

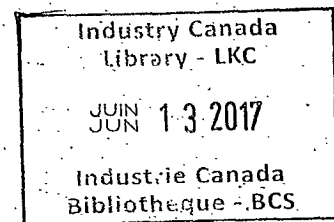
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VERTICAL INTEGRATION IN THE CANADIAN FOOD INDUSTRY:

IN RETROSPECT AND PROSPECT

Final Report



A Special Study Prepared Under Contract for
The Department of Consumer and Corporate
Affairs Policy Analysis Group

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VERTICAL INTEGRATION IN THE CANADIAN FOOD INDUSTRY:

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Om P. Tangri and George F. Skinner**

SCOPE AND OBJECTIVES

In line with its broad terms of reference, the basic objective of this study is to provide an exploratory and background analysis of market structures and vertical integration in the Canadian food industry.

Specifically, the objectives are to:

1. Analyze the definition and concepts of vertical integration as they apply to the major levels of food production and distribution in Canada in both the static and dynamic context;
2. Examine the causes and effects of vertical integration and factors contributing to changes over time; and
3. Derive significant implications of vertical integration in the food industry for consumer and public interest.

Although the primary objective was to focus on past and perspective vertical integration in the Canadian food industry, a review of the corresponding trends in the United States was considered logical in view of the geographic and economic propinquity between the Canadian and American economies. The empirical information available on vertical integration in both Canada and the United States is, admittedly, scant. However, a "side-by-side" review of whatever information is available on the two

*The assistance rendered by Allister Hickson at the concluding stages of this Report is sincerely appreciated.

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economies has provided a better appreciation of the theoretical explanations and institutional forces underlying the phenomenon of vertical integration than would have been possible through an isolated study of just the Canadian food industry.

LITERATURE REVIEW

A. Concepts and Definitions

The term Vertical Integration, by definition, describes the internal structure of a business enterprise which undertakes two or more successive operations in the production and/or marketing of a product and/or service. The stages involved in the transformation of a raw material in its natural state to a finished product for the ultimate consumer, however, are not normally so clearly defined as to facilitate the classification of a firm's operation as either specialized or vertically integrated. Indeed, the various processes required to produce any particular good may be subdivided, for descriptive or analytical purposes, to such an extent that virtually every firm producing that product may be said to be vertically integrated.

For practical purposes, traditional stages of production in a firm must be recognized as combinations of those operations which quite naturally and logically are performed as one. A vertically integrated firm, then, may be defined as one whose operations span across the accepted boundaries between quite distinct phases in the production or marketing of a good. This definition (that is, in terms of industry convention) may be, roughly speaking, based upon stages at which the

product concerned is considered to be "salable." If a firm has the option to produce for itself or to purchase some factor of production, and chooses to produce for itself, then that firm may be unequivocally classified as vertically integrated. Similarly, if a firm has the option of selling its output at one stage of production but decides, rather, to further process it prior to sale, then that firm also may be referred to as vertically integrated.

In practice, business enterprises can be found which envelope all phases of production from raw material extraction to retailing, which are very highly specialized in one phase of the production process, or which combine several closely related phases. Thus, when reference is made to vertical integration, the matter of degree becomes very important, and the question of when and how much vertical integration a firm would attempt is closely linked with the firm's objectives and aspirations.

B. Objectives of the Firm

The firm will select vertical integration as a form of business organization only when such a decision is expected to achieve its ultimate objectives. In theory, the over-riding goal of all firms is assumed to be that of maximizing profits. In practice, however, the decision to vertically integrate may be only one part of a total marketing strategy. A firm's objectives may range from cost or risk minimization to the maintenance of a status quo position. Decisions may be made which are designed to satisfy only the personal objectives of the top executives or they may be designed to fulfil some community social benefit objectives. The possibilities are virtually unlimited. In any given industry, the survival of vertically

integrated firms is determined by their ability to coordinate the exchange function between the various levels of production as well as, or better than, the competitive market forces in action. As Edwards noted, "The coordinating function of the administrator is tested against that of the market. Specialized activity is tested against activity less specialized. The result may be the survival of more than one pattern or the elimination of all but one."¹

Depending upon the structure and conduct of the industry, a number of potential advantages may exist which favor a vertically integrated structure of the firm in that industry:

Technical economies of production and/or distribution may arise through combining successive stages under one management. The costs associated with handling, packaging and selling materials may be reduced or eliminated by avoiding an exchange of ownership.

Additional security may be attained through vertical integration. That is, risk and uncertainty (and their related costs) with respect to the stability of future input supplies and product markets may be reduced by the extension of control to successive levels of production. The quality of inputs received may be more closely controlled in vertically integrated firms. This may also reduce the necessity (and cost) of maintaining large stocks in inventory.

¹Corwin D. Edwards, "Vertical Integration and the Monopoly Problem," in Werner Sichel, Industrial Organization and Public Policy: Selected Readings (Boston: Houghton Mifflin Co., 1967), p. 175.

The cost-price squeeze may be avoided or minimized through vertical integration by a firm subject to imperfect competition. Faced by oligopolistic suppliers, a firm may be able to obtain lower-cost inputs through backward integration (by producing them for itself). Faced by oligopsonistic buyers, a firm may be able to obtain higher product prices through forward integration by further processing the goods prior to sale and/or by setting up its own retail outlets. In effect, either course of action is an attempt to bypass non-competitive prices at various stages in the production distribution sequence. This may be effective in all but the initial and final stages, where it is limited by raw material availability or consumer demand.

A firm may view vertical expansion as, simply, a profitable investment alternative. The investment decisions would, presumably, consider the expected returns from vertical expansion relative to those from either further horizontal expansion or growth by diversification ("conglomerate corporation"). In addition, if the original firm is large enough it will be able to guarantee markets (or sources of supply) to the new venture, essentially replacing its former input suppliers (or customers). Furthermore, expansion into a different market level does not risk the possibility of reducing the market share of the original firm at the primary level.

The institutional characteristics of an economy may, in fact, encourage this form of business organization. In particular, as Scherer has noted:

Turnover or sales taxes on intermediate products, like the one levied in Germany until 1968, create incentives for firm size increases through vertical integration, since by internalizing the various stages of production, a firm can avoid paying the tax which would be levied on inter-firm transactions.²

Finally, vertical integration may allow a firm to grow, thus increasing its stability and market power, without risking government anti-monopoly reaction. Concentration ratios, used to measure the degree of monopoly power found in an industry, are frequently based upon sales volumes. Since vertical integration does not necessarily show an increase in a firm's sales, these ratios are not affected by growth of this kind.

In addition, vertical integration may be absolutely necessary for some firms when, for example, satisfactory supplies or suppliers of a specialized input are not available. This can often be the case for newly developed products.

From the foregoing, it is apparent that different firms can opt for vertical integration for different reasons. A further point that deserves emphasis in this context is that these different reasons can also influence a firm's decision in adopting the specific form (or instrumentality) from among many forms of vertical integration.

²F.M. Scherer, Industrial Market Structure and Economic Performance (Chicago: Rand McNally and Company, 1970), p. 125.

C. Instrumentalities of Vertical Integration

The essence of vertical integration lies in the control of successive stages of the production and/or distribution process by one decision making body. In terms of their effects, therefore, several forms of business arrangement, besides those involving direct ownership, may well be considered as different instrumentalities or variants of vertical integration. Examples of such contractual arrangements are formal agreements between producers and processors, developed prior to production; the leasing of facilities by a firm at one level from a firm at a successive level; and the performance of certain types of custom work (e.g., custom livestock feeding) by a firm at one level for another at a successive level. Tying arrangements (for example, the supplying of inputs to a firm on the proviso that it, in turns will sell all or most of its output to the input supplier) would also qualify as another form of vertical integration. Co-operative organizations composed of (or government bodies acting on behalf of) firms at one stage which perform functions at another stage (for example, marketing boards or, in fact, the Canadian Wheat Board) might also be considered as forms of vertical integration. In all such cases of different forms of vertical integration, however, the common characteristic of significance is the control of some activity at one level from a successive (higher or lower) level in the sequence of production and/or distribution. And an important question common to all such cases is: what light can economic theory shed on the phenomenon of vertical integration and its many ramifications?

ECONOMICS OF VERTICAL INTEGRATION

Until recently, the study of vertical integration was limited largely to the field of Industrial Organization. More often than not, economists tended to view it as a peculiarity of the real world rather than as a phenomenon characterizing the structure and conduct of firms which merits detailed theoretical analysis. In more recent years, however, many economists have attempted to reconcile some of the differences between their theory and the real world in order to test and improve the credibility of their theoretical constructs. An economic analysis of vertical integration at this time, therefore, would seem quite compatible with this recent activity of economists. The purpose of this section is not to supplant the existing theory of the firm, but rather, to enhance it by explicitly introducing the vertical dimension as another source of growth available to the entrepreneur.

A. A Theoretical Scaffolding for Analysis of Vertical Integration

The conventional theory of production is concerned primarily with the profit maximizing rate of output of end products by firms. This implicitly assumes that the vertical structures of those firms remain essentially unchanged throughout the time period of the analysis. Clearly, this constitutes a serious divergence from reality. Firms may influence their absolute profit levels not only by adjusting their rate of output but also by adjusting the extent to which inputs are transformed prior to their sale as a product. Several distinct processes in the sequence of

production may be performed by one firm, thus expanding its vertical dimension, without affecting its horizontal size or its rate of output of the finished product.

Generally, motivation for a firm to integrate vertically will exist only when it is possible for the firm to increase its profits by doing so. When "excess monopoly profits" persist at one or more stages of the production sequence, the firm may be able to integrate into those levels and share in the "excess" profits. These excess profits (or losses) experienced by "unintegrated" firms at successive stages of the production process may result from those firms' efficient (or subnormal) performance and/or poor market coordination. Such a situation would provide a necessary, although not sufficient, condition for vertical integration between those firms. As Corwin Edwards stated: "So far as we can rely upon competition to apportion success and failure on the basis of efficient performance, we can expect vertical integration to establish itself because it does something to remedy defects in market coordination."³

Monopoly control or public regulation, resulting in a poorly functioning price system, can be one of the most important forces that leads firms into vertical integration. According to Stigler, "this phenomenon was strikingly illustrated by the spate of vertical mergers in the United States during and immediately after World War II, to circumvent public and private price control and allocations."⁴ The most powerful thrust

³Edwards, op.cit., p. 175.

⁴George J. Stigler, The Organization of Industry (Homewood, Illinois: Richard D. Irwin, Inc., 1968), p. 136.

behind this wave of vertical integration was "...the failure of the price system (because of monopoly or public regulation) to clear markets at prices within the limits of the marginal cost of the product (to the buyer if he makes it) and its marginal-value product (to the seller if he further fabricates it)."⁵ Figure 1 illustrates the basic rationale.

If the "regulated" price for a good was set at OM, producers would supply OX units. However, OX units of output represent a marginal value of ON to buyers who, presumably, use the good as an input in the production of some other good. There would thus exist some incentive for the supplying firms to integrate vertically into the succeeding stage of production. Such action would enable them to operate at an effective price equal to YC, producing and processing OY units of the good. The net gain to the integrated firm is represented by the shaded area, ABC. "This," according to Stigler, "was the rationale of the integration of radio manufacturers into cabinet manufacture, of steel firms into fabricated products, etc,"⁶ during and after World War II in the United States.

The effect of vertical integration upon a firm's pattern of costs is illustrated in Figure II. The curve AA represents the firm's average cost for various levels of output of good X. Suppose Y is some input used in the production of X and its price to the firm is fixed at the level OPy (due to the fact that the firm buys only a small amount of Y relative

⁵Loc. cit.

⁶Ibid., p. 137.

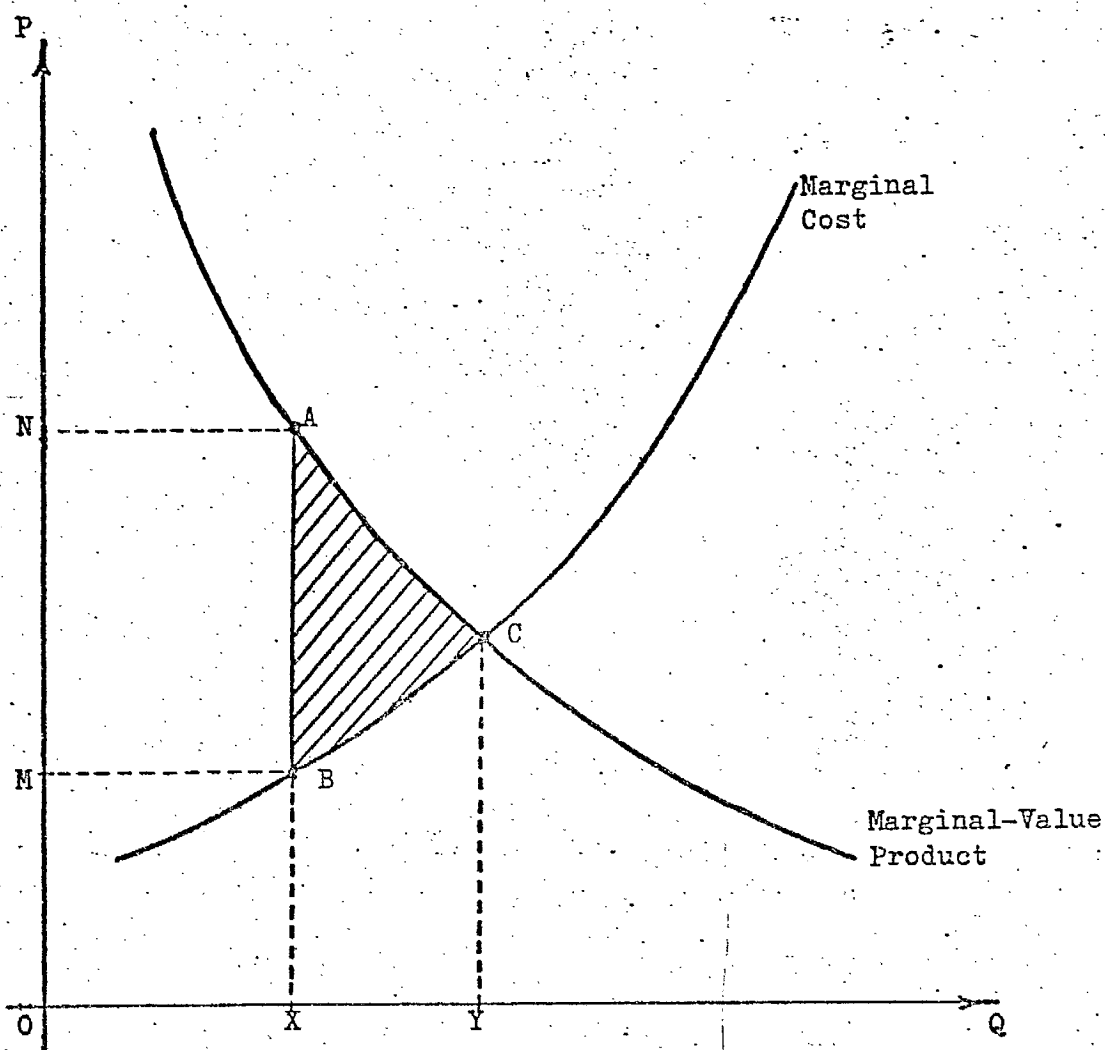


Figure 1

Source: George Stigler, The Organization of Industry, (Homewood, Illinois: Richard D. Irwin, 1968), p. 137.

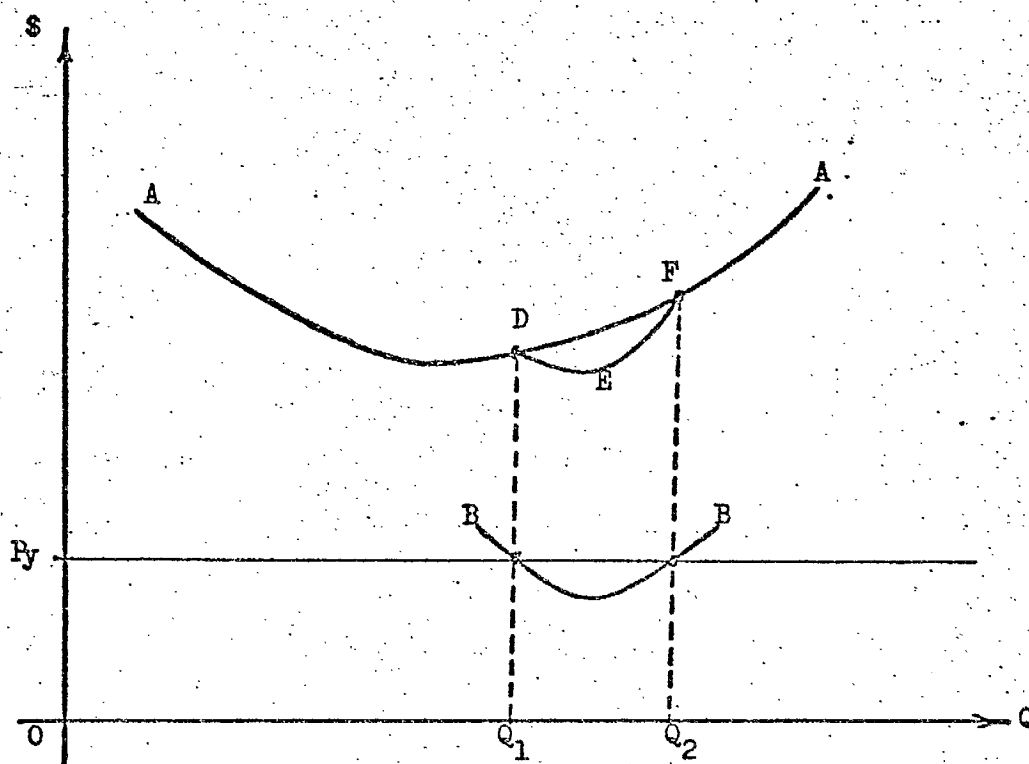


Figure 2

NOTE: The curve BB is drawn in terms of the unit cost of input Y required to produce various quantities of X.

to the total demand for Y). Further suppose that the curve BB represents the average costs of producing enough Y to allow the corresponding production of X. In this diagram the curve BB has been so drawn that, within a certain range, Q_1Q_2 , the cost to the firm of producing Y would be less than the cost of purchasing it, OP_y . That is, within the segment Q_1Q_2 , there exists some incentive for the firm to integrate into the industry level, producing Y. If it is assumed that the production of Y is independent of all of the other functions performed by the firm (i.e., no technical savings or additional costs are experienced as a result of integrating into the production of Y) the relevant average cost function of the firm's total operation becomes ADEFA.

As this diagram has been drawn, it appears that the firm can attain a lower absolute minimum cost through integrating into the production of Y and producing X at some point between Q_1 and Q_2 . This may not be always possible. However, the important point to note is simply that there may exist some range, such as Q_1Q_2 , within which the average cost of producing X may be reduced by vertically integrating the production of Y and, thus, obtaining it at a lower cost than is available through purchase. If this range happens to be in the vicinity of the previous minimum cost level of output, then vertical integration would tend to make the new minimum even lower.

It may be argued that in many cases, the level of Y production which results in an average cost below OP_y may be well in excess of the firm's own requirements. Increasing the production of X in order to attain

lower cost Y in such cases, therefore, may quite possibly result in an increase in the total cost of production. While the point is valid, it does not, in itself, constitute an argument against vertical integration. After all, the firm may be able to produce Y at its minimum average cost level and sell the amount in excess of what it needs (to produce X to attain the lowest average cost level of X) at a price greater than the cost of producing Y. Figure 3 illustrates this possibility. By integrating into the production of Y, the firm is able to procure any amount of Y, up to the amount required to produce OQ_2 of X, at its minimum average cost, OCy . The cost reduction thus achieved in the production of input Y, in turn, reduces the average cost curve for the entire operation from AA to CC. The firm will still produce OQ_1 of X but at a lower average cost (OG rather than OD). The net gain to the firm is represented by the area DEFG.

B. Some Conclusions and Implications

As the preceding discussion suggests, it is virtually impossible to make a generalized statement as to the desirability of vertical integration in the economy. Each specific instance must be carefully examined and judged for its effect on the structure, conduct, and performance of competitive forces in the market.

In some cases the coordination of several successive functions within one firm may lead to more efficient production. Complementary technological relationships may lead to a lower overall cost of production. The duplication of unnecessary functions may be avoided. In addition, vertical integration may enable a firm to withstand the pressures of

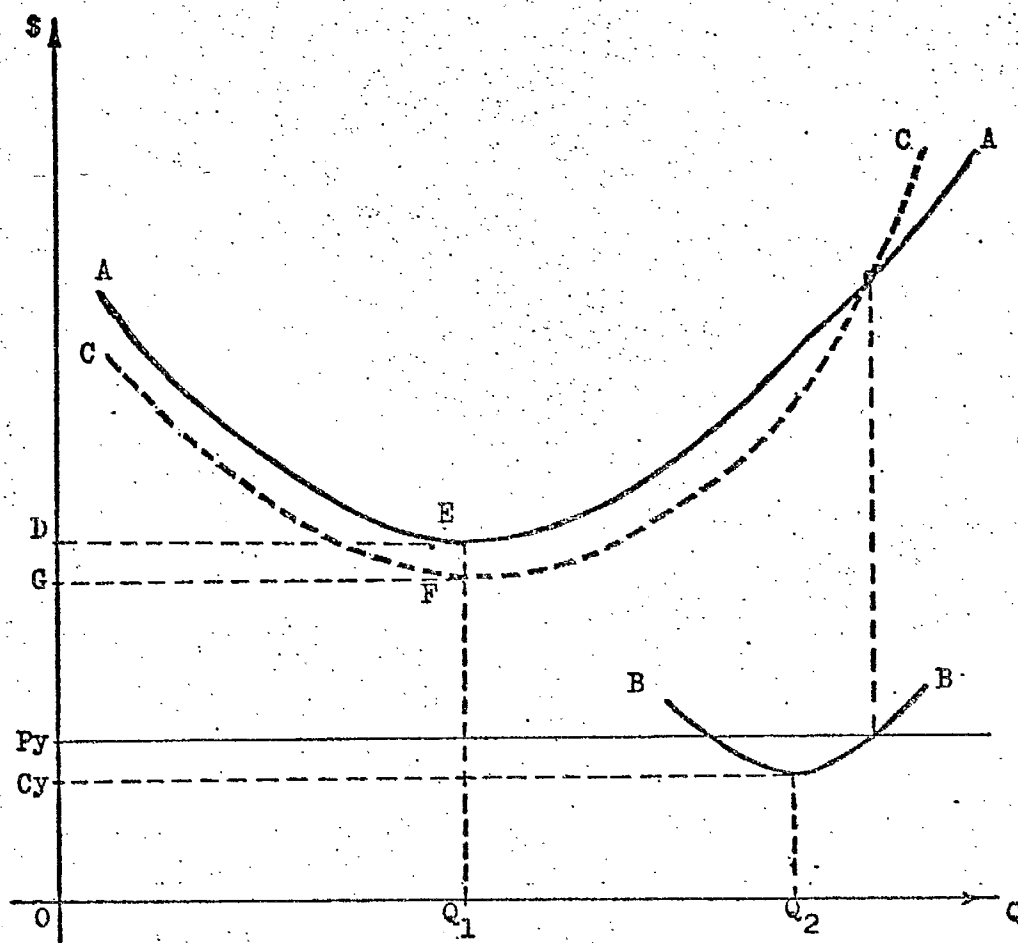


Figure 3

Note: The curve BB is drawn in terms of the unit cost of input Y required to produce various quantities of X .

competing against oligopolistic suppliers or oligopsonistic buyers, thus acting to support a greater degree of competition.

In other instances, however, vertical integration may contribute to the decline of competition. For example:

...when a vertically integrated concern...controls a substantial part of the total volume of business done at one or more levels... the fact that [it] extends over several successive levels becomes the source of special opportunities for the exercise of business power.⁷

Powerful, integrated firms can, through price discrimination and preferential treatment with respect to access to available supplies and markets, apply a great deal of pressure on their non-integrated competitors. They can "squeeze" independent firms when, for example, the independents produce only the finished good but must both sell the finished good at a price competitive with that set by the integrated firms and buy their inputs at a price controlled by the integrated firms. Thus, by weakening or eliminating independent competitors, a firm which has monopolistic powers at one level may be able to extend these powers to successive levels.

Furthermore, as Stigler has noted:

...it is possible that vertical integration increases the difficulty of entry by new firms, by increasing the capital and knowledge necessary to conduct several types of operation rather than depend on rivals for supplies or markets.⁸

Vertical integration may, then, act as a depressing force on the degree of competition and efficiency found in the economy. It is in this

⁷Edwards, op.cit., p. 176.

⁸Stigler, op.cit., p. 138.

context that the recent interests in the topic have been generated. A point that has not been sufficiently stressed in this recent spate of interest, however, is that the implications of vertical integration for the structure, conduct, and performance that emerge from one's analysis would be largely influenced by whether the analysis was static or dynamic in nature.

VERTICAL INTEGRATION IN A STATIC AND DYNAMIC CONTEXT

A. The Time Horizon and Its Implications

At any given point in time, an industry may be studied with respect to its structure and conduct, and some observation may be made as to the extent to which that industry is vertically integrated. Given that degree of integration, however, if it is also observed that the industry is functioning reasonably efficiently and that it possesses (or exercises) no monopoly power, the conclusion (about the degree of vertical integration, in itself) loses significance, especially from the standpoint of public welfare. This is perhaps as it should be because vertical integration is simply an alternate form of enterprise organization and no preliminary value judgment such as good or bad, right or wrong, may justifiably be applied to it. The competitive conduct of an industry may, over time, be influenced by the degree of vertical integration present. Whether the long-run trends are towards an increasing, decreasing, or stable level of vertical integration must be viewed because of their implications for the conduct and performance of that industry.

An analysis which observes changes only over a relatively short time period may draw erroneous conclusions based on short-run variations from the underlying trend. Minor changes in the degree of vertical integration found in an industry may be beneficial to its efficient operation. If, on the other hand, definite long-run trends can be observed toward "...an appreciable degree of market-control at even one stage of the production process..." one must confess then that "...vertical integration loses its innocence..."⁹ In that case, action may be required to reverse or, at least, moderate the rate of those trends in the interest of wider social and economic considerations.

B. Changes Over Time

In the absence of any external forces such as institutional limitations and regulations, vertical integration can be expected to undergo two distinct patterns of development associated with the growth of individual firms in an industry and with the growth of the entire industry.

An individual firm, at its birth, may be relatively small, and consequently, highly specialized in the performance of one operation in the production of some final product. As the firm grows, however, its requirements from its suppliers and buyers would increase to the point where it could support entire efficiently-sized operations at these successive levels. It would then be able to vertically expand its scope of operation, taking over functions which it previously used to purchase. In the long-run, this

⁹Ibid., p. 303.

pattern would be expected to continue, as long as the firm found it profitable. At the limit, one firm would conduct all stages of the production process, from raw material acquisition to retailing of the ultimate products to the consumers. If the firm subsequently begins to decline, it may, again, be forced to relinquish some of the functions to more specialized firms.

A young industry, on the other hand, may be too small to support specialized suppliers of unique inputs or of unique marketing functions. At its birth, then, the firms in the industry may be forced to integrate these operations into their primary enterprises. As the industry grows, its requirements in these respects may become great enough to justify specialized firms to perform successive functions, which may then be relinquished to them. If the industry subsequently begins to decline, its requirements of these specialized operations may also decline to the extent that they must, once again, be integrated back into the primary enterprises.

C. Implications

The discussion in this section would seem to re-emphasize the fact that the presence of vertical integration in an industry, or even the existence of persistent secular changes in the degree to which it is found in an industry, can be quite a natural and expected economic phenomena. Analyses, predisposed to concluding that vertical integration constitutes a problem, will undoubtedly be successful in achieving their objectives in many instances. A more objective and correct approach, however, would be to:

1. Investigate the structure, conduct and performance of an industry;

2. Examine the existing vertical integration and its trends in the industry; and

3. Investigate whether the vertical integration may, in any way, be related to whatever problems are found, or whether the trend toward vertical integration in that industry, is, in fact, simply a manifestation of the natural economic processes in the economy.

The results of such an investigation would, of course, vary with the specifics of the industry chosen. However, a selective review of the general trends with respect to vertical integration in the Canadian and United States economy and some plausible explanations of those trends would provide a useful backdrop for portraying the specifics for vertical integration in the food industry.

VERTICAL INTEGRATION IN CANADA AND

THE UNITED STATES.

A. General Trends

Although vertical integration is now generally accepted as being a significant and ever-present phenomenon in the economies of North America, there appears to be a rather obvious paucity of systematized empirical evidence that is needed to answer some important questions about its extent, nature and implications. Bain suggests that:

...The lack of systematic research endeavour in this area is in part explained by the fact that vertical integration is a much more complex and many-dimensioned phenomenon than the extension of horizontal scale, and correspondingly harder to study..."¹⁰

¹⁰Joe S. Bain, Industrial Organization, (2nd edition; New York: John Wiley and Sons, Inc., 1968), p. 380.

The results of a qualitative analysis of 111 large corporations conducted by Michael Gort¹¹ provide some indication of the degree of vertical integration present in a number of industries. The petroleum industry was found to be highly integrated while the food products and the machinery industries were found to be moderately integrated. Industries exhibiting a lesser degree of vertical integration were the transportation equipment, the electrical equipment and the fabricated metal products industries.

There are, unfortunately, no wholly conclusive data in existence which describe the general trends of vertical integration in the economy as a whole. Scraps of quantitative evidence, compiled from sundry individual industry study reports, provide the only indication available. Stigler,¹² after comparing studies of the American manufacturing industries by Thorp¹³ and Crowder,¹⁴ makes the highly qualified and reserved conclusion that between 1919 and 1937, "...there seems to have been a tendency away from vertical integration." He counters this conclusion, however, by referring to "...the spate of vertical mergers in the United States during and

¹¹Michael Gort, Diversification and Integration in American Industry, (Princeton: Princeton University Press, 1962), pp. 80-82.

¹²Stigler, op.cit., p. 135-136.

¹³W. Thorp, The Integration of Industrial Operation (Washington, D.C.: 1924), as cited in Stigler, op.cit., p. 135.

¹⁴W.F. Crowder, The Integration of Manufacturing Operations, T.N.E.C. Monographs, No. 27 (Washington, D.C.: 1941), as cited in Stigler, op.cit., p. 135.

immediately after World War II..." M.A. Adelman¹⁵ and Arthur B. Laffer,¹⁶ in separate studies, could find no discernible trends in the degree of vertical integration present in the American economy over various periods from 1849 to 1965.

After examining numerous "case study" type analyses and observing their references to vertical expansions, one is inevitably led to the conclusion that vertical integration constituted an important avenue of growth for firms in the highly industrialized sectors of the economy during the first half of this century. However, it would seem that this trend had somewhat dissipated by the mid-1950's. Of course, certain industries (notably, the food industry discussed subsequently) were, and still are, exceptions to this pattern. For the most part, however, the incidence of vertical expansions seems to have diminished in recent years.

B. Reasons Underlying These Trends

The general trend toward vertical integration, as outlined above, may be hypothesized to be closely related to the increase in government control and regulation of competitive forces in the economy. The economic activity of the early part of this century was characterized by its

¹⁵M.A. Adelman, "Concept and Statistitcal Measurement of Vertical Integration," in National Bureau of Economic Research conference report, Business Concentration and Price Policy, (Princeton: Princeton University Press, 1955), pp. 281-283.

¹⁶Arthur B. Laffer, "Vertical Integration by Corporations, 1929-1965," Review of Economics and Statistics, February 1969, pp. 91-93.

exuberance, fantastic opportunities for profit, and the rapid growth of powerful corporations. During that period, the growth of firms extended in all directions: vertical, as well as horizontal. The interesting phenomenon to note here is that while public and private (monopoly) regulation of the price system contributed to the spurt of vertical mergers, the latter, in turn, necessitated even greater action by the American government and subsequently, by the Canadian government to sustain competition.

The anti-trust, pro-competition legislation that was passed and used in both Canada and the United States tended to suppress the rapid development of conglomerate empires, and thus, had a tendency to reduce the rate of vertical expansion by firms. Legal action in the late 1940's and 1950's under the Sherman Act¹⁷ and Section 7 of the Clayton Act¹⁸ in the United States specifically discouraged vertical integration wherever it threatened competitive trade practices. Comparable action to preserve competition in Canada has proceeded almost exclusively through the Combines Investigation Act which, due to its nature, is not entirely capable of dealing adequately with this form of market structure.¹⁹

¹⁷See Scherer, op. cit., pp. 462-463.

¹⁸See *ibid*, pp. 480-482.

¹⁹For further discussion in this regard, see Roy R. Hurnanen, Murray H. Hawkins, and Travis W. Manning, Vertical Integration and Concentration in the Alberta Broiler Industry, (Edmonton: University of Alberta, 1970), Agricultural Economics and Rural Sociology Research Bulletin 8, pp. 23-24.

Vertical integration is still an important phenomenon in our economy, but perhaps not to the same extent as it was previously. Firms will probably continue to consider vertical integration as a profitable growth alternative, but the present institutional framework, within which they must operate dictates that they must behave as "good corporate citizens." Consequently, the use of vertical expansion as a means to simply achieve greater market power has become difficult with time. Nevertheless, vertical integration still remains a possible method of reducing costs of production. As long as the vertically integrated operation is more profitable than the separate performance of independent operations, as discussed in the previous section of this study, firms will continue to view it as an attractive alternative.

VERTICAL INTEGRATION IN THE FOOD INDUSTRY:

CANADA AND THE UNITED STATES

A. Expected Benefits

As noted earlier, the motivation to vertically integrate is generally embodied in firms' desires for either greater profits or greater power, or both. Ex-ante reasons for vertical expansions may be found in the presence of market imperfections, economies of large scale production, or in the nature of risk and uncertainty in an industry. The food industry exhibits examples of these phenomena which are highly conducive to the vertically integrated form of industrial organization. While the production of basic agricultural commodities is characterized by the presence of numerous atomistic firms, the processing, marketing and retailing stages are

dominated by a relatively small number of influential firms. These firms have become "big" in size over time either because of the high fixed costs which act as a stiff barrier to entry for new firms, or because of increasing returns to large scale operations in the industry, or both. Also, the quantity and quality of agricultural commodities available (and their prices) are highly variable from one year to the next. One might expect, therefore, the oligopolistic firms in the food industry to attempt to integrate vertically in order to increase their competitive power and stability, to take advantage of the internal economies of large scale production, decrease their costs of operation, and to ensure themselves of more stable supplies of the agricultural commodities.

B. Actual Results

The food industry has, in recent years, experienced major developments and changes in its structure. The rapid horizontal growth of a few food retailing chains is perhaps the most obvious of these trends. A recent study of the Canadian retail food trade by Bruce Mallen²⁰ re-emphasizes the extent to which this situation has developed and outlines some of the effects and implications which have resulted. Accompanying, and in fact related to, this trend has also been an increasing degree of vertical integration into the food manufacturing (processing) industries by

²⁰Bruce Mallen, A Preliminary Paper on the Levels, Causes and Effects of Economic Concentration in the Canadian Retail Food Trade: A Study of Supermarket Market Power, (Ottawa: Food Prices Review Board, 1976), Reference Paper No. 6.

retailers. Making reference to this phenomenon, Leon Garoian states that in the United States, "...62 grocery chains operated a total of 326 food manufacturing plants" by 1958.²¹ Commodities which were cited specifically in this respect were meat, dairy products, baking, coffee and fruit and vegetable canning. As the retail grocery chains have increased their horizontal sizes they have been increasingly able to develop sufficient consumer acceptance of private "store brand" products to utilize the entire output of efficiently sized manufacturing plants.

The pattern of vertical integration into food manufacturing by retailers may be explained with the aid of the theoretical construct developed by Stigler (discussed above). Garoian suggests that "... in most products, grocery manufacturers have much more market power in selling than retailers have in buying."²² Furthermore, it has been observed that retailers have tended to integrate more into those manufacturing industries which exhibit the greatest degree of concentration.²³ It would appear, then, that the greatest (profit) incentive for retailers to integrate into food manufacturing lies in those industries where they are subject to the greatest degree of oligopoly power from their suppliers. Indeed, this has transpired in the United States.

²¹ Leon Garoian, "Grocery Retailing," in John R. Moore and Richard G. Walsh (editors), Market Structure of the Agricultural Industries, (Ames, Iowa: The Iowa State Press, 1966), p. 16.

²² Ibid., p. 29.

²³ Ibid., p. 19.

In Canada, it has been shown that high concentration exists in at least the following food and beverage manufacturing industries: flour milling, distilling, breakfast cereal manufacturing, sugar refining, brewing and tobacco processing.²⁴ One might expect retail grocery chains in Canada to integrate into these activities. Unfortunately, research in this regard has not been conducted as yet.

A more recent development, that of food manufacturing and wholesaling firms integrating forward to the retail level, began about 1950. Garoian estimated that by 1958 the percentage of grocery chain store sales controlled by manufacturing and wholesaling interests almost equalled the percentage of retail chain-controlled grocery manufacturing (approximately eight percent).²⁵ This development had occurred over a relatively short time period, however, whereas the integration of retailers into food manufacturing had been developing since the 1920's.

As this "convergence" of the retail and intermediate stages of the food production process has developed, there has also been a trend towards increasing vertical integration with the primary production level. In consequence, a food industry is emerging in which the successive "stages of production" have become very highly interrelated--both in terms of the technical process of production and marketing strategies.

²⁴L.K. McCartney, Structure of Canadian Processing Industry, (Ottawa: Agricultural Economics Research Council of Canada, no date), p. 60 as cited in Mallen, op. cit., p. 27.

²⁵Leon Garoian, op. cit., p. 34.

A number of commodity-sectors have experienced particularly noticeable increases in the degree of vertical integration. The meat-packing industry has, for example, long been dominated by a few large firms. Over time, they have integrated backwards into livestock production through the ownership of livestock on feed, feedlots, concentration yards, transportation facilities, and by-product plants. "The extent of packer feeding of cattle ... has risen sharply since about 1955," reaching 7.4 percent of the total number of cattle fed in the United States by 1963.²⁶ Formal contracts and informal agreements with feed-lot operators for steady supplies have also grown in importance and are likely to continue to do so.

The poultry-meat industries have exhibited perhaps the most noticeable increases in vertical integration of any agricultural commodity in recent years. This development has occurred in parallel with the rapid growth of the industry as broilers, especially, have become a more important part of the North American diet.

It has been estimated that in the United States only five percent of total broiler chicken production is by independent growers whereas 57 percent is produced on contract, 18 percent is produced on account with cooperatives, and 20 percent is grown on farms operated by integrators.²⁷

²⁶Willard F. Williams, "The Meat Industry," in Moore and Walsh, op. cit., pp. 52-53.

²⁷E.P. Roy, "Effective Competition and Changing Patterns in Marketing Broiler Chickens," Journal of Farm Economics, Vol. XLVIII, No. 3 (August, 1966), p. 191.

While a comparable estimate is not available for Canada, indications suggest that the Canadian broiler industry is similarly structured, although perhaps not to the same extent. Contract production was found to be less important in Alberta but indirect forms of vertical integration with producers (e.g., the extension of credit) were found to be common.²⁸ In 1960, 88 percent of Ontario broiler production was under some form of contract.²⁹

That economic integration in the broiler industry has reduced costs is verified by research experience and observations. Horizontal and vertical integration have eliminated many smaller, inefficient firms with high costs and much instability in operation. It has permitted the maximum exploitation of scientific and technological "know-how" through pooled talents, business acumen, and ample credit. Some entrepreneurial stages in the producing-marketing process have been actually eliminated with a resulting savings in cost and lowering of price to consumers.³⁰

The dairy industry exhibits considerable vertical integration between the various stages of the production-distribution process. Retail grocery chains operate dairies to supply much of their own requirements. Home delivery of milk and milk products is performed almost exclusively by firms which also perform the processing function. Processors receive most of their raw milk supplies from dairy farmers under some form of contract or quota system. The apparent reason for this pattern of

²⁸Roy R. Hurnanen, Murray H. Hawkins, and Travis W. Manning, Vertical Integration and Concentration in the Alberta Broiler Industry (Edmonton: University of Alberta, 1970), Agricultural Economics and Rural Sociology Research Bulletin 8, p. 10.

²⁹G.I. Trant and J.H. Nurse, Broiler Contracts in Ontario, (Guelph: Ontario Agricultural College, 1961), p. 1, as cited in Hurnanen, et. al., *ibid.*, p. 10.

³⁰Ewell P. Roy, "The Broiler-Chicken Industry," in Moore and Walsh, *op. cit.*, p. 96.

development has been the rapid rate at which milk products deteriorate. Consequently, a large measure of control over supplies is necessary and vertical integration has been the instrument used to attain this.

The baking industry is characterized by some vertical integration. However, with the development of technical economies of large scale production, the major trend in the industry has been toward the demise of many small bakers, each selling their own product to consumers. Some of the retail grocery chains operate their own bakeries but large wholesale bakers provide the bulk of all bakery products, especially to the smaller independent grocers. Vertical integration in the baking industry does not generally extend below the final processing level.

The fruit and vegetable processing and canning industry exhibits a predominance of contractual agreements between growers and processors which has closely coordinated their activities. Retail grocery chains have become integrated with the processors and canners largely through the development of specification buying and "store brand" labels.

(c) Analysis of Results: Some Causes and Consequences

The trend in the food industry over the past twenty-five years, has been definitely towards a greater degree of vertical integration between all levels of production. In some cases (the broiler chicken industry, for example) it may be possible to argue that this development has resulted in more efficient operations and lower cost products. Overall, however, it would seem, as Moore and Walsh, after studying the American situation, concluded, that:

The extent of vertical integration in the agriculture-related industries is greater than required by considerations of efficiency and competition...Recent increases in vertical integration...suggest that this market condition is deteriorating. Vertical integration by agriculture related industries [with the exception of the broiler chicken industry] has had either a neutral or adverse effect on costs while exerting an adverse effect on competition.³¹

The existence of vertical integration in the food industry is not an entirely new phenomenon. At one point the farmer performed virtually all of the functions which were to be performed on his product before it reached the consumer. This pattern changed as more specialized firms developed and took over specific tasks in the processing and marketing of farm commodities. The present form of vertical integration simply originates from a different market level. This shift can be accounted for by the general shift of market power away from the farmer towards the processor, manufacturer and, in some cases, the consuming public.

Increasing levels of technology and mechanization in agriculture and the existence of definite economies of large scale operation have resulted in larger and larger capital requirements at all stages of production. Small independent firms (farmers, processors, and retailers) have lost market power relative to the horizontally integrated corporations which have emerged in recent years. The predominance of these very large firms at the retail and processing levels has been conducive to more vertical integration in the industry. It has been to the advantage of these firms (in terms of both profit and market power) to extend their realm of control over several or all levels of production which exist for each commodity.

³¹Moore and Walsh, op. cit., p. 389.

D. Producer Marketing Boards and Vertical Integration

As outlined above, producer marketing boards may be considered as a form of vertical integration in that they perform a later function (i.e., marketing) for firms at the initial stage of the production-distribution process. Such boards have become, in recent years, increasingly important in a number of commodity-sectors in Canadian agriculture.

Interestingly, this form of vertical integration is not generally compatible with the more commonly recognized forms. The regulation of quantities produced, through the control of delivery quotas, is one of the major tools available to producer marketing boards in their attempt to avoid negative price pressures. This action tends to favor the integration of processing firms into the producing level, thus ensuring themselves access to at least a certain quantity of product.

As this development proceeds and processor control over supplies increases, the marketing boards may be subject to declining bargaining power relative to the processors whom it must face in the marketplace. This problem has been cited as a distinct possibility in the Alberta broiler industry.³²

³²See Hurnanen, et. al., pp. 14-15.

MEASURES OF VERTICAL INTEGRATION

Much confusion currently exists as to what constitutes an appropriate measure of vertical integration. Unfortunately, a measure which is completely capable of sound and consistent comparisons across industries, between market levels, between individual firms, and over time has not as yet been developed. However, a number of attempts have been made to design an index which displays such characteristics. A brief review of some of these attempts is presented here in an effort to clarify the problem and hopefully remove some of the confusion. In addition, a conceptual approach utilizing a "subjective index" of vertical integration for use in specific industry studies which has been used is also outlined.

A. Value Added Concepts

Several ratios such as income to sales, inventory to sales,³³ and sales to gross product³⁴ have been suggested as statistical measures of vertical integration. The rationale underlying each of these measures is that the greater the proportion of a product's value produced or contributed by one firm, industry, or economy the greater is the degree of vertical integration present in that firm, industry, or economy. That is, a firm which contributes, say 90 percent of a product's value (in some

³³See M.A. Adelman, op. cit.

³⁴See A.B. Laffer, op. cit.

given form) must logically encompass a broader range of successive functions on that product (and, therefore, by definition, must be more vertically integrated) than another firm which contributes, say 50 percent of the product's value (in the same given form).

As several authors have pointed out, however, each of these measures may be subject to considerable difficulty and criticism.³⁵ In fact, it may be shown that they reflect a number of other factors as well as, but unrelated to, vertical integration. Specifically, these ratios may be influenced by the stage in the production-distribution process under consideration, the direction (forward versus backward) in which the integration proceeds, profit levels (as they vary from one firm to the next), differential changes in the prices of inputs and outputs over time, and the relative intensity of the production process (as opposed to its vertical extension). In short, it should be clear that the concept of value added is no longer considered an acceptable measure of vertical integration.

B. Auxiliary Employment Levels

Attempting to avoid the problems outlined above, Gort³⁶ designed a different statistical measure of vertical integration. Examining firms in which several distinct activities were associated with the output of one product, he defined:

³⁵See Gort, op. cit., pp. 81-82 and Irston R. Barnes, "Comment," in National Bureau of Economic Research conference report, op. cit., pp. 322-330, for a more explicit discussion.

³⁶Gort, op. cit.

...the largest of the stages in terms of the firm's employment [as] a "major" activity, while the other stages were identified as "auxiliary"...[Vertical] Integration was measured by the ratio of employment in auxiliary activities to total employment for the firm.³⁷

A highly specialized firm would have few employees performing "auxiliary activities" and, consequently, the value of the ratio would be very low. A firm which was integrated across several stages, on the other hand, would employ more people in "auxiliary activities" and the value of the ratio would be higher. For industries which Gort considered, the value of this ratio varied from 9.7 percent to 67.3 percent representing the presence of varying degrees of vertical integration.

C. Dependence Upon the Marketplace

In recognition of the close relationship between vertical integration and the competitive organization of industry, Barnes proposed "...the development of measures which would show the degree to which different companies are dependent upon markets at specific stages in the processes of production and distribution."³⁸ These measures, he suggested, might simply be the percentage of total firm shipments (or receipts) of a product made up by intra-firm transfers.

Use of this technique would seem to reflect the desired information and at the same time remain relatively simple. However, it would require the construction of numerous specific indices, each corresponding to a

³⁷Ibid., p. 80.

³⁸Barnes, op. cit., p. 327.

different point of exchange in the production-distribution process.

Furthermore, as Barnes recognizes, the lack of availability of appropriate data would likely severely limit any empirical application of this procedure.

D. Subjective Indices

Another approach which seems to be considerably more workable, although somewhat more qualitative in nature, has been proposed to measure the extent of horizontal and vertical integration in specific industries.³⁸ This technique involves the specification of a two dimensional conceptual matrix including all observable combinations of horizontal and vertical relationships found in the industry (see, for example, Table 1). Subjective weightings are applied to each cell in the matrix and estimates of the relative occurrence of each combination are obtained. Applying the corresponding subjective weights to these estimates and taking their sums yields an "index of integration"--both horizontal and vertical.

While perhaps lacking in its quantitative base, this technique offers a valid measure of integration in particular industries. Given that vertical integration normally only poses a problem when found in conjunction with a high degree of horizontal integration, the fact that this index measures the two phenomena together may be an advantage. Furthermore, given that other techniques have not as yet been found that

³⁸ See George B. Rogers, Vertical and Horizontal Integration in the Market Egg Industry, 1955-1969, (Washington, D.C.: U.S.D.A., Economics Research Service Report No. 477, May 1971.

Table 1

Conceptual Matrix for Types of Vertical and Horizontal
Integration in the Market Egg Industry

Vertical integration	Horizontal integration					
	Direct marketing, mostly multiple units, multiple area, high group marketing potential	Indirect marketing, mostly multiple units, multiple area, high group marketing potential	Direct marketing, mostly single units, single area, modest group marketing potential	Indirect marketing, mostly single units, single area, modest group marketing potential	Direct marketing, single units, local area, low group marketing potential	Indirect market- ing, single units, local area, low group marketing potential
Total ownership/con- trol of all produc- tion, processing input-supply functions	Fully coordinated, mostly large firms	Fully coordinated, mostly large firms	Fully coordinat- ed, mostly med- ium sized firms	Fully coordinated, mostly medium sized firms	Fully coordinat- ed, mostly small firms	Fully coordinated, mostly small firms
Contract production, ownership/control of processing, input- supplying functions	Integrated con- tractors, mostly large firms	Integrated con- tractors, mostly large firms	Integrated con- tractors, mostly medium sized firms	Integrated con- tractors, mostly medium sized firms	Integrated con- tractors, mostly small firms	Integrated con- tractors, mostly small firms
Some contracting plus production financing, and loose input-sup- plying arrangements, with marketing agree- ments	Multiple unit packers, with in- put and produc- tion arrangements	Mostly multiple unit packers, with input and production arrangements	Mostly single unit packers, mostly medium sized	Mostly single unit packers, mostly medium sized	Single local packers, mostly small	Single local packers, mostly small
Some contracting plus production financing or loose input-sup- plying arrangements, with marketing agree- ments	Multiple unit packers, with input or produc- tion arrange- ments	Mostly multiple unit packers, with input or production arrangements	Mostly single unit packers, mostly medium sized	Mostly single unit packers, mostly medium sized	Single local packers, mostly small	Single local packers, mostly small
Loose input-supplying arrangements, no other production arrange- ments, without market- ing agreements	Multiple unit packers, with some input arrangements	Mostly multiple unit packers, with some input arrangements	Mostly small and medium sized single unit packers, with some input ar- rangements	Mostly small and medium sized single unit packers, with some input ar- rangements	Single producer, producing some inputs, selling retail	Single producer, producing some inputs, selling wholesale
No input-supplying or production ar- rangements, without marketing agreements	Multiple unit packers	Mostly multiple unit packers	Mostly small and medium sized single unit packers	Mostly small and medium sized single unit packers	Single producer, buying inputs, selling retail	Single producer, buying inputs, selling wholesale

Source: George B. Rogers, Vertical and Horizontal Integration in the Market Egg Industry, 1955-1969,
(Washington, D.C.: U.S.D.A., Economics Research Service Report No. 477, May 1971.

are fully acceptable, the researcher may find that establishing a subjective "index of integration" is the only recourse open to him.

SUMMARY AND CONCLUSIONS

Vertical Integration: The Phenomenon and the Rationale

Firms which span successive phases in the production, distribution and marketing of a product are said to be vertically integrated. A firm may use the vertical integration technique as one part of its overall marketing strategy when it (the firm) expects to attain (through vertical integration):

1. technical economies of production and/or distribution arising through the consolidation of successive stages under one management;
2. reduction of the risk with respect to future supplies of factor inputs and product markets;
3. minimization of the cost-price squeeze when confronted by oligopolistic suppliers and/or oligopsonistic buyers; and
4. a greater return on investment than through other forms of growth.

Firms may also vertically integrate with a view to "escaping" certain institutional (financial and legal) factors--such as avoiding taxes on intermediate products and anti-combines regulation imposed by the government.

Many possible techniques are available to the firm wishing to vertically integrate. Some important examples are: integration through formal contracts, actual ownership, leasing agreements, and tying arrangements. The economic rationale for making these arrangements is that vertical integration gives the integrating firm an opportunity to operate

on a lower average cost curve, at least over some relevant segment of output, thus widening the spread between revenues and costs.

The lowering of average costs implies that the vertically integrated firm uses resources more efficiently. This is true to the extent that, in the short run, the lower costs will result in lower prices to the users of its products. However, in the long run a different picture may emerge. The capital structure of the vertically integrated firm may be sufficiently large to make it extremely difficult for the new (potential) competitors to raise enough capital and enter the market with a scale big enough to effectively compete with the lower-cost vertically integrated firms. Thus integrators can effectively thwart new competition. Furthermore, less integrated competitors in the industry may be driven out of the industry, due to a policy (or strategy) of lower prices followed by the lower-cost integrated firm. In short, vertical integration can result in the development of monopolistic elements which, in turn, may breed inefficiency and, eventually, higher prices to the consumer.

Vertical integration is a dynamic rather than a static concept. The trend in the degree of integration in an economy is essential to its analysis. In Canada and the U.S.A., the available evidence is rather sparse and sketchy, but it appears that the degree of vertical integration in the economy as a whole fell between 1919 and 1937; it grew from 1937 until the mid-fifties, since which time it has fallen, again. An important reason for this fluctuation seems to have been the tenacity with which the anti-combines legislation has been enforced.

The Food Industry: In Retrospect and Prospect

Vertical integration has been evident in the Canadian food industry from its initial development until the 1970's. The extent and type of integration has changed. Initially, vertical integration could be said to have started at the farm level since farmers processed their own products. Now, vertical integration is either backward by the food retailers to the food manufacturing phase or forward by the food manufacturers to the retail level.

Vertical integration by the food retailers tends to occur in highly concentrated processing industries. Since certain members of these industries (flour milling, distilling, breakfast food manufacturing, sugar refining and brewing) are already highly concentrated in Canada, it implies that they may be the future targets for vertical integration by the food retailers.

Some of the commodity sectors also show a certain degree of vertical integration. The meat packing industry controlled 7.4 percent of livestock production in 1963 and would seem to have acquired even greater control since that time. In the dairy industry, vertical integration has occurred through contracting and quotas. The poultry industry has integrated through contracting production. Small baking establishments have been forced out of business due to the economies of production offered by large vertically integrated bakeries. Canning and processing of fresh fruits and vegetables have been integrated by contractual agreements between growers and producers. The effect of these contractual arrangements has been to enhance the processors' ability to effectively establish their own price and quota

system for commodities, through their contractual agreements with producers, since these contracts usually specify the price the producer will receive and the quantity the processors desire. Consequently, the processors are able to circumvent the policies of marketing boards involved in these sectors.

Finally a word of caution about measurement of vertical integration is in order. A precise and "objective" measurement of the degree of vertical integration in the food industry, as in any other industry, is almost impossible. Numerous methods, proposed in the literature, were briefly discussed in this study; perhaps the method of subjective indices is the most comprehensive. Because of its comprehensive nature, this method may be difficult to use and prove costly. However, its ability to assess the effects of both vertical and horizontal integration simultaneously may make it a highly appropriate technique in light of the structural changes that have come about in the food industry -- an industry that has experienced both vertical and horizontal integration in the past.

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