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## CHAPTER IV

### A COMPARISON OF CONCENTRATION IN CANADA AND THE UNITED STATES

How do Canadian industries compare with their counterparts in the United States? Is concentration typically higher in one country than in the other? Is the ranking of industries by degree of concentration similar in the two countries? Investigation of these questions will throw further light on the causes of concentration and on the industrial structures of the two countries.

The manufacturing industries of Canada are in many respects similar to those of the United States. Imports of capital, enterprise, and technology from the United States have contributed materially to the development of Canadian industries.<sup>1</sup> The ease of communication and similarity of cultures have encouraged the establishment of similar industries using similar techniques. "Conversations with many American businessmen have revealed that they regard Canada as a slightly peculiar northward extension of the domestic market."<sup>2</sup>

There are, however, important differences. The population of the United States is eleven times that of Canada (1951).<sup>3</sup> Employment in the manufacturing industries in 1947 amounted to 1.13 millions in Canada and 14.8 millions in the United States.<sup>4</sup> The much smaller Canadian market is protected by a tariff wall, but even so there are many articles which it does not pay to produce in the country on so small a scale, some that are assembled from imported parts, and others that are produced without full use of the mass production techniques developed for the larger United States market.<sup>5</sup> Both imports and exports play a relatively greater role in Canadian manufacturing industries than in the United States.

<sup>1</sup> Cf. Chap. I, sec. 1. See also H. Marshall, F. A. Southard, Jr., and K. W. Taylor, *Canadian-American Industry*, Yale University Press, 1936.

<sup>2</sup> Marshall, Southard, and Taylor, *op. cit.*, p. 293.

<sup>3</sup> Chap. I, sec. 1.

<sup>4</sup> *The Manufacturing Industries of Canada, 1947*, Ottawa, Dominion Bureau of Statistics, 1950, p. 7; and *Census of Manufactures, 1947*, Bureau of the Census, Vol. I, p. 22. Figures include proprietors and firm members.

<sup>5</sup> Marshall, Southard and Taylor, *op. cit.*, pp. 234-236.

## COMPARISON OF CONCENTRATION

### 1. Comparison of Concentration in Selected Industries

In 50 of 56 industries for which a comparison of firm concentration can be made, concentration is higher in Canada than in the United States (Table 25). If we omit industries with separate regional markets, and those in which exports or imports are important (in Canada),<sup>6</sup> it is found that, of a total of 34 industries that can be compared, 30 have higher concentration in Canada.

These proportions are high enough to establish clearly a definite tendency toward higher concentration in Canada, in spite of a number of imperfections in the statistics. The Canadian statistics are for the year 1948 while those for the United States are for 1947. This discrepancy is not likely to be a source of significant error in view of the stability of concentration ratios over periods as short as a year.<sup>7</sup>

A more serious source of error is, perhaps, the fact that the Canadian statistics measure concentration of employment while the data for the United States measure concentration of the value of output. Because concentration of output is generally higher than concentration of employment,<sup>8</sup> the comparison is biased; concentration in Canada is understated relative to that in the United States. The true excess of concentration in Canada over concentration in the United States is therefore, on the average, even greater than that shown in Table 25, and the number of industries in which concentration is higher in Canada than in the United States may be even more than 50 of the 56 examined. Hence the conclusion that concentration in Canada is generally higher than in the United States is strengthened when this bias is taken into account.

The sample of 56 industries used in this comparison accounts for 22 per cent of total manufacturing employment in the United States (1947) and 28 per cent in Canada. The industries were selected as follows:

1. Only industries included in the Canadian cross-section analysis were considered (i.e. the industries shown in Appendix A, Table A-1). Industries with excessively heterogeneous products or with products of which a substantial proportion is produced in other industries (in Canada) were excluded.<sup>9</sup>

<sup>6</sup> See Table 8.

<sup>7</sup> See Appendix A, Tables A-2 and A-6. See also G. Rosenbluth, "Measures of Concentration," in *Business Concentration and Price Policy*, Princeton University Press for National Bureau of Economic Research, 1955, pp. 77-83.

<sup>8</sup> Rosenbluth, *op. cit.*, pp. 90-92.

<sup>9</sup> Cf. Chap. I, sec. 3. In addition to the basic sample of 96 industries, rice, wood preservation, and wall paper are included in Table 25. These industries

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TABLE 25

Concentration in Canada and the United States, 56 Selected Manufacturing Industries

INDUSTRY	CONCENTRATION OF EMPLOY- MENT IN CANADA, 1948		CONCENTRATION OF OUTPUT (VALUE) IN U.S., 1947	
	Number of Largest Firms	Percentage of Em- ployment Accounted for by Given Num- ber of Largest Firms	Number of Largest Firms	Percentage of Out- put Accounted for by Given Number of Largest Firms
<i>Foods, Beverages, Tobacco</i>				
Rice	a	a	4	33
Malt & malt products	9	100	8	69
Starch & glucose (corn prod.)	10	100	20	99.5
Distilleries	7	96	8	86
Macaroni, etc.	14	100	20	56
Sugar refining	7	100		
Sugar refining, cane			8	88
Sugar refining, beet			8	94
Slaughtering & meat packing	5	72		
Meat packing, wholesale			4	41
Poultry dressing, wholesale			4	32
Breweries (malt liquors)	8	79	8	30
Wine	3	58	4	26
Fruit & vegetable preparations	8	43		
Canning & preserving, except fish			8	35
Pickles & sauces			8	42
Dehydrated fruits & vegetables			8	71
Maximum for combined group			8	37
Soft drinks	5	40	8	14
Bread & other bakery products	8	35	8	26
Prepared stock & poultry feeds	9	34	8	27
Condensed milk	12	80	20	76
Biscuits & crackers	7	68	4	71.5
Tobacco processing (tobacco stemming & redrying)	4	71	4	88
<i>Textiles, Leather, Fur</i>				
Cordage, rope, twine	6	93	8	53
Cotton yarn & cloth	8	90		
Cotton yarn			8	22
Cotton cloth			8	22
Carpets & rugs	3	64		
Carpets, wool			4	52
Carpets, other			4	25
Leather belting	3	62	4	44
Narrow fabrics	3	54	4	17
Woolen fabrics	3	28	4	28
Woolen yarn	7	65	8	34
Corsets	3	37	4	16
Fur dressing & dyeing	5	59	8	42
Canvas products	4	25	4	10
Leather tanning	7	49	8	39

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TABLE 25 (cont.)

INDUSTRY	CONCENTRATION OF EMPLOYMENT IN CANADA, 1948		CONCENTRATION OF OUTPUT (VALUE) IN U.S., 1947	
	Number of Largest Firms	Percentage of Employment Accounted for by Given Number of Largest Firms	Number of Largest Firms	Percentage of Output Accounted for by Given Number of Largest Firms
<i>Textiles, Leather, Fur (cont.)</i>				
Fur goods	3	6	4	3
Cotton & jute bags (textile bags)	3	37	4	53
Boots & shoes, leather (including house slippers)	3	9		
Footwear, except rubber			4	28
House slippers			4	27
Minimum for combined group			4	27
<i>Wood and Paper</i>				
Wood preservation	a	a	4	31
Plywood and veneer	18	89		
Plywood mills			20	56
Veneer mills			20	52
Wall paper	a	a	4	49
Roofing paper	3	60	4	42
Excelsior	10	100	20	88
Boat building	20	44	20	52.5
<i>Metals</i>				
Pig Iron <sup>b</sup> (blast furnaces)	4	100	4	67
Primary aluminum	1	100	3	100
Railway rolling stock	7	95		
Railroad & street cars			8	72
Locomotives			8	95
Agricultural implements	5	83		
Farm machinery			8	88
Tractors			8	47
Ship building	4	42	4	42
<i>Nonmetallic Minerals</i>				
Gypsum products	5	100	8	94
Glass	4	100		
Glass, flat			4	88
Glass, pressed & blown			4	51
Glass containers			4	63
Abrasive products	5	96	4; 8	49; 56
Petroleum refining	3	80	4	37
Coke	7	91		
Coke, by-product ovens			8	69
Coke, beehive ovens			8	61.5
Asbestos products	3	64	4	57.5
<i>Chemicals</i>				
Matches	4	100	4	83
Printing ink	8	86	8	69
Paints & varnishes	6	49	8	36

(cont. on next page)

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TABLE 25 (cont.)

INDUSTRY	CONCENTRATION OF EMPLOYMENT IN CANADA, 1948		CONCENTRATION OF OUTPUT (VALUE) IN U.S., 1947	
	Number of Largest Firms	Percentage of Employment Accounted for by Given Number of Largest Firms	Number of Largest Firms	Percentage of Output Accounted for by Given Number of Largest Firms
<i>Chemicals (cont.)</i>				
Soap	3; 16	75; 94	4; 20	79; 93
Compressed gases	6	95	8	88
Hardwood distillation	2	100	4	72
<i>Miscellaneous</i>				
Pens & Pencils	3	67		
Pens & mechanical pencils			4	58
Lead pencils			4	51
Umbrellas	3	84	4	22
Buttons	5	68	8	32

<sup>a</sup> Data not published because of secrecy requirement. Three firms control 100 per cent, two firms 90 per cent, or one firm 75 per cent.

<sup>b</sup> Canadian data based on capacity of equipment.

Source: Canada: Computed from special tabulation of firm-size distributions in 1948, made available by the Dominion Bureau of Statistics. United States: "Concentration of Industry Report," mimeographed, Dept. of Commerce, 1949, printed in *Hearings before the Subcommittee on Study of Monopoly Power of the Committee of the Judiciary*, 81st Cong. 1st sess. 1950, pp. 1437-1456. These figures are based on the 1947 *Census of Manufactures*.

In both the Canadian and the United States compilations, the "firm" consists of those plants in the same industry that are under common ownership.

Note: In each industry group, industries listed below the horizontal line have higher concentration in the United States than in Canada, or equal concentration in the two countries.

2. Only industries for which the United States and Canadian definitions are comparable could be used. In a few cases it was possible to match two or three United States industries with one Canadian industry.

3. Industries were not included unless an unambiguous comparison of concentration could be made without requiring interpolation. Since the Canadian statistics are grouped by size classes while the United States statistics show concentration in the leading four, eight, twenty, and fifty firms, no conclusive comparison was possible for a number of industries. The cases in which a clear-cut comparison can be made are of the following types:

- a. The obvious case in which the leading Canadian size class (or group of classes) contains four, eight, or twenty firms (no comparisons were made on the basis of fifty firms).

are so highly concentrated in Canada that no data for them can be published, so that nothing is known about them except their approximate level of concentration, as indicated in note a to Table 25. No other information is required for the present comparison.

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- b. In one country  $x$  firms account for  $y$  per cent while in the other, more (less) than  $x$  firms account for less (more) than  $y$  per cent.
- c. In one country  $x$  firms account for  $y$  per cent while in the other,  $z$  firms ( $z > x$ ) account for more than  $(zy \div x)$  per cent. Concentration is higher in the second country.<sup>10</sup>
- d. One Canadian industry is matched by two or more United States industries, and the weighted average of the percentages accounted for by the  $x$  largest firms in the United States component industries (using industry sizes as weights) is less than the percentage concentrated in the  $x$  largest firms in the Canadian industry. Concentration is higher in Canada.<sup>11</sup>
- e. One Canadian industry is matched by two or more industries in the United States and concentration in the  $x$  largest firms in Canada is lower than the corresponding index of one of the United States component industries multiplied by the ratio of that industry's size to the size of the combined group. Concentration is lower in Canada.<sup>12</sup>

These requirements reduced the number of industries that could be compared to 56. Since the evidence of higher concentration in Canada is very pronounced and appears in each industry group, it is not likely that a larger sample would modify the conclusion in any important respect. Unfortunately, however, the statistics are not in a form that permits measurement of the *extent* to which concentration in Canada exceeds concentration in the United States.

### 2. Why Concentration is Higher in Canadian Industries

Concentration can, as shown in Chapter II, be regarded as a function of the degree of inequality of firm size and of the number of firms. Table 26 shows that the higher level of concentration in Canada does

<sup>10</sup> If  $x$  firms account for  $y$  per cent, their average size (measured as a percentage of industry size) is  $y \div x$  per cent and the average size of the  $(z - x)$  firms next in the size array cannot be greater. Hence  $z$  firms cannot account for more than  $z \times y \div x$  per cent and if in the other country  $z$  firms account for more than this percentage, concentration there is higher.

<sup>11</sup> The weighted average is the hypothetical percentage accounted for by the  $x$  largest firms in the combined industry which would be attained if the largest firms in the component industries were under the same ownership (and hence would be "merged" when the statistics are combined) and the same were true of the second largest firms and so on for all of the  $x$  largest firms. This is clearly the maximum possible value of the percentage for the combined industry.

<sup>12</sup> Since in the United States the leading  $x$  firms for the combined group cannot be *smaller* than the leading  $x$  firms in any of the component industries.

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TABLE 26

Comparison of Inequality of Firm Size in Canada and United States,  
31 Selected Manufacturing Industries

INDUSTRY	INEQUALITY OF FIRM SIZE (EMPLOYMENT) CANADA, 1948		INEQUALITY OF FIRM SIZE (VALUE OF OUTPUT) U.S., 1947	
	Per- centage of Firms	Percentage of Employment Ac- counted for by Given Percentage of Firms	Per- centage of Firms	Percentage of Output Ac- counted for by Given Percentage of Firms
<i>Foods, Beverages, Tobacco</i>				
Distilleries	58	96	35	98
Sugar refining, cane & beet	57	32	47	more than 66
Wine	13	58	13	74
Prepared stock & poultry feeds	3.5	34	0.8	40
Condensed milk	40	80	27	91
Biscuits & crackers	17	68	2	71
Tobacco processing	31	71	4	88
Soft drinks	1.2	40	0.15	14
<i>Textiles, Leather, Fur</i>				
Cordage, rope, twine	60	93	38	94
Leather belting	21	62	11	74
Woolen fabrics	3.4	28	0.9	28
Corsets	8	37	4	47
Fur dressing & dyeing	24	59	12	59
Canvas products	4	25	2	31
Leather tanning	10	49	4	55
Cotton & jute bags	10	37	2	53
Boots & shoes, leather, inc. slippers	1	9	0.4	more than 27
Woolen yarns	13	65	11	55
Fur goods	0.5	6	0.4	4.5
<i>Wood and Paper Products</i>				
Roofing paper	20	60	8	65
Boat building	8	44	3	52
<i>Metal Products</i>				
Pig iron <sup>a</sup>	25	38	12	67
Shipbuilding	5	42	1.5	42
<i>Nonmetallic Mineral Products</i>				
Petroleum refining	17	80	7	83
Asbestos products	20	64	9	72
<i>Chemicals</i>				
Printing ink	36	86	33	93
Paints & varnishes	6	49	4	61
Soap	6	75	2	79
Compressed gases	21	81	12	88
<i>Miscellaneous</i>				
Pens & pencils	27.3	67	27.8	more than 71
Buttons	16	68	12	72

<sup>a</sup> Canadian data based on capacity of equipment.

Source: Same as Table 25.

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not reflect a higher degree of inequality. On the contrary, in 28 industries inequality is greater in the United States than in Canada (i.e. a higher percentage of the industry is accounted for by an equal or lower percentage of the firms); this number constitutes half the industries listed in Table 25 and over 90 per cent of the 31 industries for which comparable inequality indexes could be accurately computed.<sup>13</sup> Only three industries—soft drinks, woolen yarns, and fur goods—show higher inequality in Canada.

A less reliable comparison based on a uniform index of inequality can be made for a larger number of industries by estimating the Canadian values. The indexes shown in Table 29 measure the ratio of the average size of the largest four firms to the average size of all firms, for 41 United States and Canadian industries. According to this index all the industries examined exhibit higher inequality in the United States than in Canada.

Higher concentration can thus be said to exist in Canada in spite of greater inequality of firm size in the United States. It must therefore be due to the fact that Canadian industries have fewer firms. Column 4 of Table 27 shows that all the industries examined have fewer firms in Canada than in the United States. The median ratio of the number of firms in a United States industry to the number in its Canadian counterpart is 8; the quartiles are 5 and 13. The lowest ratio found in Table 27 is 3.0.

This great divergence in the number of firms reflects the fact that Canadian industries are generally much smaller than their counterparts in the United States, while the average size of their *firms* is only slightly smaller. These relations are illustrated by columns 2 and 3 of Table 27. The median ratio of United States to Canadian industry sizes is 10, with quartiles 8 and 13. The median ratio of average firm sizes, however, is only 1.2, with quartiles 0.9 and 1.9. Thus the smaller

<sup>13</sup> Comparisons are possible for the cases corresponding (*mutatis mutandis*) to types "a", "b", and "c" described in section 1 for comparisons of concentration. In addition, where one industry in Canada is matched by two or more in the United States, a comparison can be made if the maximum possible inequality in the combined United States industry is less than in Canada, or the minimum greater.

Let United States *component* industry  $i$  have  $n_i$  firms, while the largest  $y$  firms in this industry account for  $x_i$  per cent of the *combined* industry. Inequality in the combined industry cannot be as great as control of  $\Sigma x_i$  per cent of the industry by  $y \div (\Sigma n_i)$  per cent of the firms, and it cannot be as low as control of *maximum*  $x_i$  per cent by  $y \div (\text{maximum } n_i)$  per cent of the firms.

The upper limit represents maximum concentration and the maximum total number of firms in the industry, while the lower limit represents minimum concentration and the minimum number of firms.

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TABLE 27

Comparison of Industry Size, Firm Size, and Number of Firms, United States and Canada, 53 Selected Manufacturing Industries, 1947

<i>Industry</i>	<i>Ratio of Employment, U.S., to Employment, Canada<sup>a</sup></i>	<i>Ratio of Employment per Firm, U.S., to Employment per Firm, Canada<sup>b</sup></i>	<i>Ratio of Number of Firms, U.S., to Number of Firms, Canada<sup>c</sup></i>
<i>Foods, Beverages, Tobacco</i>			
Malt and malt products	4.23	0.93	4.56
Distilleries	7.45	0.62	12.00
Macaroni	11.75	0.75	15.64
Sugar refining, cane & beet	10.25	2.11-4.22	2.43-4.86
Slaughtering & meat packing, inc. poultry dressing	10.70	0.55-0.64	16.66-19.41
Breweries	8.80	0.83	10.63
Wine	11.13	0.68	16.48
Fruit & vegetable preparations	9.62	1.39-1.96	6.91-4.91
Soft drinks	14.51	1.15	12.67
Bread & other bakery products	7.62	3.50	2.18
Condensed milk	10.65	1.76	6.07
Biscuits & crackers	9.38	2.58	6.07
Tobacco processing	17.20	2.40	7.15
Starch & glucose	11.41	2.43	4.70
Prepared stock & poultry feeds	13.01	1.43	9.12
<i>Textiles and Leather</i>			
Cordage, rope, twine	9.96	0.75	13.20
Cotton, yarn & cloth	18.67	0.66-1.15	16.23-28.42
Carpets & rugs, wool & other	35.15	2.37-3.48	10.11-14.83
Leather belting	20.68	1.63	12.71
Narrow fabrics	12.91	1.10	11.71
Woolen fabrics	13.00	2.65	4.91
Woolen yarn	6.91	2.06	3.35
Corsets	11.53	0.84	13.69
Fur dressing & dyeing	5.13	0.63	8.14
Canvas products	8.21	0.93	8.80
Leather tanning	9.59	1.40	6.85
Cotton & jute bags	8.93	1.31	6.83
Fur goods	3.09	0.85	3.64
Boots & shoes & house slippers, leather	11.23	2.55-3.04	3.70-4.41
<i>Wood and Paper</i>			
Veneer & plywood	6.20	0.94-1.83	3.38-6.62
Roofing paper	7.61	1.10	6.93
Excelsior	7.08	1.48	4.80
Boat building	11.20	3.34	3.35
<i>Metals</i>			
Pig Iron	9.63	1.17	8.25
Aluminum	n.a.	n.a.	3.00

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TABLE 27 (cont.)

<i>Industry</i>	<i>Ratio of Employment, U.S., to Employment, Canada<sup>a</sup></i>	<i>Ratio of Employment per Firm, U.S., to Employment per Firm, Canada<sup>b</sup></i>	<i>Ratio of Number of Firms, U.S., to Number of Firms, Canada<sup>c</sup></i>
<i>Metals (cont.)</i>			
Railway rolling stock	3.19	0.57-0.85	3.78-5.61
Agricultural machinery, inc. tractors	10.75	0.69-0.75	14.25-15.54
Shipbuilding	6.17	1.72	3.58
<i>Minerals</i>			
Gypsum products	8.26	1.00	8.25
Glass	29.14	0.72-1.09	26.75-40.75
Abrasive products	28.92	1.23	23.60
Petroleum refining	18.80	1.22	15.39
Coke products	12.52	1.35-2.60	4.82-9.27
Asbestos products	22.24	3.93	5.67
<i>Chemicals</i>			
Matches	8.11	1.80	4.50
Printing ink	9.90	1.44	6.86
Paints & varnishes	9.93	0.94	10.59
Soap	11.23	2.42	4.65
Compressed gases	8.26	1.68	4.93
Hardwood distillation	11.02	1.00	11.00
<i>Miscellaneous</i>			
Pens & pencils	15.40	0.75-0.94	16.36-20.55
Buttons	5.53	0.42	13.29
Umbrellas	20.02	0.74	27.00

<sup>a</sup> Employment includes proprietors and firm members.

<sup>b</sup> Employment includes proprietors and firm members. For Canada employment, 1947, is divided by number of firms, 1948.

<sup>c</sup> Number of firms, Canada, for 1948.

n.a. = not available.

Source: Appendix A, Table A-9. The industries included are those listed in Table 25 with the exception of rice, wallpaper, and wood preservation.

size of the Canadian market typically results in *fewer* firms rather than in smaller firms, compared with the United States.

The fact that average firm size is similar in the two countries probably reflects the similarity of technology and business methods discussed above.<sup>14</sup> Firms are, however, slightly larger, on the average, in the United States, and this may be due to the great difference in market size. It is likely that production techniques known in the United States are applied in Canada, except where the difference in market size makes this unprofitable. Certain techniques involving specialized

<sup>14</sup> See the introduction to this chapter, and Chap. I, sec. 1.

equipment cannot profitably be used in the small Canadian market, and in some industries firms are less fully integrated in Canada, assembling parts imported from the United States.<sup>15</sup>

Canada is, however, in a much better position to adopt American production techniques than other economies of comparable size located farther from the United States. Specialized machinery, which could not be produced for the Canadian market alone, can be easily imported from the United States, and what is perhaps more important, repair services, parts, and facilities for training technical and administrative personnel are easily accessible. In these ways production techniques dependent on the external economies resulting from the large United States markets have been made available to the much smaller Canadian market. Hence the difference in plant and firm sizes in the two countries is slight.

The great differences in industry size between Canada and the United States reflect the basic difference in population and national income. In terms of demographic or economic variables Canada is a small country while the United States is a large one, and this basic difference is reflected in the concentration level.<sup>16</sup> In terms of geographical area and natural resources, however, the two countries are quite comparable. At the present stage of technological development a rapid expansion of the Canadian economy by means of immigration and capital import is entirely feasible, and our analysis suggests that one of the results of such a development might be a reduction in the level of concentration.

### *3. The Relative Importance of Different Industries in Canada and the United States*

While, industry by industry, concentration is higher in Canada than in the United States (Table 25) a comparison of the general level of concentration in the two countries must also take into account the relative sizes of industries with high and low concentration. If, for

<sup>15</sup> There is, however, no significant correlation between the U.S.-Canada industry-size ratios and the corresponding firm-size ratios shown in Table 27.

<sup>16</sup> The finding that market size is the decisive factor explaining the difference in concentration between the two countries cannot be expected to apply to other pairs of countries. It is decisive here because the difference in market size is great and technology is similar. Even when an industry is relatively much more important in Canada than in the United States it will generally be smaller than the corresponding industry in this country. Moreover, as shown below, great differences in relative importance are rare, and the industrial patterns of the two countries are very similar. Such uniformity cannot be expected, for example, when comparing the United States with Great Britain.

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example, the Canadian economy consisted chiefly of industries with low concentration, one might well conclude that the general level of concentration is lower in Canada even though each industry is more concentrated than in the United States.

The relative sizes of twenty industry groups in the two countries are shown in Table 28. Canada is well represented in all industrial sectors, and the industrial structures of the two countries are quite

TABLE 28  
Distribution of Employment in Manufacturing by Industry Groups,  
United States and Canada, 1947

INDUSTRY GROUP	PERCENTAGE OF EMPLOYMENT	
	<i>United States</i>	<i>Canada</i>
Foods, etc.	10.0	14.8
Tobacco products	0.8	1.0
Rubber products	1.8	2.1
Leather products	2.7	3.2
Textile mill products	8.5	6.5
Apparel and related products	7.7	9.8
Lumber products	4.6	8.4
Furniture and fixtures	2.3	2.2
Paper and allied products	3.1	6.5
Printing and publishing	5.1	4.6
Primary metals	8.0	3.9
Machinery and fabricated metal products	17.6	14.3
Transportation equipment	8.2	9.2
Electrical machinery	5.5	4.7
Stone, glass, and clay products	3.3	2.3
Petroleum and coal products	1.5	1.1
Chemical products	4.4	3.5
Instruments <sup>a</sup> and miscellaneous	4.9	2.0
Total	100.0	100.0

<sup>a</sup> Measuring, scientific, medical, surgical, optical, photographic, etc.

Source: Computed from *The Manufacturing Industries of Canada, 1947*, Ottawa, Dominion Bureau of Statistics, pp. 27-31; *Census of Manufactures, 1947*, Bureau of the Census, Vol. I, p. 24. "Proprietors and firm members" included in employment.

similar. The relative importance of foods, apparel, lumber products, paper products, and transportation equipment is, however, somewhat greater in Canada, while the importance of textile mill products, primary and fabricated metal products, machinery, stone-clay-glass products, instruments, and the "miscellaneous" group is greater in the United States. The groups can be ranked according to the percentage of their output that is in industries with "high" concentration

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in the United States ("high" concentration here means that the leading four firms account for 75 per cent or more of output.)<sup>17</sup> On this basis the ten groups with highest concentration are (in descending order of concentration) tobacco, rubber, chemicals, electrical machinery, transportation equipment, stone-clay-glass products, primary metals, fabricated metals, miscellaneous industries, machinery (other than electrical). These groups (together with "instruments" which cannot be separated from the "miscellaneous" group in the Canadian statistics) account for 54.5 per cent of manufacturing employment in the United States and only 43 per cent in Canada, while the remaining groups, in which concentration is relatively low, account for 45.5 per cent of manufacturing employment in the United States and 57 per cent in Canada.

Substantially the same result is obtained when the industry groups are ranked by concentration in Canada instead of in the United States. Chapter II, Appendix Table A-1, and Appendix C indicate that foods, textiles, leather, apparel, lumber, furniture, paper, and printing have relatively low concentration in Canada. These groups account for 44 per cent of manufacturing employment in the United States and 56 per cent in Canada. On the other hand, the groups which we know to have relatively high concentration in Canada are tobacco, primary metals, transportation equipment, electrical machinery, stone-clay-glass products, petroleum and coal products, chemicals, and miscellaneous industries, and these groups (together with "instruments") account for 37 per cent of manufacturing employment in the United States and only 28 per cent in Canada.

Both bases of classification therefore yield the conclusion that industries with relatively low concentration are somewhat more important in Canada. The difference is not, however, so great as to cast serious doubt on the finding that the general level of concentration is higher in Canada than in the United States.<sup>18</sup>

<sup>17</sup> Source: *Concentration of Industry Report*, Dept. of Commerce 1949, Table IV, p. 24.

<sup>18</sup> If each industry group shown in Table 28 is assigned the (unweighted) average concentration index for its component industries in the United States (concentration of output in the largest four firms) the resulting over-all weighted average concentration index is 42.5 using the United States weights and 41.2 using the Canadian weights. This slight difference is clearly much less than the average difference in concentration between United States and Canadian industries. Compare Table 29 (this computation is based on the data in *Report of the Federal Trade Commission on Changes in Concentration in Manufacturing, 1935 to 1947 and 1950*, Federal Trade Commission, 1954, Appendix D, Table 1).

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### 4. Concentration and Monopoly

The higher level of concentration in Canada does not, of course, prove that monopoly is more prevalent in Canada. Other factors must be taken into account, some of which are discussed here.

While the concentration indexes that have been compared are based on total industry size in each country, there are industries for which the more appropriate units for the study of market control would be the separate regions of each country. However, even when the industries classified in Chapter II as selling in separate regional markets (in Canada) are deleted from Table 25, the predominance of higher concentration in Canada remains. There may, indeed, be industries for which the larger United States markets are divided into substantially separate regions while the small Canadian market is not. The reason for this cannot be a difference in transportation costs, since geographical distances are comparable in the two countries. The explanation must therefore be that the larger American market permits the establishment of several production centers without loss of the internal and external economies associated with concentration of output in such centers. If the United States market for a given industry is divided in this manner while the Canadian market is not, the presumption must be that each separate segment of the United States industry is, economically, at least as large as the total Canadian market and hence concentration in Canada is not likely to be lower than concentration in each sector of the United States market.

A second factor that must be taken into account in considering the relation between concentration and market control is the greater dependence of Canada on imports. Imports tend to reduce the degree of market control associated with a given concentration of domestic production in Canada, but the competitive power of imports is limited by two important factors. First, imports are restricted by the protective customs tariff, which has been the instrument of a long-standing policy of promoting Canadian manufactures and giving Canada a self-contained, diversified economy. The structure of the tariff reflects the power of pressure groups, among which manufacturing interests are by no means the weakest.<sup>19</sup> Second, in many industries leading Canadian producers are subsidiaries or (in a few cases) parent corporations of foreign firms that supply the imports, so that the imports do not, in fact, compete with domestic production. Other imports are

<sup>19</sup> L. G. Reynolds, *The Control of Competition in Canada*, Harvard University Press, 1940, pp. 186-199.

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restricted by international cartel agreements with or without the participation of Canadian producers.<sup>20</sup>

Reynolds, who made a study of monopolistic practices in Canada before World War II, concluded that such practices were more prevalent in Canada than in the United States.<sup>21</sup> This conclusion supports the impression derived from the comparison of concentration levels. It cannot be accepted with confidence, however, in the absence of a comparable study for the war and postwar period.

### 5. The Correlation of Concentration in Canada and the United States

Table 29 compares the *estimated* concentration of employment in the leading four firms in Canada with concentration of output in the leading four firms in the United States. These figures do not permit as reliable a comparison of concentration *levels* as Table 25, since the Canadian figures are not precise. The use of a uniform concentration index makes it possible, however, to study the *correlation* of concentration levels in the two countries.

TABLE 29

Concentration and Inequality Indexes Based on the Largest Four Firms,  
Selected Manufacturing Industries, Canada and United States

INDUSTRY	PERCENTAGE OF EMPLOYMENT OR OUTPUT ACCOUNTED FOR BY THE LARGEST FOUR FIRMS			
	<i>Canada</i> <sup>a</sup> (Employment)		<i>U.S.</i> <sup>c</sup> (Output)	
	INEQUALITY INDEX <sup>b</sup>			
	1948	1947	1948	1947
<i>Foods, Beverages, Tobacco</i>				
Malt, & malt products	71.9	48.7	1.62	4.99
Distilleries	88.0	74.6	2.64	26.86
Macaroni	63.5	23.1	2.54	12.65
Breweries	58.3	21.4	5.54	21.61
Wines	63.0	26.4	3.62	25.01
Soft drinks	35.7	10.4	37.43	134.39
Bread & other bakery products	25.1	16.4	172.44	245.38
Condensed milk	43.1	49.6	3.23	22.57
Biscuits & crackers	48.3	71.5	4.95	44.51
Tobacco processing	70.7	88.0	2.30	20.46
Starch & glucose	69.7	77.2	1.74	9.07
Prepared stock & poultry feeds	18.6	18.8	12.09	111.48

(cont. on next page)

<sup>20</sup> Cf. *Canada and International Cartels*, Report of the Commissioner, Combines Investigation Act, Ottawa, King's Printer, 1945, pp. 2-16.

<sup>21</sup> Reynolds, *op. cit.*, p. xii.

TABLE 29 (cont.)

INDUSTRY	PERCENTAGE OF EMPLOYMENT OR OUTPUT ACCOUNTED FOR BY THE LARGEST FOUR FIRMS		INEQUALITY INDEX <sup>h</sup>	
	Canada <sup>a</sup> (Employment)	U.S. <sup>e</sup> (Output)	Canada	U.S.
	1948	1947	1948	1947
<i>Textile &amp; Leather Products</i>				
Cordage, rope, twine	75.1	32.5	1.88	10.73
Leather belting	67.5	44.0	2.36	19.58
Narrow fabrics	60.5	17.0	5.75	18.91
Woolen fabrics	32.3	28.1	7.03	30.00
Woolen yarns	45.2	21.4	6.10	9.68
Cotton & jute bags	42.9	52.7	3.11	26.09
Corsets	42.3	16.2	3.81	19.97
Fur dressing & dyeing	50.2	33.0	2.63	14.11
Canvas products	24.8	9.7	6.26	21.56
Leather tanning	32.0	26.5	5.84	33.13
Fur goods	6.8	2.6	10.39	14.48
<i>Wood, Paper Products</i>				
Excelsior	68.1	66.5	1.70	7.98
Roofing paper	66.8	41.7	2.51	10.84
Boat building	18.6	30.5	11.07	60.85
<i>Metal Products</i>				
Pig iron	100 <sup>b</sup>	67.3	<sup>g</sup>	5.55
Aluminum	100 <sup>c</sup>	100 <sup>f</sup>	<sup>c</sup>	<sup>f</sup>
Shipbuilding	41.6	42.5	7.90	28.90
<i>Nonmetallic Mineral Products</i>				
Gypsum products	100	84.6	<sup>g</sup>	6.98
Abrasive products	85.6	49.4	2.14	29.15
Asbestos products	73.1	57.5	2.74	12.22
Petroleum refining	85.2	37.3	3.83	25.83
<i>Chemicals</i>				
Matches	100	82.7	<sup>g</sup>	3.72
Printing inks	64.4	57.0	3.54	21.52
Paints & varnishes	37.4	27.3	10.19	78.76
Soap	79.2	79.0	9.50	44.04
Compressed gases	87.9	82.6	3.08	14.25
Hardwood distillation	100 <sup>d</sup>	72.3	<sup>d</sup>	3.98
<i>Miscellaneous Industries</i>				
Buttons	58.4	20.4	4.53	21.01
Umbrellas	90.0	21.5	1.35	8.71

<sup>a</sup> Estimated from *Census of Manufactures, 1948*, Ottawa, Dominion Bureau of Statistics, special compilation of data by firm-size groups. For method of estimation see Appendix B, below.

<sup>b</sup> From *The Primary Iron & Steel Industry, 1948*, Ottawa, Dominion Bureau of Statistics, 1949, p. 8.

<sup>c</sup> One firm.

<sup>d</sup> Two firms.

<sup>e</sup> *Concentration of Industry Report*, Dept. of Commerce, 1949.

<sup>f</sup> Three firms.

<sup>g</sup> Four firms in the industry.

<sup>h</sup> Ratio of average size of largest four firms to average size of all firms. Computed from sources given in notes a and e.

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The correlation coefficient is 0.71, indicating that the ranking of industries by concentration level in Canada resembles that of the United States, but not too closely.<sup>22</sup> The correlation is further illustrated by the cross-tabulation of industries by concentration in the two countries (Table 30). While many of the industries with relatively low concentration in the United States have high concentration in Canada, there are very few with high concentration in the United States and low concentration in Canada.<sup>23</sup>

It is probable that the correlation between concentration in Canada and in the United States reflects certain basic technical and cultural similarities between the two countries. Since consumption habits are similar, the patterns of demand for consumer goods tend to be similar. Since technologies are related, industries tend to use equipment, materials, and supplies in similar proportions. These two tendencies mean that the relative sizes of both consumer goods industries and producer goods industries tend to be the same in the two countries. Differences arise mainly from Canada's greater specialization in certain export industries (for example flour mills, sawmills, nonferrous metals) and its greater dependence on imports (for example, textiles), but these differences are not large enough to eliminate the substantial over-all correlation,

This similarity of relative industry sizes has already been pointed out in section 3. The correlation of industry sizes is very high, yielding a correlation coefficient of 0.93 (based on the logarithms of industry size in the two countries). Of the sampled industries that are "relatively small" in the United States, having less than 10,000 employees each, none has over 1,500 employees in Canada. Of the "large" industries in the United States, with over 100,000 employees each, only two have less than 10,000 employees in Canada (Table A-9).

There is a similar (though somewhat weaker) correlation of average firm sizes in the two countries. This, too, probably reflects similarity of technology. It has already been shown that average firm size in an industry is about the same in the two countries and the reasons

<sup>22</sup> Table 29 and the correlation coefficient are based on the 41 industries that can be compared without "merging" two or more component industries in the United States.

<sup>23</sup> Tables 29 and 30 show eight industries with higher concentration in the United States than in Canada, while Table 25 only has six such cases. As explained in Chap. I, sec. 2, results obtained with different concentration measures cannot be expected to be completely consistent, although in general, as in the present case, inconsistencies are few.

The actual number of industries in which output concentration is higher in the U.S. than in Canada may be less than eight, since employment concentration tends to be less than output concentration.

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TABLE 30  
Concentration in the United States and Canada, Selected Manufacturing Industries

CANADA: CONCENTRATION OF EMPLOYMENT IN LARGEST FOUR FIRMS, 1948 (%)	UNITED STATES: CONCENTRATION OF OUTPUT IN LARGEST FOUR FIRMS, 1947 (%)			
	0-30	30-50	50-70	Over 90
Over 90			Pig iron	Gypsum products Matches Hardwood distillation Aluminum
70-90	Umbrellas	Malt Cordage, etc. Abrasive products Petroleum refining	Asbestos products	Distilleries Tobacco processing Soap Compressed gases
50-70	Macaroni Breweries Wine Narrow fabrics Buttons	Leather belting Fur dressing Roofing paper	Excelsior Printing inks	Starch & glucose
30-50	Soft drinks Woolen fabrics Woolen yarns Leather tanning Corsets Paints & varnishes	Condensed milk Shipbuilding	Cotton & jute bags	Biscuits & crackers
0-30	Bread & bakery prdct. Prepared animal feeds Fur goods Canvas products	Boat building		

Source: Table 29.

for this similarity have been suggested. The correlation coefficient (based on logarithms) is 0.90.

Since industry sizes and firm sizes are correlated, it is not surprising that there is a correlation of number of firms in corresponding industries in the two countries. While United States industries without exception have more firms than the corresponding Canadian industries, industries that have relatively few (many) firms in the United States tend also to have relatively few (many) firms in Canada. The correlation coefficient (for logarithms) is 0.92.

Concentration, as we have seen, depends on both the number of firms and the degree of inequality of firm size. To study the correlation of the degree of inequality in the two countries, a uniform index of inequality is used, consisting of the ratio of the average size of the four largest firms to the average size of all firms in the industry.<sup>24</sup> These ratios are shown for 41 United States and Canadian industries in Table 29. Inequality is, as pointed out above, greater in the United States than in Canada, and there is some degree of correlation between the inequality measures for the two countries, as indicated by a correlation coefficient of 0.69.<sup>25</sup>

There is thus considerably less agreement in the ranking of Canadian and United States industries by inequality of firm size than there is in the case of average firm size, industry size, and the number of firms.

We may conclude that the correlation of concentration indexes exhibited at the beginning of this section reflects a weak correlation of inequality indexes, and a stronger correlation of the number of firms. We cannot account for the former, since the determinants of inequality have not been investigated in this study. The latter, however, reflects the basic cultural and technical similarities of the two countries.

<sup>24</sup> The Canadian values are, of course, estimated, being derived from the estimates of concentration of employment in the largest four firms. The inequality measure is related to this concentration index by the equation  $C = 4I \div n$ , where  $C$  is the concentration index,  $I$  the inequality index, and  $n$  the number of firms.

<sup>25</sup> Based on the logarithms of the inequality index.