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A Study Of Diversification In The Canadian Food Processing Sector

by

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Abstract

This paper examines the pattern and determinants of diversification for a sample of 155 enterprises which account for half of the output of the Canadian food processing sector. The main finding of the study is that the determinants of diversification for domestically owned enterprises are consistent with *a priori* expectations and similar to that of previous U.K. and U.S. work. The important explanatory variables are enterprise size and advertising intensity as well as industry concentration and growth. However, for the foreign enterprise diversification appears to be a function of foreign direct investment and diversification by the parent enterprise, not local market conditions in Canada. Hence, in considering public policies toward the diversified enterprise the nationality of the enterprise should be taken into account.

Résumé

L'auteur étudie ici la diversification et ses causes déterminantes dans un échantillon de 155 entreprises du secteur de la transformation des aliments. L'échantillon représente la moitié de la valeur totale des expéditions de marchandises du secteur au Canada. Les résultats indiquent principalement que les causes déterminantes de la diversification des entreprises canadiennes étaient prévisibles *à priori* et semblables à celles démontrées par des études américaines et britanniques. Les variables explicatives les plus importantes sont la taille des entreprises, le niveau de publicité, le degré de concentration industrielle et la croissance. Cependant, la diversification de l'entreprise étrangère semble être fonction, non pas des conditions de marché au Canada, mais de la politique de l'entreprise-mère en matière de diversification et d'investissement direct étranger. En conséquence, les politiques publiques relatives à la diversification de l'entreprise devraient tenir compte de la nationalité de l'entreprise.

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I INTRODUCTION

Interest in the diversified enterprise[1] is justified on a number of grounds. First, diversified enterprises are of considerable economic significance. For example, in 1972 such enterprises accounted for 65.5 per cent of the value added in the Canadian manufacturing sector, but only formed 3.0 per cent of all manufacturing enterprises. In 1965, the corresponding percentages were 50.6 and 1.5, respectively.[2] Secondly, one of the most persistent themes in the literature on Canadian manufacturing industries is that enterprises and plants produce "too many" products to achieve economies of scale. Hence much of Canadian manufacturing industry remains uncompetitive and scale inefficient.[3] Thirdly, diversification may be an important structural determinant of enterprise performance because the diversified enterprise is better able to allocate resources than the capital market.[4] Fourthly, the Canadian manufacturing sector is unique among Western nations in the very high proportion of output accounted for by foreign multinational, especially U.S., corporations. The factors determining the degree of enterprise diversification may differ between foreign and domestic Canadian enterprises. This is likely to result in different policy prescriptions depending upon the nationality of the enterprise. The study of diversification presented here attempts to throw some light on these issues.

In contrast to most previous studies of diversification, which have either relied upon census industry averages or samples of larger enterprises spread thinly across the industries in the manufacturing sector, attention here is focussed on a sample of 155 enterprises in the Canadian food processing sector. Hence, although lacking the breadth of previous studies of diversification, this study has a depth not hitherto found in the analysis of diversification. Also, in contrast to most previous studies, the data base used is particularly well suited to the measurement of diversification.[5] These advantages should easily outweigh the focus of the study on only one, albeit important, sector of the Canadian manufacturing sector.

The paper is arranged as follows. The next section describes and examines the sample of enterprises. The third section discusses in detail the problems in designing an appropriate index of diversification, selecting the optimum level of industry classification and then applying the respective outcomes to present the level of enterprise diversification. Section IV discusses the determinants of diversification and their specification while the penultimate section attempts to assess the relative importance of these determinants using regression techniques. The final section presents a brief summary of the more important findings and some conclusions.

II SAMPLE SELECTION

2.1 Introduction

The selection of enterprises and plants described in this section is designed to meet two separate objectives in the analysis of the diversified enterprise. First, to attempt to resolve a problem in aggregating the output diversity of the plants owned or controlled by an enterprise to form the size distribution of products for the enterprise. An enterprise is defined as a collection of plants. The output profile of the enterprise across the N industries over which it allocates its output is derived by adding the output of each individual plant in each of the N industries. Previous researchers, because of inadequate data, have made differing assumptions about how the plant allocates its output across the industries in which it operates. A problem arises because of the arbitrary nature of these assumptions and the lack of any attempt to examine the sensitivity of the conclusions and empirical results to the various assumptions.[6] The second objective is a study of the determinants of enterprise diversification. This latter objective is the concern of this paper.

2.2 Nature of Total Sample of Plants and Enterprises

The original sample selection of enterprises for the food processing sector (hereinafter referred to as the Food Sector) was not made with diversification as a criterion. (The criteria used in the sample selection procedure is to be found in St. George, forthcoming, 1978, Chapter III, section 2.)

The criteria employed allowed for the inclusion of at least the leading four enterprises in each of the 62 national markets and the 105 regional markets into which St. George divided the Food Sector.[7] Information was collected not only on the enterprise's activity in the market(s) in which it was among the leading four enterprises, but also where such an enterprise was ranked fifth or less in a market. In other words all the activities of the enterprise in the Food Sector were included. Data on non-food plants owned by these enterprises was not collected. The data was gathered using the statutory powers given to the Director of Investigation and Research, Combines Investigation Act. St. George's sample, the source sample, will be referred to here as the Total Sample and his study, the Food Study.

Available data for Canada suggests that diversified enterprises are larger than specialist enterprises. For example, in 1965 the average size of the specialist enterprise in the Canadian manufacturing sector was $0.542 million, in terms of sales. In contrast, the corresponding figure for a diversified enterprise was $39 million.[8] This suggests that the sample of enterprises selected for the Food Study is likely to be especially appropriate for an analysis of diversification, since it includes not only the major enterprises in the Food Sector, but also some of the smaller specialist enterprises, which often characterize regional markets.

Two further points of related interest should be noted

TABLE 2-1

THE EXTENT OF TOTAL SAMPLE COVERAGE[a] OF THE CANADIAN FOOD PROCESSING SECTOR, 1970

SIC INDUSTRY[b]		Sample Value of Shipments	Total Value of Shipments	Sample Coverage (%)
Number	Title	($000's)		
101	Meat and Poultry Products	1,635,622.5	2,345,151.0	67.7
102	Fish Products	258,555.8	354,976.0	72.8
103	Fruit and Vegetable Processing	444,596.2	544,338.0	81.7
104	Dairy Products	977,013.0	1,369,206.0	71.4
105	Flour and Breakfast Cereal Products	297,240.3	306,255.0	97.1
106	Feed	294,688.8	585,843.0	50.3
107	Bakery Products	473,597.7	639,627.0	74.0
108	Miscellaneous Food	1,096,164.9	1,350,368.0	81.2
	TOTAL	5,477,479.2	7,495,764.0	73.1

a. Of the 1,072 establishments or plants.

b. For details see Section 3.2 below.

Source: St. George (forthcoming, 1978, Table 3-2)

concerning the Total Sample of Food Sector enterprises, their coverage in terms of both sales and diversified enterprises. The relevant data is presented in Tables 2-1 and 2-2, respectively. Table 2-1 compares the total value of factory shipments (sales) as recorded by Statistics Canada with the Total Sample value of shipments. The result shows that the Total Sample of enterprises accounted for a very large percentage of the total value of factory shipments (70 per cent or greater in six out of eight SIC industries), with the notable exception of the Feed Industry which recorded a figure of 50.3 per cent. At the product market level, a much finer level of industry classification, the coverage levels were usually in excess of 50 per cent.[9]

Statistics Canada records the number of diversified enterprises in each SIC industry. No information is available at a finer level of industry classification. The relevant data is presented in Table 2-2. The table also indicates the number of diversified enterprises in the Total Sample of Food Sector enterprises. One would expect that the number of diversified enterprises, as recorded by Statistics Canada, to be greater than the sample data, for two reasons. First, reference is only made in the Total Sample to plants which operate in the Food Sector. Clearly an enterprise may own a single product plant in the Food Sector but also a plant in, for instance, the Beer Industry. In such an instance, Statistics Canada would record the enterprise as diversified but the Total

TABLE 2-2

A COMPARISON OF THE NUMBER OF DIVERSIFIED ENTERPRISES[a] USING STATISTICS CANADA AND FOOD STUDY DATA FOR THE CANADIAN FOOD PROCESSING SECTOR, 1970

SIC INDUSTRY		The Number of Diversified Enterprises[b]	
Number	Title	Statistics Canada	Food Study (Total sample)
101	Meat and Poultry Products	13	12
102	Fish Products	05	03
103	Fruit and Vegetable Processing	08	06
104	Dairy Products	19	08
105	Flour and Breakfast Cereal Products	05	07
106	Feed	10	04
107	Bakery Products	12	08
108	Miscellaneous Food	20	20
	TOTAL	92	68

a. For the purposes of this table each diversified enterprise is classified to its primary industry and hence can be only counted once.

b. Statistics Canada allocates the whole of the output of a plant to the primary industry of a plant when aggregating from plants to the enterprise. This convention is not followed in this paper. However, for the purposes of comparability with the Statistics Canada numbers their convention was followed in constructing this table.

Source: Statistics Canada (1975, Table 5, pp. 110-123) and see text

Sample data would refer to it as a specialist enterprise. Secondly, as Table 2-1 shows, the Total Sample data does not have complete coverage. In other words, some diversified enterprise may be omitted from the total sample. It was not possible to estimate the significance of these two factors with the data presently available.

On the other hand, the data in Table 2-2 may bias the Total Sample data number of diversified enterprises upward. The Total Sample data records a diversified enterprise if it produces in two or more Food Sector industries. No account is taken here of plants primarily engaged in non-food output. However, the Statistics Canada data includes non-food output. Hence, if an enterprise allocates most of its output to, for instance, industry 372 (Manufacturers of Fixed Fertilizers), but has several plants in different Food Sector industries, then Statistics Canada will assign that enterprise to 372 while the Total Sample data here will record it as a diversified enterprise.[10] An incomplete attempt was made to estimate the upward bias by comparing the actual value of an enterprise's total output (i.e., food and non-food)[11] with its food output to determine which enterprises did not have the bulk of their activity in food. This was possible for approximately 70 per cent of the sample. On this basis (i.e., assuming all remaining 30 per cent had bulk in the food processing industries), the upward bias in the sample data in Table 2-2 is a somewhat unreliable <u>maximum</u>[12] of one in 101, one in 102, one in 107 and two in 108.

Table 2-2 shows that the number of diversified enterprises recorded in the Total Sample data closely matches that recorded in Statistics Canada (i.e., 60 per cent or greater) for six out of the eight industries. Sample coverage was low for industries 104 and 106. In the latter case this seems to reflect, in part, the low coverage ratio reported in Table 2-1. The most puzzling aspect of Table 2-2 is larger number of diversified enterprises recorded in the Total Sample data for 105 as compared with Statistics Canada. One possible explanation is that the owcnrship linkages in the Food Study were more complete than in Statistics Canada, since several of the diversified enterprises classified to 105 had several subsidiary enterprises/firms. Alternatively, the differences may be attributable to the fact that Statistics Canada uses ownership linkages for 1969 while 1970 linkages are used here.

2.3 Nature of Sample of Plants and Enterprises Selected

The data presented in Table 2-1 and 2-2 refer to the Total Sample of enterprises and establishments or plants. In order to conduct analysis at the plant or enterprise level outlined in the introduction (section 2.1 above) certain observations had to be excluded. Attention will be first devoted to plants then enterprises.

A plant is included in the sample if data is available on (a) the N industries over which the plant allocates its output and (b) all N industries are within the Food Sector.

TABLE 2-3

CRITERIA[a] FOR EXCLUDING ESTABLISHMENTS IN ANALYSIS OF DIVERSIFICATION IN THE CANADIAN FOOD PROCESSING SECTOR, 1970: SIC LEVEL OF INDUSTRY CLASSIFICATION

Criteria[b] for Exclusion	Number	Percentage of Exclusions
Non-Manufacturing[c]	88	48.35
Non-Food Output	13	07.14
Consolidated Returns[d]	70	38.46
Miscellaneous[e]	11	06.04
TOTAL	182	100.00

a. These are mutually exclusive. Hence no establishment is counted twice.

b. See text for definition.

c. Zero output or production employment.

d. No list of consolidated returns was readily available. In order to detect the consolidated returns, establishments were arranged by enterprise complex. The size distribution across industries was estimated. If the distributions of two or more plants was the same (i.e., percentage output in the ith industry to two decimal places) then it was assumed the establishments had been consolidated. Note this was carried out only at the SIC level of industry classification. Application of this criteria at the product market level of industry classification led to the exclusion of four more establishments.

e. This exercise was conducted at the SIC level of industry aggregation only.

Source: See text.

Application of these criteria to the Total Sample of 1,072 plants in 1970 led to the exclusion of 182 plants. These plants were excluded for three main reasons, Non-Manufacturing establishment, Non-Food Output and Consolidated Returns as well as Miscellaneous. The relevant importance of each source is detailed in Table 2-3.

(i) Non-Manufacturing Establishments

A number of establishments had zero output or the number of production employees was zero.[13] These establishments are sales offices, distribution depots, warehouses and head offices which report no value of factory shipments data as they are not engaged in any manufacturing activity. Table 2-3 shows that 88 establishments (under the heading Non-Manufacturing) were excluded because they had no recorded activity in the Food Sector in 1970. This was the most important single reason for excluding plants from the sample, accounting for 48.35 per cent of all exclusions.

(ii) Non-Food Output

Some of the establishments for which data was collected had output which was not classified to the Food Sector. This was not a problem in itself. The problem arose because the whole of a plant's non-food output was treated (using a residual code 200,000) as though it was part of a single industry. It was not possible, without considerable consumption of resources, to disaggregate this residual category

200,000 into more sensible industry categories. Considering the small number of plants, 13, excluded under this heading, it was decided not to expend those resources. The primary industry of such establishments was concentrated in 107 and 108.

(iii) Consolidated Returns

In collecting the original data, the respondents were given the option of answering a questionnaire provided by the Bureau of Competition Policy or sending in a written release authorizing access to similar material which they submit to Statistics Canada under the Annual Census of Manufacturers Survey. About 80 per cent of the enterprises opted for the latter choice. On examining the data obtained at Statistics Canada, it was discovered that Statistics Canada sometimes allows a multi-establishment enterprise to file a consolidated return, covering some or all the establishments it operates.[14] Hence, for this set of establishments the implicit assumption is made that the distribution of output across the various food industries is the same for each establishment. Clearly in a study of diversification which uses data at plant level these plants have to be excluded from further analysis. These consolidated returns were concentrated in the Dairy Products Industry (SIC 103). As Table 2-3 shows there were seventy such establishments.

(iv) Miscellaneous

In a very small number of instances mistakes were made in inputing the data, such that it was not complete for the purposes of analysing the degree of diversification. Since correction of such a small number of errors would have required an inordinate amount of work in relation to the potential gains, it was decided to exclude them from consideration.

In considering what criteria for sample selection to apply to the Total Sample of 217 enterprises, attention was paid to the fact that some enterprises may have substantial output outside the Food Sector. Hence, the question emerges of how to interpret the degree of enterprise diversification since this refers only to the enterprise's Food Sector output. The problem is further compounded because some of the independent variables used in the regression analysis conducted in Section V below, refer to the total activity of the enterprise (e.g., profitability and the advertising/sales ratio) while others refer only to food activity (e.g., industry concentration ratio). In order to solve this problem, enterprises which were mainly or primarily engaged in non-food activities were excluded from the Total Sample.[15]

Application of the four criteria relating to plants (see Table 2-3) resulted in the exclusion of 182 plants from the Total Sample, leaving a sample of 890. In other words, 16.98 per cent of the 1,072 Total Sample had to be excluded.[16] In terms of the reduction in sample coverage, the relevant data

is as follows. Table 2-1 shows that the Total Sample has a coverage ratio of 73.1 per cent. Exclusion of the 182 establishments reduces the coverage ratio to 65.2 per cent. The exclusion of these 182 plants, plus the criterion that the enterprise should be primarily engaged in the Food Sector, resulted in a sample of 155 enterprises, accounting for 51.5 per cent of total sales in the Food Sector. Hence, the excluded enterprise's had, on the average, a smaller number of plants than the sample of 155 enterprises. In terms of the number of diversified enterprises recorded by Statistics Canada (Table 2-2) the 155 enterprise sample contained 54, accounting for 58.7 per cent of the number recorded by Statistics Canada. The distribution was much the same across the eight SIC industries in Table 2-2 as the Total Sample.[17] Hence, the sample of plants and enterprises finally selected from the Total Sample should be fairly representative of diversified enterprises and plants with which to conduct an analysis of diversification. In addition, evidence is presented in section 3.3 below showing that the pattern of diversification of these 155 enterprises is very similar to that of the whole of the Canadian manufacturing sector.

III THE MEASUREMENT OF ENTERPRISE DIVERSIFICATION

3.1 Indexes of Diversity[18]

There are three dimensions of the size distribution of products which studies of diversification have attempted to take into account either in the form of a summary index or by designing measures which take into account only a single dimension. These dimentions are:

(i) the number of separate industries in which an enterprise operates, denoted by N. The maximum number of industries over which an enterprise can allocate its output is N^*;[19]

(ii) the quantitative importance to the enterprise of each of the N industries over which it allocates its output. The relative importance of any of the N industries is represented by Pi, the proportion of the output of the enterprise in the i^{th} industry. The Pi's are ranked from largest to smallest, such that $Pi > Pi+1$ for all i except i=N;

(iii) the extent to which the industries in which the enterprise operates are "related" to one another. For example, industries 101 (Meat and Poultry Products) and 102 (Fish Products) may be considered related in that both belong to the Food Sector, but would be considered "unrelated" to such non-food industries as 365 (Petroleum Refineries) and 391 (Scientific and Professional Equipment).

Early studies of diversification attempted to take into account dimensions (i) and (ii) either separately or in the form of a summary index. In particular Gort (1962, pp. 23-26) introduced a number of measures of which the following two subsequently became quite widely used. The first, D_3, is defined as $1-P_1$.[20] P_1 refers to the industry in which the enterprise allocates the largest proportion of its output and is generally labelled the primary industry. D_3 will vary between 0, when the whole of the output of an enterprise is classified to a single industry (i.e. N=1, P_1=1), and (N*-1)/N*, when the enterprise allocates its output equally among the N* industries which make up the Food Sector (i.e., Pi=1/N* for all i). Hence, the greater the value of D_3 the more diversified the enterprise. The second index, D_2, is simply defined as N-1.[21] D_2 varies between 0, for a specialist enterprise, and N*-1. Like D_3, the greater the value of D_2 the more diversified is the enterprise.

As a summary index of dimensions (i) and (ii) D_3 and D_2 both have obvious shortcomings. D_3 makes no attempt to consider the relative significance of the N-1 non-primary industries while D_2 would prove an adequate summary measure only in the event that the enterprise spread its output equally among the N markets in which it operates (i.e. Pi=1/N for all i). The evidence both for the Canadian Food Sector[22] and from other studies[23] is that equality is not usually obtained between the various markets in which an enterprise operates. As a result of these shortcomings, attempts were made to design an index which adequately took into account dimensions (i) and (ii).

Berry (1971) and McVey (1972), independently, applied the Herfindahl index of concentration to the problem of finding an adequate summary index of diversification. This index can be defined as,

$$D_1 = \sum_{i=1}^{N} Pi^2$$

where N and Pi have the same meaning as above.[24] D_1 has a maximum of unity when the plant operates in only one industry. The minimum value of $D_1 = 1/N^*$, which takes place when the enterprise allocates its output equally among the N* markets. Unlike D_3 and D_2, D_1 is an inverse index of diversification - the higher the value the lower the degree of diversity. Although D_1 has been used extensively,[25] it nevertheless suffers from a number of shortcomings. For example, different distributions can lead to the same value of D_1 (e.g., distribution A=.60, .40, D_1=0.52; distribution B=.70, .10, .10, .10, D_1=0.52). Nevertheless for a given value of D_1 the set of distributions which can yield that value is much less than for D_2 and D_3.

Subsequent to the work of Berry and McVey the measurement of diversification has proceeded in two directions. First, further attempts to design an index which will take into account both dimensions (i) and (ii). Utton (1977, p. 102-103) has suggested, for example, the following index,

$$D_4 = 2 \sum_{i=1}^{N} iP_i - 1$$

where P_i and N have the same meaning as for D_1. This index

will vary between 1, for a specialist enterprise, and N*, for an enterprise which spreads its output equally amongst the N* Food Sector industries. The second direction taken in the measurement of enterprise diversification has taken is to design a measure which will take into account all three of the dimensions mentioned at the beginning of this section. The index used by both Caves (1975) and Honeycutt and Zimmerman (1976), which relates those dimensions, can be defined as,

$$D_5 = \sum_{j=1}^{N} P_j \sum_{i=1}^{N} P_i dij$$

where P_i and N have the same meaning as before, while dij measures the "distance" from industry i to industry j. D_5 reduces to the Herfindahl index (D_1) when dij=1 for all i=j, and i≠j=0. Hence, D_5 can be viewed as a modification of D_1 such "that a greater weight is assigned to those industries that are more distant" (Honeycutt and Zimmerman, 1976, p. 512). The maximum and minimum value of D_5 will depend upon the weighting system implicit in dij.[26]

In this study of diversification in the Food Sector only three measures of diversification are used, D_1, D_2 and D_3. D_4 was not used because it was felt the incremental amount of work involved in deriving another index of diversification that analysed dimensions (i) and (ii), in addition to D_3, was not worth the result. The index which attempted to take into account all three dimensions (D_5) of diversification was not introduced because its usefulness was

strictly limited, since only enterprises which diversified within the Food Sector are considered in this paper. In any event, the use of D_1, D_2 and D_3 at various levels of industry classification give a much clearer indication of the extent to which enterprises diversify into "unrelated" activities than D_5.

3.2. Appropriate Level of Industry Classification

In applying the measures of output diversity outlined in the previous discussion the issue arises over the most appropriate level of industry classification. To resolve this question it is necessary to go one step back and ask what issues are to be resolved or answered. Two issues would seem of paramount importance. First, interest centres on the determinants of why the enterprise spreads its output over a number of different industries or markets;[27] secondly, what are the competitive implications in terms of resource allocation and possible advantages that a diversified enterprise may have over enterprises which confine their output to a single industry. Hence, a definition is required of a market which is sufficiently broad to include both specialist and diversified enterprises.

A market may be defined, theoretically at least, as a set of products in which the cross-elasticities of demand and supply exceed some critical level.[28] In other words, the market or industry consists of a set of products which are substitutes in both consumption and production. An increase in the price of one product will cause consumers to purchase less and producers to switch resources into other

products in the market. A problem arises over the critical level of cross-elasticity. There is no "ideal" or "optimum" level. The lower the cross-elasticity the greater the number of products included in the market while the converse occurs with a high elasticity. For example, application of a low cross-elasticity may result in broad categories such as Food, Beverages, Petroleum Products, and Clothing, while a high elasticity will result in much narrower categories, such as Cheese, Instant Dry Milk, Evaporated Milk and Tomato Catsup. However, the problem is further compounded because typically cross-elasticities of demand and supply are unavailable in sufficient quantities to adequately delimit markets at varying degrees of fineness.

Here the measures of diversity and their determinants are examined at both a broad and a narrow level of industry classification to determine the sensitivity of the results to the level of industry classification. Different criteria are used to derive the two industry classification systems, with narrower level of classification approximating that the market definition outlined above.

The broad level of industry classification is based upon the 1970 Standard Industrial Classification system developed by Canadian census authorities.[29] The SIC level of industry classification used here divides the Food Sector into eight separate industries which are detailed in Table 3-1. In more technical language, the classification level is at the 3-digit SIC. The SIC classification system tends to stress cross-elasticity of supply rather than demand in delimiting industry. For example, the definition of industry used by the census authorities is a group of establishments (i.e., plants) which,

> are engaged in the same or a similar kind of economic activity, e.g. logging camps, coal mines, clothing factories,... (Dominion Bureau of Statistics, 1970, p. 7).

Most previous studies of diversification have used classification systems based upon SIC defined industries, usually at the 3- or 4-digit[30] level. This reflects the census authorities as the main data source for many studies.

The much more narrowly defined level of industry classification has been developed specially for the Food Sector and attempts to overcome the supply side bias in conventional SIC systems.[31] This was achieved by concentrating on developing a system based upon defining groups of products which are close substitutes but "the possibility of production substitution is frequently entertained in an effort to determine its real possible effects".[32] Hence, the resulting system

should come close to the theoretical definition of an industry discussed above. The system generated a set of product groupings (referred to here as product markets), which divided the Food Sector into 62 product markets.[33] In Table 3-1 the number of product markets within each SIC industry are detailed.[34] There is considerable uniformity in the number of product markets within five of the SIC industries (i.e. 2 to 4) but for the remaining three[35] the number of product markets is much higher. Hence, the SIC industry classification is at a much broader level than the product market with no uniform relationship between the detail at one level compared with another. However, solely in terms of the number of product markets, the corresponding SIC level of industry classification would be somewhere between the U.S. 4- and 5-digit level. No corresponding SIC system exists for Canada. No previous studies of diversification have used product market definitions.

A problem arises with the application of either the SIC or product market definitions to the measurement of enterprise diversification. Although market A and B may be quite separate and distinct, the output of market A may be an input to market B. Hence, the enterprise ownership of plants in industry A and industry B is explained in terms of vertical integration, which is quite distinct from diversification. No attempt was made to exclude the relationships which were reflective of vertical integration. However, for enterprises

TABLE 3-1

Product Market and Standard Industrial Classification Breakdown of the Food Processing Sector

Standard Industrial Classification Industry Number and Title	Number of Product Markets Within an SIC Industry
101 Meat and Poultry Products	3
102 Fish Products	4
103 Fruit and Vegetable Processing	13
104 Dairy Products	8
105 Flour and Breakfast Cereal	4
106 Feed	2
107 Bakery Products	4
108 Miscellaneous Food Products	24
Total	62

Note: Each product market is contained entirely within the SIC industry to which it is assigned.

Source: St. George (forthcoming, 1978, Appendix B)

mainly in the Food Sector, vertical relationships are likely to be raw material inputs outside the Food Sector, such as the food product to be processed (e.g., cattle, peas, milk) and the packaging material to be used in processing (e.g., cans, bags). Some vertical integration has taken place, however, within the Food Sector: common ownership of plants in flour and bakery products as well as feed and poultry processors.[36] Nevertheless, the only available empirical evidence suggests that the

> ...principal secondary activities do not generally appear to have been undertaken for the purpose of serving the input requirements or marketing needs of the primary ones. (Gort et al, 1972, p.41).

The failure to omit vertical relationships is therefore a shortcoming of the empirical analysis presented below. Nevertheless, apart from one or two instances, this should not invalidate the results. No study of diversification has omitted vertical relationships, although most are aware of the problem.

3.3. The Extent and Sensitivity of Enterprise Diversification

In this section several topics are considered relating to enterprise diversification. First, the extent of enterprise diversification. Secondly, the sensitivity of enterprise diversification to the level of industry classification (i.e., SIC or product market). Thirdly, the degree to which an enterprise allocates its output in product markets that fall within the same SIC industry. This is of interest since it provides a

TABLE 3-2

Theoretical
Maximum and Minimum Levels
of Enterprise Diversification

Index of Diversification	Maximum		Minimum	
	SIC	Product Market	SIC	Product Market
D_1	0.125	0.016	1	1
D_2	7	61	0	0
D_3	0.875	0.984	0	0

Note: For definitions of D_1, D_2 and D_3 and formula for maximum and minimum values see text.

guide to the factors which determine the direction of diversification.

In order to be able to interpret the observed levels of D_1, D_2 and D_3, it is useful to know the maximum and minimum limits within which each index must fall. These results are given in Table 3-2. As can be seen, the minimum level of diversification for each of the three indexes is the same, regardless of the level of industry classification. The maximum levels of diversification do differ, however, by the level of industry classification. In particular, the maximum degree of diversification is greater for the product market classification than the SIC (remember, D_1 is an inverse index). The maximum level of enterprise diversification for D_1 and D_3 assumes that the enterprise allocates its output equally among the N* industries. As was pointed out in section 3.1 above, most enterprises do not spread their output equally among the industries in which they operate. Hence, the observed values of D_1 and D_3 are unlikely to be concentrated toward the maximum end of the range within which the indexes must fall.

Tables 3-3 to 3-5 present the frequency distributions for D_1, D_2 and D_3, respectively, at the SIC and product market levels for the sample of 155 enterprises. The sensitivity of the indexes of diversification to the level of industry classification is presented in Table 3-6. Table 3-7 is an attempt to test for the uneveness with which the enterprise allocates its output over the markets in which it

TABLE 3-3

Enterprises in the Canadian Food Processing Sector, Grouped by D_1, for 1970

D_1	Level of Industry Classification			
	SIC		Product Market	
	Number	Percentage	Number	Percentage
0.10-0.19	0	0	5	3.2
0.20-0.29	3	1.9	18	11.6
0.30-0.39	4	2.6	23	14.8
0.40-0.49	9	5.8	13	8.4
0.50-0.59	26	16.8	22	14.2
0.60-0.69	14	9.0	14	9.0
0.70-0.79	10	6.5	9	5.8
0.80-0.89	15	9.7	13	8.4
0.90-0.99	25	16.1	19	12.3
1.00	49	31.6	19	12.3
TOTAL	155	100.0	155	100.0

Source: See text.

TABLE 3-5

Enterprises in the Canadian Food Processing Sector, Grouped by D_3, for 1970

D_3	Level of Industry Classification			
	SIC		Product Market	
	Number	Percentage	Number	Percentage
0	49	31.6	19	12.3
0.001-0.049	24	15.5	17	11.0
0.05-0.09	15	9.7	9	5.8
0.10-0.19	14	9.0	18	11.6
0.20-0.29	16	10.3	18	11.6
0.30-0.39	15	9.7	18	11.6
0.40-0.49	15	9.7	21	13.5
0.50-0.59	5	3.2	14	9.0
0.60-0.69	1	0.6	15	9.7
0.70-0.79	1	0.6	4	2.6
0.80-0.85	0	0	2	1.3
TOTAL	155	100.0	155	100.0

Source: See text.

TABLE 3-4

Enterprises in the Canadian Food Processing Sector, Grouped by D_2, for 1970

D_2	Level of Industry Classification			
	SIC		Product Market	
	Number	Percentage	Number	Percentage
0	49	31.6	19	12.3
1	48	31.0	30	19.4
2	32	20.6	23	14.8
3	11	7.1	16	10.3
4	11	7.1	16	10.3
5-9	4[a]	2.6	35[b]	22.6
10-17	0	0	15[c]	9.7
35	0	0	1	0.6
TOTAL	155	100.0	155	100.0

a. Three enterprises D_2=5, one enterprise D_2=7.

b. The frequencies varied between five and nine with seven observed for D_2=5, 7 and 8.

c. The frequencies varied between one and three with two observed for D_2=11, 13 and 15.

Source: See text.

TABLE 3-6

The Sensitivity of Indexes of Diversification To The Level of Classification For Enterprises In the Canadian Food Processing Sector, 1970

Index of Diversification	Level of Industry Classification			
	SIC		Product Market	
	Average	Coefficient Of Variation	Average	Coefficient Of Variation
	All Enterprises[a]			
D_1	0.793	0.28	0.615	0.45
D_2	1.361	1.00	4.213	1.08
D_3	0.151	1.21	0.296	0.80
	Enterprises Diversified at the SIC Level[b]			
D_1	0.697	0.30	0.508	0.47
D_2	1.991	0.61	5.7550	0.82
D_3	0.221	0.82	0.383	0.57
	Enterprises Diversified at the Product Market Level[c]			
D_1	0.764	0.29	0.561	0.44
D_2	1.551	0.87	4.801	0.95
D_3	0.173	1.07	0.337	0.66

a. The sample consisted of 155 enterprises.
b. The sample consisted of 106 enterprises.
c. The sample consisted of 136 enterprises.

Source: See text.

TABLE 3-7

ENTERPRISES IN THE CANADIAN FOOD PROCESSING SECTOR GROUPED BY NUMBERS EQUIVALENT (NE_1)[a] FOR 1970

Number of Industries In Which an Enterprise Operates	Level of Classification			
	SIC		Product Market	
	Average	Coefficient of Variation	Average	Coefficient of Variation
1	1	0	1	0
2	1.401	0.27	1.333	0.25
3	1.563	0.29	1.609	0.32
4	1.652	0.29	1.839	0.34
5	2.156	0.40	2.105	0.41
6-10[b]	2.653	0.57	2.928	0.35
11-18[c]	0	0	4.007	0.44
36	0	0	8.568	0

a. See text for definition.

b. The average value of N at the SIC level = 6.5, at the product market level = 7.8.

c. The average value of N at the SIC level = 13.7.

Source: See text.

produces. All three topics mentioned above can be discussed with reference to these five tables.

The number of diversified and specialist enterprises[37] is quite sensitive to the level of industry classification applied to the Food Sector. Of the sample of 155 enterprises 106 are diversified and 49 are specialist at the SIC level, while the corresponding figures at the product market level are 136 and 19, respectively. The decrease in the number of specialist enterprises is explained by the fact that the finer the industry classification system applied to the Food Sector the greater the probability that the enterprise will produce in two or more industries or product markets rather than one. Hence, the significance of diversified enterprises in the economy is likely to vary, considerably, depending on the level of industry classification selected.

Table 3-6 shows the sensitivity of the various indexes of diversification to the level of industry classification. Data is presented for three different samples: all 155 enterprises; the 106 enterprises diversified at the SIC level; and the 136 enterprises diversified at the product market level. The latter two samples are presented following the convention of the census authorities, which usually present separate data for diversified enterprises. In addition many of the studies of larger enterprises refer almost exclusively to diversified enterprises. Hence these two samples are included in Table 3-6 to ensure comparability with previous studies.

Table 3-6 shows that diversification is greater at the SIC than the product market level. This is not surprising given the much finer product market classification system compared to that at the SIC level. In terms of the sensitivity of the three indexes of diversification to the level of industry classification in general, the most sensitive index is D_2, followed by D_3 and D_1, respectively. For example, in the sample of all enterprises the average value of D_2 is three times as large at the product market level than the SIC level, while for D_1 and D_3 the ratios are 0.78 and 1.96, respectively. These results suggest that measures of diversification, especially D_2, are very sensitive to the level of industry classification. This result accords with those of previous researchers using U.S. data.[38] No comparative Canadian study is available. These two results hold irrespective of the sample of enterprises.

Table 3-7 can be used to help explain the much greater sensitivity of D_2, compared with D_1 and D_3, to the level of industry classification, through an examination of the inequality in the relative importance of the N industries over which the enterprise allocates output. The table presents data on the Numbers Equivalent of D_1 (hereinafter referred to as NE_1) for this purpose. For any given value of D_1, $NE_1=1/D_1$. The NE_1 shows, for the observed D_1, the number of industries over which the enterprise must allocate its output <u>equally</u> in order to generate the observed value of D_1. For example, if $D_1=0.50$, $NE_1=2$. In other words if the enterprise allocated its output equally among

two industries (i.e. $P_1=P_2=0.50$) then $D_1=0.50$. Besides presenting data on NE_1, Table 3-7 presents, in the left hand column, the actual number of industries over which the enterprise allocates output (i.e., N). A comparison of NE_1 and N shows that the latter measure increases, but slowly, when compared with N, both at the SIC and product market level of industry classification. This implies a considerable inequality among the N industries over which an enterprise allocates output. In other words the typical diversified enterprise has a large portion of its output classified to one or two industries with a number of relatively unimportant industries. At the product market level, the number of relatively unimportant industries is larger, hence the much greater sensitivity of D_2, compared with either D_1 or D_3, to the level of industry classification.

Table 3-3 to 3-5 present the distributions of D_1, D_2 and D_3 at the SIC and product market levels of industry classification. The tables show considerable differences, both between measures of diversification and across levels of industry classification. At the SIC level, D_2 shows a highly skewed distribution with the frequency dropping for higher values of D_2. On the other hand, the distribution of D_1 and, to a lesser extent, D_3 exhibit a bimodal distribution, with modes at 1, 0.50-0.59 for D_1 and 1, 0.20-0.29 for D_3. These distributions for D_1 and D_2 are similar to those for all enterprises in the Canadian manufacturing sector and, hence, some confidence can

be placed in the representativeness of the sample of 155 enterprises.[39]

In particular, the modes for D_1 for the sample of 155 enterprises are exactly the same as that for all Canadian manufacturing enterprises. The explanation for the distributions of D_1, for all manufacturing enterprises,[40] would seem equally applicable to the sample of 155 enterprises at the SIC level used here. The reason for the mode at 0.50-0.59, is that relatively small specialist enterprises had entered one or other industry in which minimum efficient size is relatively large. As Gort (1962, p. 74) observes,

> successful entry into such industries will necessarily produce a high ratio of non-primary to primary employment.

This is confirmed by the concentration of D_3 in the range 0.20 to 0.50 and the fact that enterprises classified to D_1=0.50-0.59 had the lowest average size of enterprises in all of the size categories in Table 3-3 except D_1=1, and 0.90-0.99. Many enterprises in this former category are likely single plant enterprises with a small non-primary output.

An examination of the distribution of D_1, D_2 and D_3 at the product market level of industry classification in Tables 3-3 to 3-5 reveals a different pattern than at the SIC level. In all instances at the product market level the distributions tend to be rectangular. No data is available to see whether these distributions are typical of all Canadian manufacturing enterprises at the product market level. The

more even distribution at the product market level reflects the larger number of significant industries in which an enterprise allocates its output, and the relatively less importance of the primary industry (i.e. P_1, see Table 3-6 for details).

Not surprisingly, the distributions in Tables 3-3 to 3-5 show that the theoretical maximum and minimum levels of D_1, D_2 and D_3 detailed in Table 3-2 are rarely observed. In only one instance (D_2, at the SIC level) is a maximum level observed. In general, frequencies fall considerably in the size classes which represent the maximum degree of diversification.

The final subject of this section concerns the extent to which an enterprise allocates its output in product markets within the same SIC industry. Diversification within an SIC industry may be considered diversification into industries which have similar supply side characteristics: the source material; similar production process; the products are by-products of the production process; similar technology. For example, the eight product markets in SIC industry 104, Dairy Products, all reflect the use of a common raw material, milk. (The eight product markets included the following five, Condensed and Evaporated Milk, Dry Milk (Instant), Ice Cream and Related Frozen Desserts and Cheese.)

In order to detect the degree of intra-SIC product market diversification, a comparison is made of the indexes of diversification at the SIC and product market levels (Table 3-6). If an enterprise allocates its output among product markets in different SIC industries then the indexes

of diversification would be insensitive to the level of industry classification. However, if the enterprise allocates its output amongst product markets largely within the same SIC industry, then the recorded levels of D_1, D_2 and D_3 will register a decline in diversification. For example, if an enterprise allocated its output equally among nine product markets, eight of which are in the Dairy Industry, then D_2 will decline from 8 to 1, D_3 from 0.89 to 0.11, D_1 will increase from 0.11 to 0.80 (remember D_1 is an inverse index) between the product market and SIC.

The data in Table 3-7 show that considerable sensitivity is shown by the measures of D_1, D_2 and D_3 to the level of industry classification consistent with the view that much diversification takes place between product markets that are related on the supply side. For example, for enterprises diversified at the product market level, 33.7 per cent of their output was non-primary, but of that percentage approximately half was accounted for by diversification within SIC industries. Such diversification within industries with similar supply side characteristics has been recorded by previous studies.[41]

3.4 The Selection of an Appropriate Index of Diversification

In sections 3.1 and 3.2 of this paper considerable attention has been paid to the problems of measuring enterprise diversification, while section 3.3 detailed the the degree of output diversity for the sample of 155 enterprises. Two somewhat tentative conclusions were reached on an *a priori* basis:

TABLE 3-8

Simple Correlation Between Indexes of Diversification for Various Groups Of Enterprises in the Canadian Food Sector, 1970

Index Pair	Level of Industry Classification	
	SIC	Product Market
	All Enterprises[a]	
D_1-D_2	-0.5274*	-0.6490*
D_1-D_3	-0.3795*	-0.1775
D_2-D_3	0.5185*	-0.0742
	Enterprises Diversified at the SIC Level[b]	
D_1-D_2	-0.3962*	-0.5196*
D_1-D_3	-0.9777*	-0.2032
D_2-D_3	0.3496*	-0.1187
	Enterprises Diversified at the Product Market Level[c]	
D_1-D_2	-0.4956*	-0.6168*
D_1-D_3	-0.3382*	-0.9252*
D_2-D_3	0.4566*	0.5716*

a. The sample consisted of 155 enterprises.

b. The sample consisted of 106 enterprises.

c. The sample consisted of 136 enterprises.

*Statistically significant at .01 level

Source: See text.

due to the inequality in the relative proportion of the enterprise's output allocated over N industries, D_1 was a better index of diversification than either D_2 or D_3; the appropriate industry classification level referred to the product market. In this section, using simple and rank correlations, an attempt is made to see whether, in practice, selection of D_1 over D_2 and D_3 and the product market over the SIC, results in substantial or minor differences. Tables 3-8 and 3-9 relate to the choice of index, Table 3-10 to the choice of index and the level of industry classification. In all cases the correlations relate to the complete sample of 155 enterprises; the 106 diversified enterprises at the SIC level; the 136 enterprises diversified at the product market level.

Table 3-9 shows that the ranking of enterprise by output diversity results in essentially similar rankings whether D_1, D_2 or D_3 is the selected index. The correlations are always statistically significant at the .01 level. The correlations are highest between D_1 and D_3, reflecting the importance of P_1 in the estimation of both measures. The generally lower correlations between D_3 and D_2, as well as D_1 and D_2, reflect the relative insensitivity of D_3 and D_1 the N-1 non-primary industries over which an enterprise allocates output, which are often of little significance. These findings hold irrespective of the sample of enterprises or the level of industry classification, except that the greater sensitivity of D_1 than D_3 to the N-1 non-primary activities of

TABLE 3-9

Rank Correlation Between Indexes of Diversification for Various Groups Of Enterprises in the Canadian Food Sector, 1970

Index Pair	Level of Industry Classification	
	SIC	Product Market
	All Enterprises[a]	
D_1-D_2	-.7669	-.8091
D_1-D_3	-.9775	-.9655
D_2-D_3	.7859	.7515
	Enterprises Diversified at the SIC Level[b]	
D_1-D_2	-.3332	-.6656
D_1-D_3	-.9749	-.9304
D_2-D_3	.3250	.5439
	Enterprises Diversified at the Product Market Level[c]	
D_1-D_2	-.6729	-.7170
D_1-D_3	-.9768	-.9490
D_2-D_3	.6871	.6316

a. The sample consisted of 155 enterprises.

b. The sample consisted of 106 enterprises.

c. The sample consisted of 136 enterprises.

Note:
All correlation coefficients significant at .01 level.

Source: See text.

enterprise (i.e. D_2) is much more evident at the product market level than the SIC level. These results are consistent with those of Honeycutt and Zimmerman (1976, Table 2, p. 526) for a sample of 91 large U.S. corporations.

Rank correlations contain no information on whether differences in the relative magnitude of diversification is constant across D_1, D_2 and D_3. The simple correlations in Table 3-8 show a much more equivocal picture than the rank correlations in Table 3-9. The simple correlations are not always statistically significant, even when significant they vary considerably (e.g., D_1-D_3 at the product market level for the 136 industry sample, -0.3382, but for the SIC level -0.9252) such that no consistent pattern emerges either between levels of industry classification or within an industry classification, but for different samples of enterprises. Hence, although D_1, D_2 and D_3 may yield similar rankings of an enterprise's diversity, the magnitude of relative differences is non-constant. This should not be a surprising result in view of the observed inequality of the Pi's already noted and demonstrated. In sum, both a priori and empirically selection of an appropriate index of diversity does make a difference.

Table 3-10 shows a remarkable degree of stability in the simple and rank correlation coefficients between the level of industry classification for D_1, D_2 and D_3. Gort (1962, p. 25) considers that,

TABLE 3-10

Rank and Simple Correlations Between Indexes of Diversification for Different Levels of Industry Classification in the Canadian Food Sector, 1970

Index Pair at SIC and Product Market Level / Sample of Enterprises	D_1D_1	D_2D_2	D_3D_3
Rank Correlation			
All Enterprises[a]	0.7890	0.8721	0.7595
Enterprises Diversified at the SIC Level[b]	0.7413	0.7754	0.6907
Enterprises Diversified at the Product Market Level[c]	0.7392	0.8394	0.6977
Simple Correlation			
All Enterprises[a]	0.7794	0.8450	0.7306
Enterprises Diversified at the SIC Level[b]	0.7440	0.8081	0.6739
Enterprises Diversifed at the Product Market Level[c]	0.7479	0.8232	0.6962

a. The sample consisted of 155 enterprises.

b. The sample consisted of 106 enterprises.

c. The sample consisted of 136 enterprises.

Note:

All correlation coefficients significant at .01 level.

Source: See text.

> Greater confidence can be placed in a measure of diversification that yields roughly similar results for several levels of industry detail than in one that is highly unstable with regard to the system of classification used.

Hence, given the similarity of the coefficients reading across any row in Table 3-10, no basis would exist for selecting one index or another. In other words, although the product market level of industry classification is preferred on an *a priori* basis, empirically the difference may not be that significant. This suggests that users of conventional SIC based systems of industry classification may draw conclusions and inferences from their empirical analysis similar to these using the product market classification system. This discussion is reintroduced in Section V below.

IV THE DETERMINANTS OF DIVERSIFICATION

4.1 Introduction

This section is concerned with several aspects of the determinants of enterprise diversification. Using previous work of the author (Gorecki, 1975), which in turn is an application of some of the ideas developed in the literature on the multinational corporation,[42] the concept of a specific asset is introduced as a general explanation of diversification. Several important determinants are then identified and their empirical specification detailed.

4.2 The Concept of a Specific Asset

An enterprise may have the capacity to operate in several distinct industries because it has a "specific asset" of value in more than one industry. Such an asset may be an innovation, consumer loyalty, a certain marketing skill or managerial expertise or experience with a particular production process. A choice confronts the enterprise with such an asset: the enterprise may sell the asset or its services to another enterprise (or enterprises) for exploitation in an industry (or industries); or the enterprise itself may exploit the asset by diversifying its operations into that industry (or industries). The relative profitability of these two alternatives will depend upon many factors. A general consideration influencing the choice in favour of diversification is likely presence of 'imperfections' in the market for 'specific assets' or their services. The imperfections in question include the following:

(a) No market may exist for the sale of the asset or

its services because the exclusion principle does not apply. For example, the specific asset may be basic knowledge or the secret ingredient of a soft drink not protected by any patent.

(b) The specific asset or its services may not be transferable independently of the owner, for example, exceptional loyalty to the owner of a team of executives, or a skilled labour force.

(c) The transactions costs of transmitting the specific asset (or its services) to a buyer may be especially high because of the nature of the asset. For example, the asset may be highly complex, involving knowledge of a technology and production technique distinctly different from that currently employed by any potential buyer.

(d) Externalities in the use of the services of the specific asset by the buyer and seller may affect the costs of negotiating and concluding a satisfactory contract with a potential buyer. The use by the buyer of the seller's reputation and consumer loyalty embodied in a trademark may affect the profits of the seller, and conversely. Hence the contract would have to be carefully drawn and could prove difficult to enforce. There may, additionally, be institutional constraints which prevent the parties from giving binding undertakings to refrain from actions which affect each other's profits. The sale of the services of the specific asset may enable the buyer to enter the industry of the seller more easily, as in a know-how agreement. A contractual

term prohibiting such entry may be unenforceable or unlawful in a particular country.

There may be several different industries in which a specific asset may be valuable. For application in each of these industries the asset or its services may have to be modified or adapted. The costs involved in this process may be called transfer costs. It is possible that the transfer costs in a particular application may be different if the transfer is made by the owner or by an enterprise already established in the transferee industry; and this would affect the choice between diversification and sale. Further, the transfer costs for the owner of the asset may be different in the various industries of its possible application. Other things being equal, these costs would be relevant for the decision as to which industry (or industries) the enterprise would enter by diversification, if, as is likely, it cannot simultaneously take up all available profitable diversification opportunities.

4.3 Empirical Specification of Determinants of Diversification

The variables which determine the degree of diversification can be divided into three categories: enterprise activities which are likely to produce specific assets; environmental factors such as industry growth, concentration and profitability which are likely to facilitate the use of the specific asset; finally, variables which are likely to affect the scope of

the use of the asset such as whether the industry is regional, national or international. Variables under each of these headings are considered below together with the statistical proxy used here.

(i) Advertising

Advertising is likely to result in the production of two types of specific assets which are in some ways quite similar. First, the skill to produce, sell, market and differentiate a product. This skill will reside in the marketing division of the enterprise. Secondly, advertising may result in the creation of a strong brand image associated with a particular product and/or enterprise name.[43] Such a strong image would be protected from imitation by trademark. For both sorts of assets, considerations listed under (d) in the previous section mean that diversification is the preferred strategy to sale or licence.

The impact of advertising on the degree of enterprise diversification will depend upon the degree to which the marketing skills and brand image can be transferred to other food markets from the one in which it was originally developed. Caves (1977b, p. 116) argues that the transferability of these skills is likely to be contained within the boundaries of a single 4-digit SIC industry. The main use of the assets will be in direct foreign investment. Since diversification and foreign investment are competing for the enterprise's investment funds, a negative relationship may be expected between

advertising and diversification. Caves' (1977b, Table 5-2, p. 123) results indicated a negative relationship between enterprise diversification and advertising intensity.[44] On the other hand, Horst (1974, p. 62) in his study of domestic and foreign operations of U.S. Food Sector enterprises, suggests that advertising and diversification are likely to be positively related for the same reasons as suggested here. Horst's empirical results, however, proved inconclusive.

In this study, two levels of industry classification are used in order to determine the transferability of brand images and marketing skills: the Canadian SIC level which divides the Food Sector into fewer industries than the 4-digit level mentioned by Caves; the product market level which is a finer level of industry classification than the U.S. 4-digit division.[45] If the specific assets produced by advertising are easily transferable within the Food Sector then a positive relationship between advertising and diversity may be expected; the more limited this scope for transferability the greater the probability a positive relationship will be observed at the product market level of industry classification, while a negative relationship will be observed at the SIC level in accordance with Caves' expectations and results.[46]

The measure of advertising used here is the enterprise's unweighted advertising sales ratio for the years 1965 to 1972. The level of enterprise diversification refers to the year 1970. Hence it is assumed that the average for the years 1965 to 1972 is a good indicator of the presence of

advertising created specific assets which pertain to the degree of diversification observed in 1970. Unlike most of the independent variables which are discussed in this section, data was not available for the full sample of 155 enterprises, but only for 57 enterprises.

(ii) Research and Development

Research and development activities are likely to yield specific assets such as an innovation, basic technical knowledge or a new production technique. Diversification is often likely to be the preferred method of realising the value of the asset because of factors (a), (c) and (d) listed in the previous section. Other studies have shown research and development activities positively related to the level of diversification.[47] In this study, however, no data was collected on the level of enterprise or industry research and development activity. The omission of this determinant of diversification is not likely to be significant because of the relative unimportance of research and development activities in the Food Sector. Horst (1974, p. 56), in his thorough study of the U.S. Food Sector, comments,

> The food-processing industry never has been what one would think of as a high technology industry. Many of the basic food manufacturing processes - pasturization, canning and preserving milling, baking, and others - go back decades, centuries or even millennia. Much of the technological progress affecting food-processing originated in other sectors of the economy.... in 1969 the food and beverage industry spent only .4 per cent of its sales on research and development, which compares rather unfavorably with the 4 per cent average for all manufacturing industries.

In Canada the picture is much the same. In 1965 food and beverages spent only 0.2 per cent of its sales on research and development compared with 1.3 per cent for all manufacturing industries. Only one industry, Other Transportation Equipment, spent a lower per cent of its sales on research and development. (See Dominion Bureau of Statistics, 1967, Table 33, p. 42.)

(iii) Enterprise Size

Enterprise size is predicted to be positively related to the degree of enterprise diversification. Smaller enterprises are likely to be less diversified for several reasons. First, smaller enterprises are likely to be mainly pre-occupied with establishing themselves in a single market before attempting to diversify. Failure in this regard is likely to result in exit. Secondly, smaller enterprises are likely to have greater difficulty in raising funds either for internal or external expansion into another market because they are less well established and entry into another markect is likely to be more risky than for a larger enterprise. Under such conditions the smaller enterprise, assuming it has a specific asset, is likely either to wait until it is larger or lease the use of the asset to another enterprise. On the other hand, the larger enterprise is likely to find availability of capital for diversification easier to raise and more likely to have a specific asset of some description. Hence largeness confirms in the enterprise the ability to diversify, because of ease of raising capital,

and the greater probability that it already possesses a specific asset.

In this paper enterprise size is captured by total enterprise sales for 1970. The available evidence for Canada relating enterprise size to diversification for the 100 largest manufacturing enterprises does not show a strong relationship between size and diversity.[48] However, when account of other factors, such as industry growth and concentration as well as enterprise advertising intensity and profitability, is taken, a positive relationship may be observed between enterprise size and diversification.

(iv) Concentration, Regionalism and Growth

In considering how to allocate its resources, the enterprise has several alternatives to diversification. The most prominent of these is the addition of capacity and/or modernization of equipment in established lines of business. Table 3-6 showed that, on the average, an enterprise allocated a very large proportion of its output to a single industry, while Table 3-7 was used to demonstrate that many of the industries over which the enterprise distributes its output are relatively unimportant. Hence the characteristics of the primary industry of the enterprise are likely to be particularly significant in determining the degree of enterprise diversification. Attention is paid here to three factors: industry growth, concentration and regional vs national characteristics.

The greater the growth rate of the enterprise's primary industry, other things being equal, the easier it will be for the enterprise to expand within the boundaries of that industry. Evidence from Canadian studies of the determinants of industry profitability tends to show that growth is positively related to profitability.[49] Hence not only is expansion within the enterprise's primary industry likely to be easier when the growth rate is faster but it is also likely to be more profitable relative to expansion in other industries. As a result of these factors, a negative association is expected between diversification and growth in the primary industry of the enterprise.

The number and size distribution of the enterprises in an industry are also likely to constrain and affect the direction of diversification of an enterprise. The more concentrated the industry (i.e., oligopolistic rather than competitive), the more difficult it is likely to be for an enterprise to expand within that industry, other things being equal. Expansion to any significant degree by an enterprise in its primary industry is likely to involve a reduction in the market share of the leading enterprises which will react by price cutting and/or advertising campaigns.[50] In view of such a reaction, diversification might be the preferred growth pattern of both smaller and larger enterprises in a particular industry. Hence a positive relationship is predicted between diversification and concentration in the enterprise's primary industry, other things equal.

An implicit assumption made so far is that all enterprises operate in national markets. However, markets are likely to be regional as well as national, especially in the Food Sector. For an enterprise operating in a regional industry an alternative to diversification is geographic expansion within an existing product line. This is likely to be attractive since it involves relatively lower costs to diversification[51] and hence, other things equal, will provide a higher rate of return. Hence, enterprises classified to a regional industry are likely to be less diversified than these enterprises classified to a national industry. On the other hand,Horst (1974, p. 80) argues for regional industries, which in the Food Sector are usually based upon perishable and bulky products, that,

> Success in these industries depends on decentralized strength at the local level such as comes from an aggressive sales force or well-developed distributional system. Such competitive advantages may provide substantial profits at the local level, but they are not readily and easily transferable to other regional markets. Strong ties to regional markets discourage national distribution....

Hence diversification within the region in which the enterprise operates is likely to be more attractive than geographic expansion of existing products or product lines. These conflicting predictions concerning the relationship between regionalism and diversification means that it is not possible

to specify, a priori, the direction of this relationship.

The empirical specification of concentration, growth and regional/national industries, is as follows. The concentration ratio is the familiar percentage industry size accounted for by the four largest enterprises. At the SIC level the ratio is estimated on a national basis since insufficient data existed to disaggregate in order to take into account regional markets. However, at the product market level the concentration ratio is designed to take into account regional markets.[52] The concentration ratio refers to 1970. The regional/national split is taken into account by a dummy variable which is equal to 0 for a regional industry and 1 for a national industry. The regional/national dummy variable is estimated at both the product market and SIC level of industry classification. Finally growth in industry size (i.e., sales) is the percentage change between 1970 and 1965.[53] This was available only for the SIC level.[54] Hence SIC industry growth is used as a somewhat poor proxy for the growth of product markets which are part of any given SIC.

(v) Profitability

The enterprise's ability to diversify is likely to be affected by its profitability. The more profitable the enterprise, the easier it will be to raise funds externally or allocate funds from retained earnings in order to diversify. Hence, other things equal, the more profitable the enterprise the more likely it is to diversify. However, the

sign on the profitability variable need not necessarily be positive, as predicted, because of the positive inter-relationship, noted above, between industry growth and profitability. In other words, depending upon the relative strengths of these forces, the coefficients on profitability could be positive, insignificant and, somewhat less likely, negative.

The measure of profitability, used here is the economic rate of return on sales. This is defined as $(\pi - T - r\,E)/S$ where π=net profits, T=taxes, r=long term rate on a risk free asset, E=equity, S=enterprise sales.[55] The economic rate of return was estimated for each year from 1965 to 1970, inclusive. The simple six year average was then taken and expressed in percentage terms.

In estimating the economic rate of return on sales, certain approximations had to be made to the sample of 62 enterprises for which data could be obtained. In the Food Study, the profitability data refer to separate legal entities whereas here, account of ownership linkages is taken so that an enterprise may consist of one of several legal entities. In 35 instances no problem arose because the legal entity and the enterprise were one and the same; in 11 cases profitability data for one legal entity, which accounted for in excess of 90 per cent of the enterprise's output, is taken as a proxy for the profitability of the enterprise; for 16 enterprises a weighted average of the profitability of two or more separate legal entities,

accounting for in excess of 90 per cent of the enterprise size, is taken as an indication of enterprise profitability. The 57 enterprises for which advertising data is available are entirely included within the 62 profitability enterprise sample.

(vi) Opportunity To Diversify

Given that an enterprise has developed and owns a specific asset and certain economic incentives exist for the enterprise to diversify, the question arises over the extent to which the asset can be used. The greater the scope for the use of the asset, the more diversified, other things equal, the enterprise is likely to be. Diversification in product markets within the same SIC industry is likely to be much easier than diversification into different SIC industries. As argued in section 3.3, this is likely because of similar technology, production processes, and raw materials. That section also showed that much diversification at the product market took place within an SIC industry. The number of product markets within the SIC industry in which the enterprise's primary product market falls is taken as an indication of the opportunity to diversify. At the product market level a positive relationship with diversification is expected but at the SIC level the proper inference is not quite as clear. To the extent that an enterprise has a considerable scope to diversify within an SIC industry it may, correspondingly, diversify less at the SIC level. Hence a negative relationship

TABLE 4-1

Summary of Explanatory Variables Used in Analysis of Diversification

Variable Name and Definition	Average Value and Coefficient of Variation[a]	
	Enterprise Level Variables	
Size 1970 sales X 10^{-6}	24.86 (1.78)	
Profitability $(\pi-T-R.E)/S$, π=net profit, T=taxes, r=long term interest rate on a risk free asset, E=equity, S=sales. Estimated for each of six years 1965 to 1970, simple average then taken and expressed as a percentage.	1.11 (2.87)	
Advertising/Sales Average annual advertising/sales ratio for 1965 to 1972, expressed as a percentage.	1.77 (1.84)	
	Primary Industry Variables	
	SIC	Product Market
Regional Dummy 0 for regional industry, 1 for national, at both product market and SIC level	0.45 (1.12)	0.45 (1.09)
Concentration The percentage of market size accounted for by the four largest enterprises in 1970. (National at SIC level but regional ratios taken into account at product market.)	36.60 (0.30)	58.32 (0.31)
Growth (1970 sales - 1965 sales)/1965 sales. Available only at SIC level.	29.60 (0.31)	-
Opportunity Number of product markets within an SIC industry (see Table 3-1 for details).	10.23 (0.78)	10.23 (0.78)

a. The co-efficient of variation is in brackets below the average.

Note:

All statistics refer to the sample of 155 enterprises except profitability and advertising/sales which refer to 57 enterprises.

Source: See text.

may result at the SIC level.

In this section, attention has been devoted to seven determinants of enterprise diversification for which data is available. Those seven can be sub-divided into two categories: those which relate to the enterprise (i.e., size, profitability and advertising/sales ratio) and those which relate to the primary industry of the enterprise (regional dummy, concentration, growth and opportunity).[56] Table 4-1 contains the variable names, definitions and the average values together with the coefficient of variation. The generally lower coefficient of variation for the primary industry variables reflects the much narrower range of values than for the enterprise specific variables.

V THE EMPIRICAL RESULTS AND FINDINGS

5.1 Introduction

The relative importance of the determinants of diversification defined and justified in 4.3 above are presented and discussed in 5.2. The remaining section examines the sensitivity of the results presented in part 5.2 to the ownership characteristics of the enterprise (i.e., foreign or domestic).

5.2 The Regression Results

Different explanatory variables are available for different samples of enterprises. In particular three groupings can be isolated: growth, regional dummy, concentration and opportunity are available for the full sample of 155 enterprises; profitability is available for 62 enterprises; advertising/sales observations relate to only 57 enterprises. These 57 enterprises are a sub-sample of the 62 enterprise profitability sample. Only two of these samples of enterprises, the 155 and 57 sample, were used here so that the number of computations for the regression analysis could be reduced to manageable proportions.

In order to evaluate fully the regression results presented in Table 5-4 for the 155 and 57 enterprise samples, a comparison between the means and standard deviations of the indices and determinants of diversification and the correlation matrix of the independent variables used in Table 5-4

TABLE 5-1

A Comparison of Means and Standard Deviations of Various Indices and Determinants of Diversification for Two Samples of Enterprises in the Canadian Food Processing Sector

Variable	Level of Industry Classification			
	SIC		Product Market	
	Mean	Standard Deviation	Mean	Standard Deviation
D_1				
55 Enterprise Sample	79.3	22.3	61.5	27.4
57 Enterprise Sample	78.7	21.3	59.6	27.6
D_2				
155 Enterprise Sample	1.4	1.4	4.2	4.6
57 Enterprise Sample	1.5	1.4	4.5	4.2
D_3				
155 Enterprise Sample	15.1	18.2	29.6	23.8
57 Enterprise Sample	15.6	18.2	30.7	23.8
Size				
155 Enterprise Sample	24.9	44.3	24.9	44.3
57 Enterprise Sample	27.0	41.1	27.0	41.1
Concentration				
155 Enterprise Sample	36.6	11.0	58.3	17.8
57 Enterprise Sample	36.9	11.8	61.9	20.2
Growth				
155 Enterprise Sample	29.6	9.3	29.6	9.3
57 Enterprise Sample	31.6	8.5	31.6	8.5
Opportunity				
155 Enterprise Sample	10.2	8.0	10.2	8.0
57 Enterprise Sample	12.0	8.9	12.0	8.9
Regional Dummy				
155 Enterprise Sample	0.45	0.50	0.46	0.50
57 Enterprise Sample	0.63	0.49	0.53	0.50

Note: For size, growth and opportunity the means and standard deviations are unaffected by the level of industry classification

Source: See text.

is presented for these two samples of enterprises in Tables 5-1 to 5-3. The closer the similarity between the two samples the greater the confidence that can be placed in generalizing from the smaller sample of 57 enterprises to the much larger sample of 155 enterprises.

Table 5-1 presents the means and standard deviations for the three indices of diversification used as dependent variables in the regression analysis presented in Table 5-4 as well as the five independent variables for which data is available for both the 155 and 57 enterprise samples. For D_1, D_2 and D_3, at both the product market and SIC level of industry classification,[57] the means and standard deviations are virtually identical between the two samples of enterprises. A similar result is recorded for the five independent variables, although the difference in sample means for opportunity and regional dummy is larger than the other variables, but the standard deviations are the same. Table 5-2 presents the correlation matrix of the independent variables for the 155 enterprise sample, while Table 5-3 refers to the 57 enterprise sample. Again there is considerable similarity between the two samples. The signs of the corresponding correlation coefficients between the two tables are always the same.[58] For both samples the correlation

TABLE 5-2

Correlation Matrix for Various Explanatory Variables Used in Table 5-4

	Size	Concentration	Regional Dummy	Opportunity	Growth
			SIC Level		
Size	1.0000	0.2003	0.1010	-0.1295	0.0504
Concentration		1.0000	0.2875	-0.5610	-0.2878
Regional Dummy			1.0000	0.3774	0.3505
Opportunity				1.0000	0.0084
Growth					1.0000
			Product Market Level		
Size	1.0000	0.0563	0.0881	-0.1295	0.0504
Concentration		1.0000	-0.0527	0.1687	-0.3752
Regional Dummy			1.0000	0.1138	0.1340
Opportunity				1.0000	0.0084
Growth					1.0000

Note:
All correlations refer to the 155 enterprise sample.

Source: See text.

TABLE 5-3

Correlation Matrix of all Explanatory Variables Used in Table 5-4

	Size	Concentration	Regional Dummy	Opportunity	Growth	Profitability	Advertising/ Sales
				SIC Level			
Size	1.0000	0.3068	0.0509	-0.2258	0.0263	-0.0918	-0.0575
Concentration		1.0000	0.2955	-0.6620	-0.1544	0.0472	-0.0285
Regional Dummy			1.0000	0.2621	0.3092	0.2322	0.0079
Opportunity				1.0000	-0.1521	0.1157	0.2166
Growth					1.0000	-0.0988	-0.2138
Profitability						1.0000	0.1659
Advertising/ Sales							1.0000
				Product Market Level			
Size	1.0000	0.1172	0.1516	-0.2258	0.0263	-0.0918	-0.0575
Concentration		1.0000	-0.0977	0.3195	-0.3201	0.2226	0.2899
Regional Dummy			1.0000	0.0362	0.2345	-0.0824	0.2067
Opportunity				1.0000	-0.1521	0.1157	0.2166
Growth					1.0000	-0.0988	-0.2138
Profitability						1.0000	0.1659
Advertising/ Sales							1.0000

Note:
All correlations refer to the 57 enterprise sample.

Source: See text.

coefficients at the SIC level are usually higher than at the product market level. Finally, the corresponding correlation coefficients between the two samples of enterprises are of a similar order of magnitude. These comparisons confirm the inference drawn from comparing the means and standard deviations in Table 5-1 - that considerable confidence can be placed in generalizing results from the small to the large sample of enterprises.

Prior to discussing the regression results a brief comment on the correlation matrices in Tables 5-2 and 5-3 is presented. One of the most noticeable features of these two tables is the high negative correlation between opportunity and concentration at the SIC level but a positive correlation coefficient at the product market level. This reflects the fact that as the SIC industry is divided into a larger number of product markets the likelihood that the leading four enterprises at the SIC level hold equivalent positions in the constituent product market declines. Hence, other things equal, the greater the number of product markets within an SIC industry, the lower the concentration ratio at the SIC level. On the other hand as an SIC industry is divided into a larger number of product markets, then, other things equal, product market size will fall. Given the commonly observed inverse relationship between market size and concentration,[59] the positive relationship between concentration and opportunity at the product market is to be expected. The negative correlation between concentration and

market growth also agrees with a priori expectations. Finally the correlation coefficients among the independent variables are low (i.e., less than 0.30).

In the analysis and description in Section III above the extent of enterprise diversity was detailed for all enterprises, enterprises diversified at the SIC level, and enterprises diversified at the product market level. In the regression analysis presented here attention is devoted to all enterprises in either the 155 or 57 sample, irrespective of the degree of diversification. The determinants of diversification discussed in the previous section apply to all enterprises, not just diversified or specialist.

The regression results are presented in Table 5-4. The regression equations included in the table were selected as follows. Regression equations #1, 2, 4, 5, 6 and 8 refer to the 155 enterprise sample and include all five explanatory variables for which the 155 enterprise sample had complete coverage. Regression equations were estimated for the 57 enterprise sample with all seven independent variables for which complete coverage was available. However, only with D_2 as the dependent variable, at either the SIC or product market level, was the R^2 of the equation statistically significantly different from zero.[60] Hence only these two equations are presented in Table 5-4, as numbers 3 and 7.

For the full sample of 155 industries, the five explanatory variables at the SIC level explained between 17.6 per cent and 41.0 per cent of the variance in the indices of

TABLE 5-4

Regression of Indices of Diversification on Various Explanatory Variables For Enterprises in the Canadian Food Processing Sector: 1970

Equation Number	Index of Diversification	Explanatory Variables								R^2	F-Ratio	Sample Size
		Enterprise Related Variables				Primary Industry Variables						
		Intercept	Size	Profitability	Advertising/ Sales	Regional Dummy[a]	Concentration	Growth	Opportunity			
		Regression Coefficients and t-values[b]										
		SIC Level										
1.	D_1	66.354	-0.195 (-5.07)**	-	-	-9.789 (-1.13)	0.222 (.51)	0.430 (1.23)	0.125 (.22)	0.1762	6.37**	155
2.	D_2	2.414	.018 (9.22)**	-	-	.806 (1.79)	-.020 (-.89)	-.022 (-1.23)	-.046 (-1.57)	0.4099	20.70**	155
3.	D_2	.971	.018 (4.63)**	-.072 (-1.44)	.002 (.04)	-.378 (-.43)	-.008 (.18)	.01 (.32)	-.022 (-.41)	0.4450	5.61**	57
4.	D_3	17.252	.141 (4.42)**	-	-	5.730 (.79)	-.051 (-.14)	-.243 (-.83)	.087 (.19)	0.1467	5.12**	155
		Product Market Level										
5.	D_1	31.774	-.257 (-5.64)**	-	-	-2.410 (-.60)	.281 (2.28)*	.833 (3.58)**	.374 (-1.46)	0.2233	8.57**	155
6.	D_2	4.390	.079 (13.96)**	-	-	-.812 (-1.63)	-.012 (-.79)	-.046 (-1.60)	.029 (.92)	.5708	39.63**	155
7.	D_2	7.983	.054 (4.35)**	-.235 (-1.52)	.097 (.59)	-1.255 (-1.21)	-.021 (-.77)	-.076 (-1.24)	-.041 (-.70)	.3704	4.12**	57
8.	D_3	57.026	.204 (5.10)**	-	-	1.708 (.48)	-.251 (-2.32)*	-.732 (-3.57)**	.292 (1.29)	.1991	7.41**	155

a. National - 1, Regional - 0.

b. t-values in parenthesis; R^2 tested by F-test; all t-tests one tailed except profitability and regional dummy which are two tailed.

**Significant at .01 level.

*Significant at .05 level.

Source: See text.

diversification used as the dependent variable. At the product market level, the corresponding percentages are 19.9 and 57.1 respectively. The addition of profitability and the advertising/sales ratio added little to the explanatory power of the five independent variables, used for the full sample of 155 enterprises, at either the SIC or product market.[61] Hence the level of industry classification at which diversification is measured is important. The closer to the theoretical optimum level (i.e., product market rather than SIC) the greater the explained variance.

For both the product market and SIC levels of industry classification, however, the explanatory variables account for a greater percentage of the variance of D_2 than either D_1 or D_3.[62] In the latter two cases the explained variance is much the same order of magnitude. These results are broadly consistent with those of Honeycutt and Zimmerman (1976, Table 5, p. 529) for a sample of large U.S. corporations. The close similarity in explained variance of D_1 and D_3 is also consistent with Caves' results for Canada. (See Caves, 1977b, Table 5-2, p. 123 where DH = D_1 and VDE4 = D_3). However, the results recorded here and those of Honeycutt and Zimmerman differ from those of Caves (1977b, p. 125) in one important respect, since D_2 "rather resembles" D_3 in Caves' findings. As a result Caves' (1977b, p. 125) concludes,

> No major conclusion is affected by ones choice of a diversity index, although marginal shifts do occur in the levels of significance.

This conclusion is inconsistent with the findings presented here with respect to the overall explanatory power of the regression equations and the significance of individual explanatory variables, which is detailed below.

In terms of the individual explanatory variables the most consistently significant is enterprise size, which always has the predicted positive association with diversification (remember D_1 is an inverse index) whether at the SIC or product market level of industry classification.[63] The proportion of the total explained variance of equations 1 to 8 accounted for by enterprise size is always high: 75 per cent or greater for equations 1 to 4 at the SIC level and 60 per cent or more for equations 5 to 8 at the product market level.[64] The coefficient on enterprise size displayed a considerable degree of stability at both the SIC and product market level, irrespective of the index of diversification. For example, a comparison of the coefficient on enterprise size, when this was the only independent variable in the regression equation, with the corresponding coefficient in equations 1 to 8 in Table 5-4 yielded ratios which fell in the range 0.90-1.11. The relative size of the regression coefficients between the two levels of industry classification agrees with the finding in Section 3.3 above that enterprises diversify to a large extent within one SIC industry. Hence a unit increase in enterprise size will result in an increase of 0.20 in non-primary output at the product market level but only

0.14 at the SIC level. Previous studies have also found enterprise size to be an important determinant of enterprise diversification.[65] No other explanatory variable except size is statistically significant at the SIC level of industry classification.[66]

At the product market level, although enterprise size is still the most important determinant of diversification, growth and concentration are also of significance. As predicted, growth has a negative relationship with diversification, although this holds only for D_1 and D_3 and not D_2. Growth, it will be recalled, refers to the growth of the enterprise's primary SIC industry, not the product market. Many enterprises may be diversified into several product markets and the growth of one particular product market means resources are re-allocated toward it, with the resulting negative relationship between growth and D_1 and D_3, but no relationship between D_2 and growth. The findings of Caves (1977b, Table 5-2, p. 123) that enterprises diversify from slow to fast growing industries, with D_1 and D_3 as the dependent variables, is consistent with the results reported here.[67]

A positive relationship was predicted between concentration and diversification in Section IV. However, Table 5-4 shows a negative relationship, contrary to expectation, though only when either D_1 or D_3 is the dependent variable. No relationship is observed with D_2.[68] This result does not accord with either a priori expectations or the results of previous studies.[69] In

order to explore the relationship between concentration and diversification a new variable is introduced to replace growth and concentration. Given the commonly observed relationship between concentration and profitability it may be that only enterprises whose primary industry is highly concentrated, have the financial ability to diversify. For such enterprises if the growth rate of the industry is slow diversification will be the preferred direction of growth and conversely for fast growing industries. The new variable is defined as 0 if the concentration ratio of the enterprise's primary product market is less than 50 per cent and the enterprise's growth rate wnere the enterprise's primary product market is greater than 50 per cent. Equations 5, 6 and 8 in Table 5-4 were re-estimated with the new variable entered instead of growth and concentration. A negative relationship is predicted. However, in all instances the regression coefficient on the new variable is not statistically significantly different from zero, except for D_2, where the coefficient is statistically significant at the 5 per cent level. However, the sign of the coefficient is not, as predicted, negative, but positive. Caves (1977b, Table 5-1, p. 118) recorded a similar result at the industry level of analysis. Maybe with better data on growth at the product market the result may be clarified. At this stage no other tests were undertaken to resolve this problem.[70]

The main findings of this section can be summarized as follows. First, the determinants of diversification are

sensitive to the level of industry classification. The more appropriate the level of industry classification (i.e., product market rather than SIC), the greater the explained variance of the diversification index. Hence, although in section 3.4 it was suggested that, empirically at least, there was little to choose between measuring diversification at the SIC and product market level, this result is not repeated in studying the determinants of diversification. Secondly, the explanatory power of the independent variables, at either the SIC or product market level, is sensitive to the index of diversification selected as the dependent variable. Thirdly, the most consistently significant explanatory variable was enterprise size, at both the SIC and product market level. However, only at the product market level on D_1 and D_3 did concentration and growth become statistically significantly different from zero.

5.3 Foreign vs Domestic Enterprise Diversification

One of the most marked features of the Canadian manufacturing sector is the high incidence of foreign (usually U.S.) ownership. The Food Sector, as Table 5-5 shows, is no exception to the rule. However, the importance of foreign owned enterprises does vary considerably across the eight SIC industries composing the Food Sector, from a high of 73.9 per cent of the sales in Miscellaneous Food Products to a low of 11.3 per cent in Meat and

TABLE 5-5

The Percentage of Industry Shipments (Sales) Accounted for by Foreign and Domestic Enterprises in the Canadian Food Processing Sector: 1970

Standard Industrial Classification Industry Number and Title	Percentage of Industry Shipments Accounted for By	
	Foreign	Domestic
101 Meat and Poultry Products	11.3	88.7
102 Fish Products	33.1	66.9
103 Fruit and Vegetable Processing	59.4	40.6
104 Dairy Products	29.9	70.1
105 Flour and Breakfast Cereal Products	48.2	51.8
106 Feed	19.4	80.6
107 Bakery Products	32.4	67.6
108 Miscellenous Food Products[a]	73.7	26.3

a. No data available for cane and beet sugar processors and vegetable oil mills.

Source: Statistics Canada (1976, Table 3, pp. 46-69).

Poultry Products. Over time, foreign ownership has increased. For example, in the period 1967 to 1974, the percentage of assets in the Food Sector owned by foreign controlled corporations increased from 35.7 to 38.8.[71] Much attention has been devoted to explaining the factors which determine the incidence of foreign investment in Canada. However, here interest centres on whether the determinants of diversification are different for foreign as compared with domestic Canadian enterprises.

A priori, it is difficult to specify whether the set of explanatory variables presented in Section IV are likely to have the same effect on domestic and foreign enterprises. For example, the foreign based enterprise may have a less diversified output[72] than a domestic corporation because it is able to import items from its foreign parent, for which only a limited Canadian market exists. Such an opportunity may not be available to the Canadian enterprise. On the other hand, in some instances, easy access by the foreign owned enterprise to the parent's advertising and production experience may result in diversification that would be prohibitively expensive for a Canadian enterprise. Hence, in the absence of any empirical evidence, the null hypothesis that foreign and domestic enterprises react in the same manner to the determinants of diversification is tested here.

However, there is limited evidence available on the motives for foreign direct investment abroad and their diversification patterns in Horst's (1974) study of U.S. Food Sector multinational corporations. Horst's work suggests that U.S. multinational direct investment abroad is related to the skill developed in marketing

food in the U.S. Further such a skill is,

> ...not limited in its application to specific products. While some American food products were suitable for foreign distribution, many were not. But the American producer without a suitable product did not have to give up, for it could always acquire a foreign firm with an already established brand. (Horst, 1974, p. 103).

The empirical evidence presented by Horst (1974, p. 106) was consistent with his hypothesis that the greater the enterprise's advertising intensity, the higher the degree of foreign direct investment.[73] Concerning the diversification pattern of U.S. Food Sector corporations abroad, Horst (1974, pp. 110-111) observed that,

> ...the domestic operations of U.S. food processors were becoming increasingly diversified as firms redirected their own internal resources or, more likely, acquired smaller firms in other industries. Diversification at home led directly to diversification abroad in two ways. Frequently the acquired firm had already invested abroad, and the ownership of these foreign subsiduaries was acquired along with that of the parent. Secondly, domestic diversification often encouraged foreign investing in the new industries the firm was entering.

A priori there is no reason to assume that the factors outlined above as responsible for U.S. enterprise's direct investment abroad and the diversification patterns of such investment is related to the determinants of diversification as discussed in Section IV. This is supported by Caves (1975, p. 60) conclusion for U.S. subsiduaries'[74] direct investment in Canada that,

> It may be that subsiduaries' diversity depends

> heavily on the activities already carried on by their parents, and that their entrepreneurial independence is not sufficient to produce measurable competitive reactions of this kind /i.e. the determinants discussed in section IV/.

Hence, on the basis of the work of both Horst and Caves it is unlikely that any of the determinants of diversification discussed in section IV will be related to the diversification of foreign enterprises in Canada.[75] The evidence should therefore be inconsistent with the null hypothesis that no differences exist between the determinants of foreign and domestic enterprises.

Caves (1975, Table 5-1, p. 38) found, at least at the establishment level, that D_2 is greater for the domestic owned establishment than for the foreign owned establishment. (Where establishment size is held constant.) Since diversity of output at the plant level is often held to be an important determinant of sub-optimum production runs, such a result has implications for the competitiveness of domestic vs foreign enterprises. Table 5-6 is presented to assist in determining whether a similar result holds at the enterprise level.[76] The results are somewhat equivocal. For enterprises classified to the smaller size categories (i.e., $0.00-$9.99) there is a strong tendency for domestically owned enterprises to be more diversified than foreign owned enterprises. The converse applies to enterprises classified to the larger size groups (i.e., $10.00-$99.99). Finally, for the enterprises in the largest size group ($100.00 and over) domestically owned enterprise is more diversified than the foreign owned.

TABLE 5-6

Size[a] and Diversity for Domestic and Foreign Enterprises[b] In the Canadian Food Processing Sector: 1970

Size Group (in $000,000's)	Frequency		Foreign						Domestic					
			SIC			Product Market			SIC			Product Market		
	Foreign	Domestic	D_1	D_2	D_3	D_1	D_2	D_3	D_1	D_2	D_3	D_1	D_2	D_3
0.00-0.99	5	8	0.996	0.280	0.002	0.946	0.008	0.193	0.982	0.375	0.009	0.819	1.000	0.133
1.00-2.49	6	13	0.996	0.167	0.002	0.886	0.005	0.076	0.876	0.692	0.088	0.638	1.923	0.276
2.50-4.99	5	17	0.786	1.000	0.148	0.607	4.600	0.253	0.794	0.941	0.149	0.632	3.353	0.267
5.00-7.49	7	13	0.874	0.714	0.080	0.790	1.571	0.148	0.855	0.462	0.120	0.739	1.769	0.202
7.50-9.99		12							0.681	1.417	0.251	0.577	2.750	0.329
10.00-24.99	7	19	0.715	1.857	0.196	0.435	5.000	0.441	0.847	1.421	0.108	0.682	3.737	0.246
25.00-49.99	10	12	0.638	2.200	0.279	0.358	8.300	0.501	0.791	1.833	0.147	0.579	4.583	0.309
50.00-99.99	11	3	0.674	2.273	0.235	0.410	8.091	0.446	0.761	3.000	0.150	0.517	7.667	0.322
100.00 and over	3	4	0.485	3.333	0.352	0.281	12.667	0.559	0.434	5.000	0.447	0.289	18.000	0.584

a. Size measured by sales.

b. Refers to 155 enterprise sample

Source: See text.

The similarity of the result for enterprises and establishments for the smaller sized enterprises reflects the fact that most small enterprises tend to be single-plant. The greater diversification of foreign owned enterprises in the larger size groups may reflect the foreign enterprise purchasing certain services from its parent enterprise,[77] thus the size of the foreign enterprise may be "understated" compared to equivalent sized domestically owned enterprise.

The full sample of 155 enterprises consists of 101 domestically owned enterprises and 54 which are foreign owned. Table 5-7 presents the means and standard deviations for the three indices of diversification used as dependent variables in the regression analysis presented below as well as the five independent variables for which data is available for both the 101 and 54 enterprise samples.[78] The foreign owned enterprises are more diversified than the domestically owned enterprises, on the average, at both the product market and SIC levels of industry classification. This is not surprising given the higher average size of foreign owned enterprises and the positive association between enterprise size and diversification exhibited in Table 5-6. Little difference was observed between the growth rates of the primary industry of foreign and domestic enterprises. However, the primary product market concentration ratio was much higher for foreign than domestic enterprises (i.e. 64.6 to 55.0). The tendency of the primary industry of foreign enterprises to be national rather than the more localized nature of the domestically

TABLE 5-7

A Comparison of Means and Standard Deviations of Various Indices and Determinants of Diversification for Four Samples of Enterprises in the Canadian Food Processing Sector

Variable	Level of Industry Classification			
	SIC		Product Market	
	Mean	Standard Deviation	Mean	Standard Deviation
D_1				
Foreign				
54 Enterprise Sample	76.4	23.3	56.6	29.8
20 Enterprise Sample	76.4	21.6	55.9	30.2
Domestic				
101 Enterprise Sample	80.8	21.7	64.1	25.8
37 Enterprise Sample	79.9	21.3	61.6	26.3
D_2				
Foreign				
54 Enterprise Sample	1.5	1.4	5.3	4.5
20 Enterprise Sample	1.7	1.5	5.6	4.8
Domestic				
101 Enterprise Sample	1.3	1.4	3.6	4.5
37 Enterprise Sample	1.4	1.4	3.9	3.7
D_3				
Foreign				
54 Enterprise Sample	16.8	18.6	34.1	25.6
20 Enterprise Sample	16.9	17.8	32.8	24.9
Domestic				
101 Enterprise Sample	14.2	18.0	27.2	22.5
37 Enterprise Sample	15.0	18.6	29.5	23.4
SIZE				
Foreign				
54 Enterprise Sample	33.0	42.3	33.0	42.3
20 Enterprise Sample	35.4	48.8	35.4	48.8
Domestic				
101 Enterprise Sample	20.6	45.0	20.6	45.0
37 Enterprise Sample	22.4	36.2	22.4	36.2
CONCENTRATION				
Foreign				
54 Enterprise Sample	35.1	11.2	64.6	17.9
20 Enterprise Sample	33.4	10.9	72.3	18.6
Domestic				
101 Enterprise Sample	37.4	10.9	55.0	16.9
37 Enterprise Sample	38.8	12.0	56.4	19.0
GROWTH				
Foreign				
54 Enterprise Sample	29.0	8.6	29.0	8.6
20 Enterprise Sample	30.6	7.3	30.6	7.3
Domestic				
101 Enterprise Sample	29.9	9.7	29.9	9.7
37 Enterprise Sample	32.2	9.1	32.2	9.1
OPPORTUNITY				
Foreign				
54 Enterprise Sample	12.5	8.5	12.5	8.5
20 Enterprise Sample	15.3	8.7	15.3	8.7
Domestic				
101 Enterprise Sample	9.0	7.4	9.0	7.4
37 Enterprise Sample	10.2	8.5	10.2	8.5
REGIONAL DUMMY				
Foreign				
54 Enterprise Sample	0.46	0.50	0.52	0.50
20 Enterprise Sample	0.65	0.48	0.60	0.50
Domestic				
101 Enterprise Sample	0.44	0.50	0.43	0.50
37 Enterprise Sample	0.60	0.50	0.49	0.51
PROFITABILITY				
Foreign				
20 Enterprise Sample	1.5	3.1	1.5	3.1
Domestic				
37 Enterprise Sample	0.92	3.28	0.92	3.28
ADVERTISING/SALES				
Foreign				
20 Enterprise Sample	4.1	4.6	4.1	4.6
Domestic				
37 Enterprise Sample	0.50	0.76	0.50	0.76

Note: For size, growth, opportunity, profitability and advertising/sales the means and standard deviations are unaffected by the level of industry classification.

Source: See text.

owned enterprises' primary industry, reflects Horst's (1974, p. 106) finding that U.S. Food Sector enterprises which invested abroad tended to come from industries with "low levels of regional segmentation".[79] Finally, the primary SIC industry of the foreign enterprise tends to be more finely divided into product markets than the primary SIC industry of the domestically owned enterprise. These differences will be discussed further below.

Profitability and advertising/sales data is available for only 37 of the 101 domestically owned enterprises and 20 of the 54 foreign owned enterprises. In order to be able to assess the confidence of generalizing the regression results for the profitability and advertising/sales variables from the smaller to larger samples of both foreign and domestic enterprises, Table 5-7 presents the means and standard deviations for the five independent or explanatory variables plus the three dependent variables (i.e., D_1, D_2 and D_3) for all four samples of enterprises. For both foreign and domestic enterprises there is a close uniformity between the means and standard deviations of the larger and smaller enterprises for all the aforementioned variables with the exception of regional dummy and concentration at the product market level for the two samples of foreign owned enterprises. Hence, on the whole, considerable confidence can be placed in generalizing regression results obtained for advertising/sales and profitability from the smaller to the larger samples.[80]

TABLE 5-8

Correlation Matrix for Various Samples of Explanatory Variables Used in Table 5-10

	Size	Concentration	Regional Dummy	Opportunity	Growth	Profitability	Advertising/ Sales
For the 101 Domestic Enterprise Sample							
SIC Level							
Size	1.0000	0.2139	0.1271	0.1170	0.0185	n.a.	n.a.
Concentration		1.0000	0.3795	-0.5569	-0.1935	n.a.	n.a.
Regional Dummy			1.0000	0.2818	0.4130	n.a.	n.a.
Opportunity				1.0000	-0.0381	n.a.	n.a.
Growth					1.0000	n.a.	n.a.
Product Market Level							
Size	1.0000	0.0981	0.0551	-0.1170	0.0185	n.a.	n.a.
Concentration		1.0000	-0.2072	-0.0203	-0.4136	n.a.	n.a.
Regional Dummy			1.0000	0.1337	0.2536	n.a.	n.a.
Opportunity				1.0000	-0.0381	n.a.	n.a.
Growth					1.0000	n.a.	n.a.
For the 37 Domestic Enterprise Sample							
SIC Level							
Size	1.0000	0.3508	0.1438	-0.1744	-0.0970	-0.0562	-0.0652
Concentration		1.0000	0.3817	-0.6729	-0.0749	-0.0182	-0.0091
Regional Dummy			1.0000	0.1512	0.3874	0.1702	-0.3615
Opportunity				1.0000	-0.1831	0.0420	-0.0198
Growth					1.0000	0.0079	-0.3970
Profitability						1.0000	-0.0045
Advertising/ Sales							1.0000
Product Market Level							
Size	1.0000	0.1950	0.1608	-0.1744	-0.0970	-0.0572	-0.0652
Concentration		1.0000	-0.2073	0.1871	-0.3231	0.1976	0.1517
Regional Dummy			1.0000	-0.0476	0.3208	-0.2495	-0.3138
Opportunity				1.0000	-0.1831	0.0420	-0.0198
Growth					1.0000	0.0079	-0.3970
Profitability						1.0000	-0.0045
Advertising/ Sales							1.0000

n.a. = not available.

Source: See text.

A second indicator of the confidence that can be placed in generalizing the regression results from the smaller to the larger samples of either the foreign or domestic enterprises, is by a comparison of the appropriate correlation coefficients of the independent variables used in the estimated regression equations. The relevant coefficients for domestic enterprises are presented in Table 5-8, for foreign in Table 5-9. A comparison of the corresponding correlation coefficients between any two of the independent variables for the 101 and 37 domestic enterprise sample reveals a very close similarity. The same result is recorded for the 54 and 20 foreign enterprise samples. These findings confirm the above inference made after comparing means and standard deviations.

The comparison of means and standard deviations for various variables between foreign and domestic enterprises conducted above (Table 5-7), revealed differences, for at least some variables, between the two samples of enterprises. The comparison of foreign and domestic enterprises can be taken one stage further by an examination of the correlation matrices presented in Tables 5-8 and 5-9. These tables show there are differences in the sign and the absolute magnitude of the coefficients with the higher coefficients recorded for the foreign sample. For example, the correlation coefficient between growth and size at the SIC level for the smaller sample of foreign enterprises is 0.2879, but for the corresponding sample of domestic enterprises, -0.0970.[81] This suggests

TABLE 5-9

Correlation Matrix for Various Samples of Explanatory Variables Used in Table 5-11

	Size	Concentration	Regional Dummy	Opportunity	Growth	Profitability	Advertising/ Sales
			For the 54 Foreign Enterprise Sample				
				SIC Level			
Size	1.0000	0.2224	0.0417	-0.2464	0.1470	n.a.	n.a.
Concentration		1.0000	0.1318	-0.5550	-0.5066	n.a.	n.a.
Regional Dummy			1.0000	0.5436	0.2267	n.a.	n.a.
Opportunity				1.0000	0.1272	n.a.	n.a.
Growth					1.0000	n.a.	n.a.
				Product Market Level			
Size	1.0000	-0.1210	0.1208	-0.2464	0.1470	n.a.	n.a.
Concentration		1.0000	0.1477	0.3403	-0.3022	n.a.	n.a.
Regional Dummy			1.0000	0.0393	-0.1001	n.a.	n.a.
Opportunity				1.0000	0.1272	n.a.	n.a.
Growth					1.0000	n.a.	n.a.
			For the 20 Foreign Enterprise Sample				
				SIC Level			
Size	1.0000	0.3733	-0.0540	-0.4352	0.2879	-0.1847	-0.2294
Concentration		1.0000	0.1156	-0.5799	-0.4546	0.2565	0.2063
Regional Dummy			1.0000	0.5282	0.1283	0.3687	0.1769
Opportunity				1.0000	-0.0187	0.2070	0.1521
Growth					1.0000	-0.3483	-0.2474
Profitability						1.0000	0.2664
Advertising/ Sales							1.0000
				Product Market Level			
Size	1.0000	-0.1195	0.1083	-0.4352	0.2879	-0.1847	-0.2294
Concentration		1.0000	-0.0407	0.3461	-0.2830	0.2291	0.1477
Regional Dummy			1.0000	0.1080	0.0732	0.2292	0.4091
Opportunity				1.0000	0.0187	0.2070	0.1521
Growth					1.0000	-0.3483	-0.2474
Profitability						1.0000	0.2664
Advertising/ Sales							1.0000

n.a. = not available

Source: See text.

differences in the sample of domestic and foreign enterprises which may result in differences in the estimated regression equations reported below.

Prior to the presentation of the regression results, brief mention will be made here of the pattern of correlation coefficients recorded in Tables 5-8 and 5-9. Brief, because in most respects the correlations are of a similar magnitude to the corresponding coefficients recorded in Tables 5-2 and 5-3 for the full sample of 155 enterprises presented in the previous section. The discussion of these latter two tables applies equally well here and need not be repeated.[82]

The regression results for domestic and foreign enterprises are presented in Tables 5-10 and 5-11, respectively.[83] The results in these two tables contain striking contrasts between the determinants of foreign and domestic enterprises, both within and between the SIC and product market levels of industry classification. At the SIC level a much greater similarity is observed in the determinants of diversification between foreign and domestic enterprises than at the product market level. Hence, the regression results presented here, like those detailed in the previous section, are sensitive to the level of industry classification.

At the SIC level, enterprise size is the main determinant of the degree of both foreign and domestic enterprise diversification. However, the stability of the regression coefficient on enterprise size and the proportion of the total explained variance of equations 1 to 4 in Tables 5-10 and 5-11 accounted

TABLE 5-10

Regression of Indices of Diversification on Various Explanatory Variables For Domestic Enterprises in the Canadian Food Processing Sector: 1970

Equation Number	Index of Diversification	Explanatory Variables								R^2	F-Ratio	Sample Size
		Enterprise Related Variables				Primary Industry Variables						
		Intercept	Size	Profitability	Advertising/ Sales	Regional Dummy[a]	Concentration	Growth	Opportunity			
		Regression Coefficients and t-values[b]										
					SIC Level							
1.	D_1	84.822	-.176 (-3.84)**	-	-	.238 (.02)	-.085 (-.15)	.290 (.68)	-.666 (-.93)	.1822	4.23**	101
2.	D_2	2.323	.020 (8.52)**	-	-	.706 (1.24)	-.022 (-.80)	-.020 (-.93)	-.036 (-.99)	.4629	16.38**	101
3.	D_2	.677	.023 (4.16)**	-.044 (-.72)	.335 (1.18)	-.185 (-.18)	.015 (.29)	.031 (.73)	.001 (.02)	.4515	3.41*	37
4.	D_3	1.198	.136 (3.56)**	-	-	-2.615 (-.28)	.217 (.47)	-.133 (-.38)	.809 (1.35)	.1800	4.17**	101
					Product Market Level							
5.	D_1	25.144	-.196 (-3.81)**	-	-	-7.676 (-1.59)	.320 (2.14)*	1.091 (4.13)**	-.449 (-1.44)	.2634	6.79**	101
6.	D_1	16.340	-.303 (-2.75)**	-1.231 (-1.04)	-11.389 (-2.07)*	-4.017 (-.48)	.704 (3.23)**	.791 (1.64)	-.423 (-.92)	.4346	3.19*	37
7.	D_2	5.677	.082 (13.70)**	-	-	-.483 (-.86)	-.037 (-2.10)*	-.058 (-1.87)*	.024 (.67)	.6673	38.11**	101
8.	D_2	7.18	.066 (4.46)**	.032 (.20)	1.314 (1.77)*	-.336 (-.30)	-.071 (-2.41)*	-.044 (-.68)	.010 (.17)	.4842	3.89**	37
9.	D_3	62.971	.163 (3.64)**	-	-	7.911 (1.88)	-.297 (-2.27)*	-.974 (-4.23)**	.329 (3.64)**	.2 35	6.80**	101
10.	D_3	70,280	.251 (2.56)*	.856 (1.05)	10.526 (2.16)*	6.233 (.843)	-.636 (-3.29)**	-.731 (-1.71)	.378 (.93)	.4390	3.24*	37

a. National = 1, Regional = 0.

b. t-values in parenthesis; R^2 tested by F-test; all t-tests one tailed except profitability and regional dummy which are two tailed.

**Significant at .01 level.

*Significant at .05 level.

for by enterprise size is greater for domestic than foreign owned enterprises.[84] A given increase in enterprise size results in greater output diversity for the domestic than the foreign enterprise with D_2 and D_3 as the diversity index, but not D_1, where the affect of increase in size has a marginally larger effect on the foreign compared to the domestic enterprise.[85] The results are consistent with the explanation that as the foreign enterprise grows it produces in fewer industries than the domestic enterprise, but allocates its output more equally than the domestic enterprise.[86] The products which are produced in smaller quantities by the domestic enterprise may be imported by the foreign enterprise from its parent.[87]

At the product market level the determinants of diversification for foreign enterprises contrast quite sharply with those recorded at the SIC level. Enterprise size is still the most important explanatory variable but it exhibits considerably greater stability.[88] The coefficient on enterprise size is greater at the product market level than for the corresponding coefficient at the SIC level for reasons discussed in the previous section. Profitability is negatively related to the extent of foreign enterprise diversification (equation 6, Table 5-11).[89] An explanation for this result is as follows. Foreign enterprises are likely to, initially at least, invest abroad in those industries in which they earn the highest rate of return (usually horizontal direct investment). Further diversification is into more marginal activities which will lower

TABLE 5-11

Regression of Indices of Diversification on Various Explanatory Variables For Foreign Enterprises in the Canadian Food Processing Sector: 1970

Equation Number	Index of Diversification	Explanatory Variables								R^2	F-Ratio	Sample Size
		Enterprise Related Variables				Primary Industry Variables						
		Intercept	Size	Profitability	Advertising/ Sales	Regional Dummy[a]	Concentration	Growth	Opportunity			
		Regression Coefficients and t-values[b]										
		SIC Level										
1.	D_1	65.890	-.186 (-2.65)**	-	-	-25.023* (-1.90)	.269 (.39)	.104 (.17)	1.255 (1.42)	.3389	4.92**	54
2.	D_2	2.114	.014 (3.35)**	-	-	1.014 (1.30)	-.009 (-.23)	-.013 (-.34)	-.066 (-1.26)	.3489	5.15**	54
3.	D_2	2.761	.009 (1.15)	-.144 (-1.52)	-.027 (-.43)	-.454 (-.33)	.006 (.06)	-.003 (-.03)	-.061 (-.60)	.6697	3.47*	20
4.	D_3	15.705	.114 (1.98)*	-	-	17.668 (1.63)	-.067 (-.12)	.087 (.17)	-.877 (-1.20)	.2945	4.01**	54
		Product Market Level										
5.	D_1	45.888	-.354 (-3.81)**	-	-	6.964 (.93)	.118 (.50)	.355 (.74)	.070 (.14)	.2632	3.43*	54
6.	D_2	3.724	.070 (5.59)**	-	-	-1.864 (-1.85)	.025 (.78)	-.036 (-.56)	-.027 (-.40)	.4286	7.20**	54
7.	D_2	11.424	.029 (1.33)	-.739 (-2.30)*	-.126 (-.55)	-.555 (-.27)	.039 (.72)	-.158 (-1.11)	-.188 (-1.53)	.6099	2.68*	20
8.	D_3	47.553	.261 (3.18)**	-	-	-9.417 (-1.42)	-.095 (-.45)	-.327 (-.77)	-.129 (-.30)	.2207	2.72*	54

a. National = 1, Regional = 0.

b. t-values in parenthesis; R^2 tested by F-test; all t-tests one tailed except profitability and regional dummy which are two tailed.

**Significant at .01 level.

*Significant at .05 level.

Source: See text.

the observed profitability rate. No other determinant of diversification was related to enterprise diversification for foreign enterprises. These results are therefore consistent with the inference drawn above from Horst (1974), that the determinants of foreign enterprise diversification are unlikely to be related to the type of environmental factors, introduced here, which primarily reflect conditions in the host country (i.e., Canada).

The estimated regression equations in Table 5-10 for domestic enterprises at the product market level are quite different to those recorded at the SIC level. Enterprise is an important determinant of D_1 and D_3 but the important determinant of D_2.[90] Also of considerable statistical significance is advertising/sales, concentration, growth and, to a lesser extent, regional dummy and opportunity. All the signs on these coefficients are consistent with the a priori expectations of Section IV, except that on concentration. Of particular interest is the positive coefficient on advertising/sales, which suggests that the tranferability of a brand name or consumer loyality might be limited to product markets within an SIC industry rather than across different SIC industries. The results at the product market level suggest that the diversification of domestically owned enterprises is a response to the enterprise and primary industry factor discussed in Section IV above.

The main findings of this section can be divided into two. First, the conclusions and inferences drawn for the full sample of 155 enterprises at the end of the previous section

also hold for the domestic and, to a lesser extent, foreign enterprises.[91] Secondly, the differences in the determinants of diversification of foreign and domestic enterprises suggests that studies which combine foreign and domestic enterprises into a single pooled sample, especially at the product market level, may result in misleading inferences and conclusions. This is perhaps not surprising given the importance of foreign enterprises in the Canadian economy and the previous findings of Horst (1974) for U.S. Food Sector multinational enterprises.

VI CONCLUSION

In the Introduction, a number of reasons were cited for studying the diversified enterprise: their economic significance; the perennial problem of Canadian manufacturing enterprises and plants producing "too many" products; the potentially greater efficiency of the diversified enterprise in allocating resources; the influence of the large proportion of assets owned by foreign enterprises. Here attention is confined to the second and fourth reasons for this is where the evidence presented in this paper can throw the greatest light.

Broadly speaking most previous studies of the determinants of diversification for the U.K. and U.S., either for the industry or enterprise, have found results largely consistent with a priori expectations of Section IV. Factors such as growth, profitability, concentration, advertising intensity and enterprise size usually accounted for a significant proportion of the variance of diversification in those studies. For Canada, such findings are recorded for the diversification of domestically owned enterprises.[92] However, the diversification pattern of foreign owned enterprises operating in Canada is not related to the aforementioned determinants of diversification, with the exception of enterprise size and, to a much lesser extent, profitability.[93]

These differences and similarities between the findings for domestic and foreign enterprises in Canada and those for the U.S. and U.K. can be explained as follows. The significance of foreign enterprises in the Canadian manufacturing sector is unique

among Western industralized countries. For the Canadian Food Sector nearly 40 per cent of the assets are owned by foreign, mainly U.S., corporations. The determinants of diversification in countries such as the U.K. and U.S. are likely to reflect, primarily, domestic enterprise diversification. Hence the close similarity between the determinants of domestic Canadian enterprise diversity and those recorded for studies of other Western countries. The determinants of a foreign enterprise's diversification in Canada are likely to reflect factors related to foreign direct investment and home country diversity, as Horst (1974) has shown for U.S. Food Sector multinationals. However, Horst's result is likely to hold much more for U.S. enterprises operating in Canada than in other Western industrialized countries, given the similarities in culture and language, plus closer geographical proximity. U.S. enterprises operating in Western Europe are likely to have a much greater degree of independence and ability to react to local market conditions than is the case for such enterprises operating in Canada. As a result a much greater similarity is likely to be observed between the determinants of U.S. and domestically owned enterprises in the U.K. than in Canada. No empirical evidence is currently available to test this proposition.

Canadian manufacturing industries are often considered to be at a competitive disadvantage when compared with other industrialized countries because of Canada's small domestic market size, which occasions short production runs, sub-optimal

plant sizes and "excessive" diversification. The uniqueness of Canada's manufacturing industrial structure in this respect may result in patterns and determinants of diversification which differ from those of other industrialized countries. However, the evidence presented in section 3.3 on the pattern of diversification in the Canadian Food Sector was similar to that recorded in other countries, while the regression results, for domestic enterprises, revealed determinants of diversification which were consistent with those found for U.S. and U.K. studies. The "excessive diversification" may not be a factor which appears to influence the results reported here for several reasons. First, "excessive diversification" may only be a factor at a much finer level of industry classification than the product market. For example, the relevant classification system may require that plum, apple, strawberry and other jams be considered separately, and not included in product market 1036 (Jams, Jellies and Preserves). Second, the excessive diversification may result in larger coefficients in the regression analysis on the explanatory variables. Hence, a unit increase in enterprise size would result in a greater increase in diversification for an enterprise operating in the Canadian manufacturing sector than the U.S. or U.K. Unfortunately, on the basis of the data presently available, it is not possible to assess the validity of either of these suggestions.

In terms of the implications for the framing of public policy toward the diversified enterprise the results recorded

here would suggest that attention should be paid to the nationality of the enterprise.[94] In particular when policymakers are looking at the "industrial logic" of the pattern of diversification of a foreign enterprise in Canada, reference to the activity of the parent enterprise is likely to be necessary in order to fully appraise the advantages of a particular diversification change. The appropriate policy maker in this instance is the Foreign Investment Review Agency, which must approve all investments by foreign enterprises in Canada into "non-related" businesses, whether by merger or building a new plant.[95] To explore the issue of "excessive diversification", further study is required at a finer level of industry classification than that used here. On the basis of the evidence presented here it would appear that domestic enterprises behave in much the same way as their counterparts in the U.S. and U.K. No specific policy recommendations emerge on how to reduce the presence of "excessive diversification."[96]

FOOTNOTES

1. A diversified enterprise allocates its output over two or more industries which are non-competing and non-vertically related. In contrast, a specialist enterprise confines its activity to a single industry. Considerable confusion has arisen in the literature over the use of terminology for an enterprise which spreads its output over several industries. Sometimes diversification refers only to those activities which have a common marketing or technological link, while the application of the term "conglomerate" is confined to activities where the main link is managerial expertise. Here the term "diversified enterprise" is used to cover both cases, since it was not possible to distinguish the common link which is necessary before an enterprise can be assigned to one of these categories.

2. For 1972 data see Statistics Canada (1978, Statement 35, pp. 90-91) while for 1965, see McVey (1972, Table 1, p. 114). Note that due to differences in the industry classification system used in the two sources the results are not directly comparable for the two years.

3. For a discussion of these issues see Gorecki (1976a, pp. 10-17) and references cited therein.

4. See Williamson (1975, pp. 132-175).

5. Previous studies have made differing assumptions in allocating the output of the plant across the industries in which it produces. On the basis of the particular assumption made, indices of enterprise diversification are derived. Regression techniques are then applied to explain the inter-enterprise variance of diversification. Policy recommendations and conclusions are then often drawn. A problem arises because of the arbitrary nature of the assumption made about the markets over which a plant allocates its output and the lack of any attempt to examine the sensitivity of the conclusions and empirical results to alternative assumptions. In this paper, data is used on the actual distribution of output of the plant (and hence enterprise) across the industries over which output is allocated. The problem is discussed further in Gorecki (forthcoming, 1978).

6. See footnote 5 above for details.

7. St. George (forthcoming 1978, Chapter III, Section 5) defined 62 product markets or, more properly, lines of food processing activity. As 16 of these categories were sub-national in nature, a set of 59 regional or provincial geographic markets categories were substituted, resulting in a total of 105 geographic market categories for the Canadian Food Sector.

8. Consumer and Corporate Affairs (1971, Table 11-3, p. 16). The SIC level of industry classification, discussed in section 3.2 below, was used.

9. The product market level of industry classification is a finer level of industry classification discussed in section 3.2 below. For details concerning product market coverage ratios see St. George (forthcoming, 1978, Table 3-1a).

10. If any enterprise operated in only one industry in the Food Sector, it would be classified as a specialist.

11. From financial statements of the enterprises it was possible to estimate total sales, although detailed output profiles were collected directly only for their food activities.

12. It is a maximum because an enterprise could allocate its output in the following manner 25 per cent in 101, 20 per cent in 104, 15 per cent in three different non-food industries and 10 per cent in the remaining non-food industry. In this example, despite the fact that 55 per cent of the enterprise's output is in non-food industries, the industry to which the enterprise will be classified is 101. Further, the data indicates that in 1970 there were 39 enterprises with the Food Sector as their primary industry but which also produced in non-food industries

(see Statistics Canada 1975, Table 7, pp. 128-130). Primary industry is that to which an enterprise allocates more of its output than any other industry. It is to the primary industry that an enterprise is classified.

13. The employment in a plant can be divided into production and non-production (that is, executive, office and sales) employees. Interest here centres only on establishments which are engaged in production within the Food Sector. Such establishments should have a non-zero number of production workers. However, eight of the establishments in the sample had zero production employees, but a non-zero total employment. In three instances, total employment was quite low (less than five employees). It was concluded that in such instances the persons filling in the Statistics Canada or Bureau of Competition Policy questionnaires had difficulties in allocating their small number of employees between the various categories of employees. For this reason it was decided to leave these three establishments in the sample. However, in the remaining five instances the total employment was sufficiently large (16-196) that allocation difficulties did not seem to provide a reasonable answer for the zero production employees observation. Instead, either those answering the questionnaire neglected to fill in the category 'production employees' (that is, the total employment of the establishment was biased downward),

or all employees (production and non-production) were classified to the non-production category. Since it was not possible to distinguish between these two sources of inaccuracies it was decided to omit these five establishments from the sample.

14. In other words, it is treated as though it were a single plant enterprise.

15. From the financial statements it was possible to discover the total value of output of the enterprise (i.e., food and non-food).

16. These figures refer to the SIC level of index by classification. Application of the same criteria at the product market level led to the exclusion of an extra four establishments. See footnote d to Table 2-3.

17. The 54 diversified enterprises were distributed as follows (industry, number of diversified enterprises):

    101 (9); 102 (1); 103 (4); 104 (8);
    105 (5); 106 (4); 107 (6); 108 (17).

    It should be noted that now the number of diversified enterprises in industry 105 is reduced by two, so that equality in number is obtained between the sample used here and that of Statistics Canada for this industry.

18. The first part of this section is based upon Gorecki (1974).

19. N* is the number of industries into which the Food Sector is divided, since here consideration is given only to the Food Sector operations of enterprises.

20. D_3 is also quite widely used because it can be easily obtained from census publications, which publish P_1 under the heading "Specialisation Ratio. See, for example, Statistics Canada (1977, Table 4, pp. 114-135).

21. Gort (1962, p. 24) actually uses N.

22. See Gorecki (forthcoming, 1978).

23. See, for example, Berry (1975, Table 4-4, p. 65).

24. It should be noted that Gort (1962) did attempt to design a summary index. However, D_1 is to be preferred for reasons given in Gorecki (1974, p. 399).

25. See, for example, Caves (1975) and Statistics Canada (1978).

26. See Caves (1975, pp. 22-25) for another measure which incorporates all three dimensions mentioned at the beginning of this section.

27. The terms industry and product are used interchangeably here. They are defined more specifically below.

28. A similar discussion may be found in Gort (1962, pp. 8-9).

29. For details see Dominion Bureau of Statistics (1970).

30. The 4-digit level of industry classification is at a slightly finer level than the 3-digit level.

31. This discussion is based upon the extensive account in St. George (forthcoming, 1978, Chapter V, section 1.1), who, in turn, draws on Imel (1971).

32. Imel (1971, p. 70).

33. The original classification system consisted of 66 product markets. However, certain data collection problems meant that eight product markets had to be collapsed into four, reducing the number to 62.

34. The identity of the product markets may be found in St. George (forthcoming, 1978, Appendix B).

35. SIC industries 103, 104 and 108.

36. The link with vertical integration is through the production of broilers which use feed as an input and then the bird is processed to the final output.

37. A diversified enterprise is defined as having $D_1<1$, $D_2>0$, $D_3>0$, at the relevant level of industry classification conversely a specialist is defined as $D_1=1$, $D_2=0$, $D_3=0$. Tables 3-3 to 3-5 provide the relevant data.

38. See, for example, Honeycutt and Zimmerman (1976, Table 4, p. 528) or Berry (1975, Table 4.3, p. 64 and Table 4-4, p.65).

39. For D_2 see Consumer and Corporate Affairs (1971, Table 11-3, p. 16) and D_1 McVey (1972, Table 2, pp. 115-116). McVey's results are discussed further in Gorecki (1974, pp. 400-401). No distribution is available for D_3 for Canada.

40. This explanation is taken from Gorecki (1974, p. 401).

41. See footnote 38 above for references which refer to the U.S. For similar findings, using a somewhat different approach see Gorecki (1975, pp. 133-136).

42. See, for example, Caves (1971) and references cited therein.

43. For example, General Foods promotes both its name as well as separate trademarks for its various brands such as "Maxwell House Coffee". Campbell's, on the other hand, promotes its name as synonymous with the brand image of its major product-soups of various kinds.

44. My earlier research also arrived at this result. (See Gorecki, 1975, Table II, p. 140.) This result was recorded for an industry classification between the 2- and 3-digit SIC level.

45. There were eight 3-digit SIC industries, 14 4-digit SIC industries and 62 product markets in the Food Sector.

46. Given the finding in section 3.3 that enterprises typically diversify within product markets which are part of the same SIC industry, this result is clearly feasible.

47. For the U.K., see Gorecki (1975, Table II, p. 140) while for the U.S., see Gort (1962, pp. 138-139).

48. See McVey (1972, p. 113 and Table 3, p. 117). McVey measured enterprise diversity by D_1 and D_2. However, Gort (1962, p. 65) found a positive relationship between size with D_2, but not D_3, for a sample of 721 U.S. enterprises for 1954.

49. This result is recorded by Jones et al (1973) while McFetridge (1973) fails to find any relationship.

50. See, for example, the price cutting and advertising campaigns used by the Eddy Match Co. Ltd. to prevent entrants from expanding. McGregor (1950).

51. The enterprise may realise, for example, scale economies in advertising and/or distribution.

52. In those instances in which a product market is regional, the concentration ratio is the weighted sum of the regional contration ratio. The weights are based on sales.

53. More specifically, (1970 sales - 1965 sales)/1965 sales X 100.

54. The product market classification system was designed specifically for the Food Study. Data relating to 1965 could not, therefore, be gathered from conventional census sources of data.

55. For further discussion of this measure see St. George (forthcoming, 1978, section 2 of Chapter III) and Qualls (1972, pp. 148-150).

56. It was not possible to estimate the corresponding industry measures of profitability and advertising intensity.

57. Note that D_1 and D_3 were multiplied by 100 to match conveniently the dimensions of the independent variables recorded in Table 4-1. No scaling was required for D_2.

58. These comparisons refer only to the five independent variables common to both samples in Tables 5-2 and 5-3.

59. See, for example, Ornstein et al (1973).

60. The same result was observed with either D_3 or D_1 as the dependent variable and only profitability and advertising/sales as the explanatory variables.

61. Equation number 2 in Table 5-4 was re-estimated for the 57 enterprise sample. The R^2 of the equation was 0.4211. Hence the addition of profitability and advertising/sales raises the R^2 only marginally to 0.4450 (i.e. equation number 3 in Table 5-4). The corresponding R^2 at the product market was 0.3383 and 0.3704.

62. In order to compare R^2 across different estimated regression equations where the explanatory or independent variables remain the same but the dependent variable changes (i.e., D_1, D_2 or D_3), certain adjustments are required to take into account the differing variables of the dependent variables. Subsequent work will make this adjustment. Hence the comparison presented here should be regarded as tentative.

63. The proportion is computed by estimating the regression equation corresponding 1 to 8, but with enterprise size as the only independent variable. The ratio of the R^2 is then calculated.

64. In cross section studies of this nature in industrial organization, one of the problems associated with variables designed to capture enterprise size is that heteroscedasticity may occur. Spearman rank correlations were calculated between enterprise size and the residuals from equations 1, 2, 4, 5, 6 and 8 in Table 5-4. For these, with either

D_1 or D_3 as the dependent variable, at both the SIC and product market level, the Spearman rank correlations were not statistically different from zero at the .10 level, but for D_2 there was significant difference at .01. However, the correlations were low: 0.1607 for D_2 at the SIC level and 0.3201 at the product market level. The use of the Spearman rank correlation follows Johnston (1972, pp. 219-221). My understanding of this problem was considerably enhanced after discussions with A. Klymchuk.

65. At the industry level, Caves (1977b, Table 5-1, p. 118) found enterprise size to be a significant determinant of diversification, but for some reason did not enter size as an explanatory variable in his analysis of enterprise diversification. Honeycutt and Zimmerman (1976, Table 5, p. 529) found enterprise size significantly related to D_1 and D_2. However, the variable was lagged 17 years. Gort (1962, p. 65) found enterprise positively associated strongly with D_2 but "not clearly related" to D_3.

66. In view of the high correlation between opportunity and concentration in comparison with the R^2 of equations 1 and 3 these two equations were re-estimated excluding opportunity. The results did not differ materially from those presented in Table 5-4. The most important difference was that for the D_1 index the regional dummy variable was of the predicted sign and significant at .05.

67. Since enterprise size accounted for 97 per cent of the explained variance of equation number 6, but only 60 to 65

per cent for equations 5 and 8, the significance of growth and concentration for D_1 and D_3, but not D_2, is not a surprising result.

68. This discussion and the results refer to the product market level of industry classification.

69. See, for example, Gort (1962, p. 138).

70. Profitability, advertising/sales, regional dummy, and opportunity were not significant. In the case of profitability the rate of return on equity for 1965-1970 was substituted for the economic rate of return on sales with no change in significance on the profitability variable.

71. Royal Commission on Corporate Concentration (1978, Table 8.4, pp. 191-192).

72. The measure of diversification used here refers only to the foreign enterprise's activities in the Canadian Food Sector.

73. One of the predictions of Horst (1974, p. 104) was that foreign based multinationals would spend more on advertising than their domestic competitors. The available evidence here is consistent with this prediction. For the sample of 37 Canadian domestic enterprises for which data is available the mean advertising sales ratio is 0.50 with a standard deviation of 0.76. The corresponding figures for the sample of 20 foreign enterprises is 4.1 and 4.6 respectively. Horst was unable to test his hypothesis directly because of lack of data.

74. Caves (1975) sample referred to enterprises operating in all sectors of manufacturing industries, not just the Food Sector.

75. It should be noted that Horst is referring to U.S. Food Sector enterprises' direct investment in all foreign countries while Caves is referring to U.S. subsiduaries in Canada only. Here attention is focused on foreign enterprises' diversification in the Food Sector. Since approximately 68 per cent of the sales of foreign enterprises in the Food and Beverage Industries is accounted for by U.S. owned enterprises, the findings of Caves and Horst are likely to be valid for all foreign enterprises in the Food Sector. (For data on foreign ownership see Statistics Canada, 1976, Table 8, pp. 124-153.)

76. Caves presented no results comparing U.S. and Canadian enterprise diversity.

77. This is called truncation. For a discussion see Government of Canada (1972, pp. 41-43).

78. The meaning of the 20 and 37 enterprise samples is discussed below.

79. Since much direct investment is horizontal in nature the foreign enterprise will likely enter Canadian national, not regional, industries.

80. Table 5-7 shows that foreign enterprises are markedly more profitable and advertising intensive than Canadian enterprises.

81. These differences are more pronounced for the smaller samples of foreign and domestic enterprises.

82. There are some differences, however. For example, the correlation between opportunity and concentration, which is positive at the product market for Tables 5-2 and 5-3, becomes negative for the 101 domestic enterprise sample in Table 5-8. Equally, while the correlations are usually higher at the SIC level than the product level the difference is often much greater for Tables 5-8 and 5-9 than 5-2 and 5-3 (e.g., between regional dummy and opportunity for Table 5-9).

83. The same criteria were used for inclusion of an estimated regression equation in Tables 5-11 and 5-10 as Table 5-4. These criteria are presented in the previous section.

84. The proportion of the total explained variance accounted for by enterprise for equations 1 to 4 in Table 5-10 varies from 0.56 for equation 4 to 0.84 and 0.97 for equations 2 and 3 respectively. For the equations in Table 5-11 the corresponding ratios were a lows of 0.45 (equation 3) and 0.48 (equation 4) and high 0.97 (equation 2). The ratio of the coefficient on the enterprise size variable, when this was the only independent variable in the equation,

with the corresponding coefficients fell in the range 0.93 to 1.00 in Table 5-10, for Table 5-11, 0.57-1.77.

85. As mentioned in footnote 64, in cross-section studies of the type presented here one of the problems associated with variables designed to capture enterprise size is that heteroscedasticity may occur. Spearman rank correlations were calculated between enterprise size and the residuals from equations in Table 5-10 for the 101 enterprise sample and equations in Table 5-11 for the 54 enterprise sample. The rank correlations were statistically different from zero at the .05 level in all cases except for equation numbers 2 and 7 in Table 5-11 and equation number 6 in Table 5-11. In all three instances the index of diversification was D_2. However, the rank correlations were typically quite low (0.1800 to 0.2845).

86. Given the instability of the coefficient on enterprise for foreign enterprises recorded in the previous footnote this inference should be viewed with caution.

87. See Government of Canada (1972, pp. 183-211) for a discussion of foreign enterprise procurement policies.

88. The proportion of the total explained variance accounted for by enterprise size for equations 5 to 8 in Table 5-11 ranged between 0.76 to 0.94 but declined to 0.35 for equation 7. The ratio of the coefficient on the enterprise size variable, when this was the only independent variable

in the equation, with the corresponding coefficients in equations 5 to 8 of Table 5-11, fell in the range 0.90 to 1.05, except for equation 7 which recorded a ratio of 1.59. The difference for equation 7 no doubt reflects, in part, the much smaller sample and degrees of freedom.

89. For the 20 foreign enterprise sample, if only advertising/sales and profitability are the independent variables then profitability is always statistically significantly related to the index of diversification (i.e., D_1, D_2 or D_3) at the product market level. The association is negative.

90. The proportion of total explained variance accounted for enterprise size for equations 5 and 9, was 0.36 and 0.37 respectively, for equation 7, 0.96. A similar result was recorded for equations 6, 8 and 10. The coefficient on enterprise size displayed the same stability as at the SIC level.

91. There are certain obvious exceptions/additions to the inferences drawn at the end of section 5.2 which need not be detailed here.

92. Note that this discussion refers to the product market level of industry classification.

93. These findings reported here are also consistent with the results of Caves (1975, 1977a, 1977b) for the Canadian manufacturing sector.

94. This agrees with earlier research which showed that the determinants of entry into Canadian manufacturing industries were different for foreign and domestically owned enterprises. For details see Gorecki (1976b).

95. For a discussion of this issue see Abdel-Malek and Sarkar (1977), Abdel-Malek (1978) and Custeau (1978).

96. It may, of course, be that the Food Sector does not experience too short production runs and excessive diversification. However, in terms of productivity at least, Canadian Food Sector industries often fall short of that achieved in the corresponding U.S. industry (see Frank, 1977, pp. 39-72). Excessive diversification is likely to result in lower productivity.

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