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NOTES AND MEMORANDA

CHANGES IN THE EXPORT INDUSTRIES OF IRELAND. (No. II.).¹

IN a previous paper (given in *THE ECONOMIC JOURNAL* dated June, 1918) I analysed the figures for the exports at Irish ports which have been published by the Department of Agriculture and Technical Instruction for Ireland for the twelve years 1904 to 1915 inclusive. In this present paper it is possible to include the figures for 1916 also.

The analysis given in this previous paper for each of the twelve years revealed extraordinary changes in the values exported. Ireland was there shown to have become mainly an industrial country so far as exports are concerned; it was the industrial exports that were increasing, while the exports of live stock were stationary or retrograding. This result of the investigation was so surprising that it invited further examination. It is obvious that when exports are measured by their money-values, the element of price-fluctuations can play a great disturbance of the figures. I propose in the present paper to eliminate this element of prices, and to obtain a measure of the quantities exported in a form which will allow comparison of year with year. If my measure of the quantities exported be accepted as correct, it will be easy to discern how far the remarkable changes in Irish exports during these thirteen years were caused by changes in prices and how far they were the expression of a real expansion in the volume of the trade itself.

I will consider only the four years 1904, 1908, 1913, and 1916. I omit 1912, because the Larkin Strike of that year held up the export trade of Dublin for three months; and I wanted to have 1913 because it was the last normal year before the war.

These tables need no commentary. But the surprising lift in all the figures as we pass into the war period makes the impression that inflated prices rather than expanding trade must be the chief cause of the great increase in the values exported.

¹ A paper read to the *Statistical and Social Inquiry Society of Ireland* on Friday, 14 February, 1919.

The problem presents itself, therefore, Can we obtain a measure of the volume of the trade free from the disturbance of price-changes, can we measure exports by *quantities* instead of by *values*?

TABLE I.—IRISH EXPORTS FOR FOUR DIFFERENT YEARS.
(The figures are Estimated Values, sterling).

Exporting Industry. (Order of 1913).	1904.	1908.	1913.	1916.
	£	£	£	£
I. Linen ...	9,026,890	10,167,234	16,572,208	19,804,702
II. Cattle ...	8,985,336	10,935,197	15,464,468	20,464,086
III. Bacon ...	2,205,657	3,249,170	4,430,061	7,069,095
IV. Poultry...	2,887,772	3,560,449	4,048,088	8,122,834
V. Butter ...	3,271,827	4,185,180	3,954,611	6,853,848
VI. Steamers ...	1,500,000	2,900,000	3,148,000	6,322,543
VII. Cotton Goods ...	1,320,802	1,468,947	2,722,350	3,503,851
VIII. Brewing ...	1,879,445	1,931,239	2,554,044	3,540,860
IX. Whiskey ...	2,343,496	2,299,964	2,008,500	4,272,578
X. Woollens ...	989,832	1,247,285	1,852,554	3,155,404
XI. Sheep ...	1,747,677	1,723,223	1,784,142	2,438,680
XII. Horses ...	1,291,165	1,347,225	1,703,260	596,480
XIII. Pigs ...	1,742,039	1,332,258	1,024,197	2,051,878
Total (above) ...	39,191,938	46,347,371	61,246,483	88,196,839
Other Exports ...	10,206,598	11,067,606	12,639,927	18,974,178
Total Exports ...	49,398,536	57,414,977	73,886,410	107,171,017

TABLE II.—PERCENTAGE GROWTH IN EXPORT VALUES.
(Value exported in 1904 = 100).

Exporting Industry. (Order of 1913).	1904.	1908.	1913.	1916.
I. Linen ...	100	112.6	183.5	196.8
II. Cattle ...	100	121.7	172.1	227.7
III. Bacon ...	100	147.3	209.0	324.9
IV. Poultry ...	100	123.3	140.1	281.3
V. Butter ...	100	124.8	120.9	209.4
VI. Steamers ¹ ...	100	132.5	162.7	276.1
VII. Cotton Goods ...	100	111.2	206.1	265.2
VIII. Brewing ...	100	102.8	135.9	188.4
IX. Whiskey ...	100	98.1	85.7	182.3
X. Woollens ...	100	126.0	187.1	318.7
XI. Sheep ...	100	98.6	102.0	139.5
XII. Horses ...	100	104.3	131.9	45.4
XIII. Pigs ...	100	76.4	58.8	117.8
Total Exports ...	100	116.2	149.5	216.9

¹ Steamers are here averages of two-year periods, 1904-05, 1907-08, 1912-13, 1915-16; so not as in previous tables.

The usual method of solving this problem would be as follows : The exports of any year, such as 1916, are to be recalculated according to the prices which existed at the base year 1904. If the total quantities exported in 1904 for each article of trade be divided into the total values of each such article in that year's exports, we get an averaged export price for each article, as in 1904. Take, then, the *quantities* (only) exported in any subsequent year 1916, multiply them by these averaged export prices for 1904, and we obtain the materials for measuring *what the exports of 1916 would have amounted to if valued at the prices of 1904*. If we did the same thing for 1908, 1913, and 1916, and arrayed the results in the form resembling Table II. above, then the figures would show the expansion of trade undistorted by mere price fluctuations.

In the case of British foreign trade this calculation is done for us every year by papers like the *Economist*; and it is a very necessary thing to do. The recalculation is rendered easier for British imports and exports, because those "averaged prices," both of exports and imports (*i.e.*, the results of dividing total values by total quantities) have been calculated for each article every year by the Board of Trade and are always put on record in the *Statistical Abstract for the United Kingdom*. So one merely takes from the *Statistical Abstract* the prices of the base year (say, 1904) and multiplies the *quantities* for the current year (say, 1916) by those base prices, and the calculation is quickly done.

This is the usual method by which exports are freed from price fluctuations. I have not been satisfied, however, to apply to Irish exports the "averaged prices" in the *Statistical Abstract* which were worked out from British exports. Consequently, I have tried another method, *using the principles of index-numbers* to obtain a measure of the *quantity* of our export trade, apart from the fluctuations of prices.

To illustrate the application of *index-numbers* to this problem, I will consider in detail the figures for the linen trade for the year 1916, as compared with the year 1904. The Department's returns supply the particulars of quantities and values for the four items that make up the exports of the linen trade, which are set out in Table III.

Here the figures in columns C and D can be added, and the totals at foot are the same figures as appeared already in Table I. for the "estimated values" of the linen exports for 1904 and 1916. But the *quantity* figures in columns A and B, being in

discrete units, cannot be added; our problem is to obtain an *index-number* that will measure each of those columns. Taking 1904 as the base with which other years will be compared, we

TABLE III.—EXPORTS OF IRISH LINEN INDUSTRY.

ITEM. ¹	QUANTITIES.		VALUES, £.	
	A. 1904.	B. 1916.	C. 1904.	D. 1916.
a. Flax (<i>tons</i>) ...	2,641	4,664	132,050	426,317
b. Linen Yarn (<i>lbs.</i>) ...	20,163,700	18,020,576	1,232,356	2,027,315
c. Linen Goods (<i>cwt.</i>)...	972,924	1,083,208	7,296,930	16,248,120
d. Thread (<i>lbs.</i>) ...	2,924,432	5,522,272	365,554	1,092,950
			9,026,890	19,804,702

represent each figure in column A by the number 100; and we calculate the proportional numbers which then represent the corresponding figures in column B. The result is Table IV.

TABLE IV.—PERCENTAGE CHANGE IN LINEN EXPORTS (*Quantities*).

	1904.	1916.
a. Flax (<i>tons</i>) ...	100	177
b. Linen Yarn (<i>lbs.</i>) ...	100	89
c. Linen Goods (<i>cwt.</i>)...	100	111
d. Thread (<i>lbs.</i>) ...	100	189

Now, the simple arithmetic mean of the index-numbers in the last column is 141·5: can we take it as a measure of the 1916 column? To do so would be to assume that the four items (a, b, c, and d) are of equal importance. But the money values of those items, shown by column D in Table III., are very unequal; and it so happens that the smaller items (a and d) show much larger percentage changes than the important items (b and c). I take these money values to be a correct measure of their relative importance. In place of a simple arithmetic average, therefore, we require to have a *weighted average* of the 1916 index-numbers of Table IV.—using as *weights* the figures shown in column D of Table III. This *weighted average* works out² at 114·5, which figure we take to be the index-number that

¹ A small doubtful item, "Waste (Flax, Tow, and Hemp)" is omitted.

² By the theory of index-numbers, the "weights" yield the same *weighted average* even if only relatively approximate. Now the four large figures in Column D of Table III. are relatively approximate to 4, 20, 162 and 10; and therefore to 2, 10, 81, and 5. We may now use these last figures as the

measures the *quantity* of the linen trade exports in the year 1916. The *quantities* exported by the linen industry had risen from 100 in 1904 to 114·5 in 1916; whereas (as we have shown in Table II.) the *values* exported by the linen industry had undergone the much greater rise from 100 in 1904 to 196·8 in 1916. The disparity between these results reveals the effects of mere price changes upon the estimated values of the exports, apart from the growth of the trade.

As we have now obtained an index-number (114·5) to measure the change in the *quantities* exported for the linen industry, so by the same process we can obtain a corresponding index-number for 1916 to measure the change in the *quantities* exported in the cattle industry, and each of the other principal export industries of Ireland. Only in the case of shipbuilding it cannot be done for the war-years 1915-6, for the tonnage output was not disclosed. As in Table II., the steamers are measured by the averaged output for the two-year periods 1904-5, 1907-8, 1912-3, and 1915-6, in order to distribute the tonnage of very large vessels whose construction had spread over two years. Moreover, what we can do for the year 1916 we can do in the same manner for other years. The results in Table V. were thus obtained.

TABLE V.—PERCENTAGE CHANGES IN QUANTITIES EXPORTED.

(Year 1904 = 100).				
—				
	1904.	1908.	1913.	1916.
I. Linen	100	97·5	120	114·5
II. Cattle	100	111·8	148·3	142·9
III. Bacon	100	129·2	139·1	150·8
IV. Poultry	100	119·3	118	146·5
V. Butter	100	112·8	112·3	156·3
VI. Steamers	100	134·6	134·0	—
VII. Cotton Goods	100	98·8	130·1	124·8
VIII. Brewing	100	122·7	162·1	171·8
IX. Whiskey	100	93·9	85·8	45·6
X. Woollens	100	169·6	234·6	332·2
XI. Sheep	100	101·4	88·6	87·4
XII. Horses	100	104·3	131·9	25·9
XIII. Pigs	100	77·1	39·5	55·0
Average No. for Year	100	113·1	128·3	140·7

“weights,” and the *weighted average* will be practically the same. It will be found to be 114·28; as compared with 114·56 when the large figures were used as “weights.” In this manner the calculations are much simplified and shortened.

The view given in this table of the growth in volume of Irish exports is interesting from many points. The astonishing growth in the output of the woollen industry is unparalleled. But the brewing and bacon industries have also extended their exports to a remarkable degree for such a short period of time as twelve years. All the manufacturing industries, except whiskey, show steady progress. All the live stock trades are less healthy-looking. [N.B.—The cattle figure for 1913 is abnormal, because the Larkin Strike had stopped the Dublin trade for some three months of 1912.] The rise between 1913 and 1916 in nearly all items shows the emphatic demand for Irish products in war time, which had operated for horses previous to the outbreak of hostilities. The decline in pigs is nearly equivalent to the rise in bacon, which, if it be cause and effect, is a satisfactory feature.

It remains only to compare the *quantity* changes in Irish exports with the changes in *values* in order to see how the contemporaneous increase of prices has operated. This can best be seen in Table VI. which combines together the previous

TABLE VI.—PERCENTAGE CHANGES IN IRISH EXPORTS
DURING THIRTEEN YEARS.

[Darker figures in brackets = Quantities ; other
figures = Values. Year 1904 = 100.]

(Order of 1913).	1904.	1908.	1913.	1916.
I. Linen ...	100 (100)	112.6 (97.5)	183.5 (120)	196.8 (114.5)
II. Cattle ...	100 (100)	121.7 (111.8)	172.1 (148.3)	227.7 (142.9)
III. Bacon ...	100 (100)	147.3 (129.2)	209.0 (139.1)	324.9 (150.8)
IV. Poultry ...	100 (100)	123.3 (119.3)	140.1 (118)	281.3 (146.5)
V. Butter ...	100 (100)	124.8 (112.8)	120.9 (112.3)	209.4 (156.3)
VI. Steamers ¹ ...	100 (100)	132.5 (134.6)	62.7 (134.0)	276.1 (—)
VII. Cotton Goods ...	100 (100)	111.2 (98.8)	206.1 (130.1)	265.2 (124.8)
VIII. Brewing ...	100 (100)	102.8 (122.7)	135.9 (162.1)	188.4 (171.8)
IX. Whiskey ...	100 (100)	98.1 (93.9)	85.7 (85.8)	182.3 (45.6)
X. Woollens ...	100 (100)	126.0 (169.6)	187.1 (234.6)	318.7 (332.2)
XI. Sheep ...	100 (100)	98.6 (101.4)	102.0 (88.6)	139.5 (87.1)
XII. Horses ...	100 (100)	104.3 (104.3)	131.9 (131.9)	45.4 (25.9)
XIII. Pigs... ...	100 (100)	76.4 (77.1)	58.8 (39.5)	117.8 (55.0)
Total Value All Exports ...	£49,398,536	£57,414,977	£73,886,410	£107,171,017
Percentage of 1904 Values ...	100	116.2	149.5	216.9
Average Quantity Index No. ...	(100)	(113.1)	(128.3)	(140.7)

¹ Steamers are averages of two-year periods 1904-05, 1907-08, 1912-13, 1915-16.

Tables II. and V.—the darker figures enclosed in brackets representing quantities and the other figures representing values. This table may be let speak for itself. It tells a remarkable story for each of the thirteen principal exporting industries of Ireland. In regard to two of them, the woollens and the brewing, this table points to a peculiarity, viz.: the *quantity* figures are larger than the *value* figures, except in the year 1916. This seems to show that the products in these industries had experienced a fall of prices—until the war year 1916. In the case of horses it may be noticed that the *quantity* and *value* figures are alike, except in 1916. But in this case, probably, the Department has nothing but *quantity* figures to handle; the statistician had put an average price applicable to all horses of the same sort. If I may guess what he did, he seems to have valued every stallion at £250 all the time; and every mare and gelding was valued at £45 every year except the last, when for 1916 he raised this figure to £80. Of course, it was necessary to value them at some figure, in order that the total exports of Ireland might be aggregated in its money values. The difficulties under which the Department brings out its annual return of the trade in imports and exports at Irish ports, owing to the absence of legal powers to require adequate returns from traders and shippers, were dwelt on in my previous paper, and are, perhaps, not always appreciated by those who may make use of these very important statistics of Irish external trade.

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Emigration Statistics of Ireland for the Year 1918. [C. 77.]

THE number of emigrants was 983, 1,131 less than for 1917—a “record.”