the Stability of the Balance of Trade«, for full mathematical model of balance of trade fluctuations when prices change as well as income.

² See Simkin »The Instability of a Dependent Economy« for similar conclusions to the relative independence of fluctuations in the New Zealand economy from changes in exports. Banking policy was found to be a much more potent influence on the New Zealand economy, which corresponds closely to the importance attached below to the role investment in the Danish economy.

and thus, by itself, tend to keep Danish income in line with movements in foreign incomes. For while Danish home investment was of less importance than exports in the Danish National Income, the fluctuations in investment were, in general, much more violent than fluctuations in exports and were more highly correlated with changes in U.K. income. Also, given the factors tending to offset changes in the value of exports, the scope allowed to investment as a determinant of Danish income is, of course, considerably increased.

Thus while the potential monopolistic position of Denmark in the U.K. market for butter and bacon meant that the U.K. demand for these goods was inelastic, it was not possible to specify any model indicating that there would be violent fluctuations in Danish income due to fluctuations in U.K. income, as a variety of causes tended to weaken the relationship between the two incomes.