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INTERNATIONAL CAPITAL FLOWS AND THE TAKE-OVER OF DOMESTIC COMPANIES BY FOREIGN FIRMS: CANADA, 1945–61

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1 INTRODUCTION

TRADITIONAL concerns about business mergers within countries have broadened during the past decade or two to encompass international mergers as well. This development has reflected the substantial growth since 1945 in the international flow of direct investment and the growing importance of the large, integrated international corporation. A wide range of questions have been raised in the fast-growing literature on these developments, including questions about the factors giving rise to increased direct investment, the importance and characteristics of foreign ownership and control, the benefits and costs of direct investment to the capital importing and exporting countries, and the non-economic implications for the host country of having a sizable portion of its leading industries owned and controlled abroad.

Much of this discussion has been foreshadowed by developments in Canada, which received very large flows of direct investment before these became important elsewhere, and where foreign ownership and control has long been enshrined as a major issue of public policy. At present, nonresidents control over a third of the assets in major sectors of the Canadian economy, including control over three-quarters of the assets in the oil and gas industry, and three-fifths of the assets in the mining and smelting and manufacturing industries. In 1966, direct investment by U.S. residents accounted for about 40 per cent of the *new* investment in plant and equipment in Canada, com-

pared with 6 per cent for Britain and the Common Market countries.[1]

Despite the attention that has recently been given to foreign take-overs in many countries, economic analysis in this area continues to be seriously hampered by a lack of reliable data susceptible to meaningful analysis. In 1969, the Government of Canada released a new and unique body of statistical information on all foreign and domestic mergers occurring in Canada from 1945 to 1961.[2] These data significantly enhance the range of information available on the subject. In the discussion in Sections 2 and 3, the relative importance and leading characteristics of foreign take-overs are examined on the basis of this information. In the remaining sections, an attempt is made to identify and assess the importance of the leading determinants of foreign take-over activity. Although the data do not extend beyond 1961, it is noteworthy that they cover the period when Canada absorbed a large share of the flows of direct investment to industrial countries and when foreign control over Canadian firms increased most rapidly – from 25 per cent of the total assets of leading sectors of the Canadian economy in 1948 to 34 per cent in 1963.[3] Since the early sixties, Canada has absorbed a much smaller share of total flows of direct investment and the rate of increase in foreign ownership and control has remained virtually unchanged.[4]

[1] Christopher Layton, *Trans-Atlantic Investments*. Boulogne-Sur-Seine, France, 1967, Table C, p. 14.

[2] Grant L. Reuber and Frank Roseman, *The Take-Over of Canadian Firms, 1945-61, An Empirical Analysis*. Economic Council of Canada, Special Study No. 10, Ottawa, 1969. The present paper summarizes some of the main findings reported in this monograph and presents the results of further analysis undertaken since this initial study was completed. Details regarding the data and definitions employed in the current paper and some of the estimates that are reported may be found in this earlier study.

In addition to the help received previously from those cited in the monograph, the authors wish to acknowledge the helpful comments and suggestions made on an earlier draft of the present paper by G. C. Eads, T. Horst, C. P. Kindleberger, and E. T. Penrose. We are also indebted to Miss P. Skene, our invaluable research assistant. Throughout this paper, the terms *mergers, acquisitions,* and *take-overs* are regarded as synonyms and are used interchangeably.

[3] These sectors include manufacturing, petroleum and natural gas, mining and smelting, railways and other utilities, and merchandising. The figures are based on the book value of capital employed in each industry. Dominion Bureau of Statistics, *The Canadian Balance of International Payments, 1963, 1964 and 1965 and International Investment Position*, Table XIV, p. 127. *Dominion Bureau of Statistics Weekly*, February 20, 1970, p. 4.

[4] From 1957 to 1960, Canada accounted for 35 per cent of gross flows of direct investment into industrial countries; the corresponding figure for 1961 to 1964 is 16

A central feature of the research strategy adopted for this analysis is the use of domestic mergers as a control group against which to assess the importance, leading characteristics, and determinants of foreign take-overs. Foreign mergers may be viewed simply as a part of the more general phenomenon of business mergers common in most countries. Accordingly, much of the theory and empirical evidence that has emerged from the study of domestic mergers may be drawn upon to illuminate foreign merger activity as well.[5] Moreover, if one wishes to understand more clearly what influence international boundaries have on the characteristics of merging firms and the factors influencing merger activity, it is helpful to compare foreign mergers with domestic mergers occurring simultaneously.

2 THE RELATIVE IMPORTANCE OF FOREIGN TAKE-OVERS

FROM 1945 to 1961, over 639 foreign mergers occurred in Canada, compared with 1,187 domestic mergers (as shown in Table 1). This 1:2 ratio for the period as a whole compares with a ratio of 1:2½ for the period prior to 1954 and roughly 1:1½ for the period after 1954. The average value of foreign take-overs (total price paid divided by number) increased over five times from 1945–49 to 1960–61, compared with a twofold increase over the same period in the average value of domestic take-overs and in the price of business investment in new plant and equipment. From 1945 to 1949 the average value of firms acquired in foreign take-overs was 29 per cent less than the average

per cent. Marcus Diamond, "Trends in the Flow of International Private Capital, 1957–65." International Monetary Fund, *Staff Papers*, March, 1967, Table 2.

[5] This approach would appear to be similar to that developed by Stephen H. Hymer, as reported by Charles P. Kindleberger in his book, *American Business Abroad*. New Haven, Yale University Press, 1969, p. 11. Hymer evidently argues that direct investment "belongs more to the theory of industrial organization than to the theory of international capital flows." For an excellent recent discussion of foreign investment, combining the approaches of international trade theory and industrial organization, see Richard E. Caves, "International Corporations: The Industrial Economics of Foreign Investment." *Economica*, Vol. XXXVIII, No. 149 (February, 1971), pp. 1–27.

TABLE 1

Number and Average Value of Firms Acquired in Foreign and Domestic Mergers and Number of Canadian Firms, 1945–1961
(*values in thousands of dollars*)

Year	Number of Foreign Acquisitions		Number of Domestic Acquisitions	Number of Domestic Firms	Average Value of Col. (1)	Average Value of Col. (3)
	Total (1)	By U.S. Firms (2)	(3)	(4)	(5)	(6)
1945	23	20	51	27,229	755	348
1946	15	9	64	30,442	528	719
1947	13	9	32	34,087	339	276
1948	14	12	39	35,960	317	1,059
1949	11	6	27	37,467	513	1,057
1950	9	6	36	40,545	1,060	1,012
1951	19	14	61	43,365	1,977	1,192
1952	17	10	59	45,777	946	603
1953	25	14	68	49,745	1,210	744
1954	43	24	61	54,434	1,949	852
1955	56	32	78	59,773	2,631	1,270
1956	54	34	81	67,480	3,004	573
1957	35	19	68	73,823	2,697	2,438
1958	60	46	80	80,770	1,650	2,099
1959	66	46	120	88,806	1,093	1,632
1960	93	52	110	97,549	3,000	1,803
1961	86	63	148	106,309	1,981	972
Total	639	416	1,183			

SOURCE: Reuber and Roseman, *op. cit.*, Tables 3-1 and 3-2.

value of firms acquired in domestic take-overs. For the last five years of our sample period, the average value of firms acquired in foreign take-overs exceeded that of firms acquired in domestic take-overs by 14 per cent. In short, during this period both the number and size of foreign take-overs increased relative to the number and size of domestic take-overs.

In the remainder of this section, attention will focus on three

additional yardsticks of comparison: the number of firms in Canada and the United States; the number of employees in Canada; and the non-resident control of Canadian industry.

NUMBER OF FIRMS

About 100,000 companies filed tax returns in Canada in 1961, compared with 1,200,000 in the United States in the same year. From this perspective, the number of foreign take-overs in Canada has been small, in no year exceeding 1/10 of 1 per cent of all companies in Canada. Moreover, it is noteworthy that although companies in the United States have outnumbered companies in Canada by a ratio of about 12:1, the ratio of foreign to domestic mergers has been 1:2. In this restricted sense, there is prima facie evidence that the international political boundary has mattered: apparently it has served to inhibit considerably the take-over of Canadian firms by firms in the United States. Otherwise, one would expect the ratio of foreign to domestic take-overs to approximate more closely the ratio of the number of firms in each country.[6]

Another basis of comparison might be the number of mergers in the United States. Unfortunately, as already noted, the data on the number of mergers in the United States are very incomplete, accounting, perhaps, for only one-third to one-half of the number of mergers that actually took place. According to data released by the Federal Trade Commission, 8,092 mergers occurred in the United States from 1945 to 1961.[7] Arbitrarily doubling this figure to allow for underreporting, one may say that during this period, take-overs in Canada by firms in the United States, numbering 416, were equal to roughly 2.6 per cent of the number of domestic mergers in the United States.

[6] If one considers only border states in the United States – in order to allow for the possible influence of distance and differences in industrial structure related to climate – the ratio of the number of United States companies to Canadian companies in 1961 was about 5:1.

[7] *Economic Concentration*, Part 2, "Mergers and Other Factors Affecting Concentration." U.S. Congress, Senate Hearings before the Sub-committee on Antitrust and Monopoly of the Committee of the Judiciary, S. Res. 40, 89th Congress, 1st Session, March 16, 17, 18, April 13, 14, 15 and 21, 1965. Washington, 1965, p. 504. Bernard A. Kemp, "Understanding Merger Activity – Assessing the Structural Effects of Mergers." *The Bulletin*, New York University, Nos. 55-56 (April, 1969), Chapter V and p. 57.

NUMBER OF EMPLOYEES

The firms acquired in foreign take-overs employed about 105,000 employees at the time of their take-over. Those acquired in domestic take-overs employed about 115,000 persons. In mid-1953—midway between 1945 and 1961—the labor force engaged in nonagricultural production in Canada was about four million. On this basis, one may say that 2.6 per cent of the nonagricultural labor force in Canada was affected by foreign take-overs at the time they took place, while about 2.9 per cent was affected by domestic take-overs.

BALANCE OF PAYMENTS AND NONRESIDENT CONTROL OF CANADIAN INDUSTRY

Two main questions arise in connection with the balance of payments and the nonresident control of Canadian industry. The first is the extent to which foreign investment for take-over purposes has been accompanied by a transfer of capital to Canada, and to what extent it has represented an increase in foreign control without a transfer of capital.[8] This is essentially concerned with changes in the supply of foreign exchange associated with foreign take-overs. Unfortunately, it is not feasible to analyze this question with the available figures. Although the data on foreign take-overs indicate the amount of cash paid when firms were acquired, they do not indicate how much of this cash originated abroad, and how much domestically.[9]

The second question concerns the extent to which the postwar increase in foreign ownership and control over Canadian firms, referred to earlier, can be attributed to firms taken over by nonresidents from 1945 to 1961. It is apparent that foreign acquisitions from 1945 to 1961, valued at the time of acquisition, account for only a relatively small part of the assets controlled by nonresidents in various sectors

[8] This point is discussed briefly by Charles P. Kindleberger, *op. cit.*, pp. 2–3 and p. 23, where he claims that it is largely true that "direct investment does not represent a capital movement."

[9] Of the total price paid for acquisitions by foreigners from 1945 to 1961, at least 60 per cent was paid in cash—in comparison to the 51 per cent paid in cash by domestic acquiring firms.

of Canadian industry in 1962.[10] For manufacturing, the estimated ratio is 12 per cent; for mining and trade, 5 per cent; for transportation, 38 per cent; and for construction, 5 per cent. Within the manufacturing sector, the largest ratios occur for leather, wood, paper, and nonmetallic minerals. Apparently, the level of assets controlled by nonresidents in 1962 mainly reflected (*a*) the acquisition and growth of firms prior to 1945; (*b*) the growth of firms—*after* they were acquired by nonresidents—during the years from 1945 to 1961; and (*c*) the establishment and growth of new enterprises undertaken by nonresidents.

3 THE LEADING CHARACTERISTICS OF MERGING FIRMS

SINCE a more detailed review is available elsewhere, only a few of the leading characteristics of merging firms will be discussed here.[11] These include the nationality of acquired and acquiring firms; the age, size, and industrial distribution of firms; the degree to which acquisitions were concentrated among acquiring firms; the profitability of acquired firms; and the market relationships among merging firms.

As for nationality, 82 per cent of the firms acquired by nonresidents from 1945 to 1961 were Canadian, 13 per cent were controlled by Americans, and 5 per cent were controlled in Britain (omitting cases where the premerger nationality of control was not reported). Of the acquiring firms, 65 per cent were American, 27 per cent were British, and 8 per cent were established in other countries. Four-fifths of these mergers consisted of a single firm buying out a single firm, and over 73 per cent of the foreign acquisitions were made through Canadian-based subsidiaries. The median age and size characteristics of firms acquired in foreign and domestic mergers may be summarized as follows:[12]

[10] For further details, see Reuber and Roseman, *op. cit.*, pp. 40–42.

[11] *Ibid.*, Chapters 4 and 5.

[12] Because the distributions are highly skewed in the direction of the larger classes, the value of the mean is consistently greater than the value of the median.

		Foreign Mergers	*Domestic Mergers*
Age (years):	All Acquired Firms	14.3	13.7
	Acquired Firms of Canadian Nationality	12.9	
Size:	Sales (million dollars)	1.1	0.7
	Assets (million dollars)	0.7	0.4
	Employees (number)	54	43

One may say that on the average, firms acquired in foreign mergers were larger than those acquired in domestic mergers. Moreover, taxation data indicate that the mean size of firms acquired in both foreign and domestic mergers was considerably greater—five to eight times greater—than the mean size of all firms in existence in Canada, whether measured in terms of assets or sales. This said, it is also worth noting that about half of the firms acquired in foreign mergers had less than 50 employees, assets under $700,000, and sales less than $1 million; three-quarters had fewer than 200 employees.

Because the coverage of the questionnaire was less complete for those industrial sectors that do not come under the jurisdiction of the Combines Act, the industrial distribution of firms acquired in foreign mergers can be compared only very roughly with the industrial distribution of firms acquired in domestic mergers and the distribution of the population of firms in Canada. The main point that emerges from such a comparison is the relatively heavy concentration of foreign mergers in the manufacturing sector relative to other sectors, to domestic mergers, and to the number of firms in existence. The second most important sector is trade, though in this sector foreign mergers are relatively less numerous than domestic mergers and fewer relative to the number of firms. These same general patterns are evident when one considers the industrial distribution of acquiring firms. Within the manufacturing sector, foreign acquisitions were widely dispersed among various industries.

The evidence indicates that merger activity was less concentrated among foreign acquiring firms than among domestic acquiring firms. In both cases, a large majority of firms acquired no more than two firms each. The nine foreign acquiring firms that made ten or more acquisitions accounted for 20 per cent of all foreign acquisitions.

The aggregate picture on the profitability of acquired firms may be summarized as follows:

	Foreign Mergers	*Domestic Mergers*
Median Profit Rate of Acquired Firms Earning a Profit (per cent) *	17.0	18.7
Percentage of Acquired Firms Incurring Losses	19.0	22.8

* Profit Rate = reported book profit as a percentage of reported net worth.

One of the striking features of the profit picture which develops when the figures are disaggregated is the extent to which acquired firms in mining were less profitable than those acquired in other industrial sectors: more than two-fifths of the firms acquired in both foreign and domestic mergers were incurring losses, and the median rate of profit for those earning a profit was about one-quarter of that earned in other sectors. It is also noteworthy, however, that in the mining sector, firms involved in foreign acquisitions were more profitable than those involved in domestic acquisitions – in the sense of having a higher median profit rate and including a lower percentage of companies suffering losses.

Finally, there is the question of the marketing relationships prevailing among merging companies. Consideration of this issue anticipates to some extent the discussion on reasons for mergers, since, presumably, questions of market expansion and market power enter into the decision to buy out another firm. From 1945 to 1961, the relative importance of mergers in the four broad categories of merger types describing the direction of expansion of the acquiring firm was as shown on the table which follows.[13]

Unfortunately, the data are very incomplete in indicating the market orientation and market position of acquiring and acquired firms entering into mergers. Nevertheless, for what they are worth, the figures suggest that firms acquired in both foreign and domestic mergers primarily served the domestic market. In the large majority of cases,

[13] These categories, together with various subcategories, are defined in Reuber and Roseman, *op. cit.*, Chapter 5.

	Foreign Mergers		*Domestic Mergers*	
		(per cent)		*(per cent)*
Broad Horizontal: Horizontal	27		47	
Geographic Market Extension	14		12	
Product Extension	11		9	
Other	6	58	6	74
Vertical: Forward	20		11	
Backward	11	31	7	18
Conglomerate:		11		8
		100		100

both the acquiring and acquired firms in foreign mergers held less than a quarter of the market for their particular outputs. If anything, the market share of firms entering domestic mergers was somewhat higher. At the same time, the evidence—imperfect as it is—indicates that both foreign and domestic acquiring companies tended to have a high rank in their respective industries prior to merging, and that they improved their market position as a consequence of merging.

Charles P. Kindleberger has argued that horizontal integration reflects internal economies of scale, resulting in increased monopoly power and, consequently, higher profits.[14] Vertical integration is said to reflect external economies mainly. These are alleged to arise from the improved coordination and planning made possible when industries are integrated, as well as from a reduction in risk and uncertainty. To a considerable degree, such external economies may reflect pecuniary gains due to the overcoming of market inefficiencies in coordinating activities at several stages of production, and to the inability of the market for technology to eliminate the rents from a technological monopoly.

If one accepts this line of argument, the foregoing evidence on types of mergers suggests that internal economies were an important factor in both foreign and domestic mergers, and that the pace of competition may have been impaired by these mergers. At the same time, it is important to note that this factor, as measured by the share of

[14] Kindleberger, *op. cit.*, pp. 19–25.

horizontal mergers, was less important for foreign than for domestic mergers. On the other hand, external economies—as indicated by the share of vertical mergers—were apparently a more important consideration in foreign mergers than in domestic ones.

4 REPORTED REASONS FOR MERGING

ECONOMISTS generally tend to be skeptical about information obtained from businessmen by questionnaires aimed at reporting the reasons for their actions; and at least the usual dash of salt is justified in considering the evidence to be presented here. Respondents were asked to indicate (*a*) "the reasons which led the reporting company or firm in this instance to choose the merger route to expansion rather than to rely on internal growth," and (*b*) "details of the economies, if any, secured by the merger which were not otherwise obtainable." For various reasons that are reviewed elsewhere, not much can be made of this evidence. Nevertheless, it is worthwhile to note a few of the main impressions that it conveys.

One impression is that, in general, more of the initiative to undertake mergers came from buyers than from sellers. Separating the reasons reported into these two categories as well as one can, it appears that demand factors and initiative from the buyer were relatively more important than supply factors and initiative from the seller in about 73 per cent of foreign take-overs, and in about 65 per cent of domestic take-overs.[15]

On the demand side, two considerations stand out for both types of merger: "it was cheaper and less risky to acquire another firm than to build a new one," and "something unique was acquired through the acquisition." These are scarcely surprising responses, but the underlying rationale given for them is of some interest. For the first state-

[15] These percentages relate only to those firms who reported reasons. For a review of this approach, see E. T. Penrose, *The Theory of the Growth of the Firm*. Oxford, Basil Blackwell, 1959, pp. 158 ff. This author also cites conflicting evidence on the relative importance of demand and supply considerations in relation to domestic United States mergers.

ment, the response from both foreign and domestic acquiring firms indicates that considerable importance was attached to the speed with which expansion could be achieved via a take-over and also to the gaining of immediate access to an assured market. As for gaining control over certain unique assets possessed by the acquired firms, the following assets were particularly noted: management, particularly emphasized in the case of foreign acquisitions; know-how and processes; licenses or permits from regulatory authorities, given greater emphasis in domestic acquisitions; access to brands or trademarks, given particular emphasis in domestic acquisitions; trade connections, given special emphasis in foreign acquisitions.

On the sellers' side, the most frequently given reason for merging is that the firm was on the market and the "owner(s) wanted to sell." Some mention is also made of the business being "available at a bargain price." Although further details are not provided in many instances, some of the more frequently identified considerations include such factors as retirement, and financial and competitive difficulties. The importance of this latter factor tends to be supported in the case of domestic mergers when one separates out profit and loss companies. For loss companies, supply considerations are mentioned more frequently than for profit companies. For foreign acquisitions, however, losses by the acquired firm are cited much less frequently as a factor leading to take-over than they are for domestic acquisitions.

Finally, there is the interesting question of the economies made possible by expansion through merger. This question is of particular interest as far as Canada is concerned because of the claim frequently heard that Canadian plants are too small, or, where they are large, that the output mix produced in them is too diversified to reap fully the potential economies of large-scale production.[16] Again, the evidence is not reliable enough to give more than an impression. Nevertheless, it suggests that mergers did not give rise to much by way of cost reductions. Negligible or no economies were reported in 56 per cent of the foreign acquisitions reporting, and in 41 per cent of domestic acquisitions. Such economies as were reported were largely con-

[16] See, for example, D. J. Daly, B. A. Keys, and E. J. Spence, *Scale and Specialization in Canadian Manufacturing*. Staff Study No. 21, prepared for the Economic Council of Canada, Ottawa, 1968. Note also the references cited there.

centrated in head-office activities, not at the plant level. The head-office economies were reported to be largely savings in administration and improvements in management. At the plant level, a few references were made to savings in production and distribution costs. The most striking result, however, is negative; no reference whatever was made to reduced costs due to increased specialization as a reason for foreign acquisitions, and in only 1 per cent of the responses on domestic acquisitions was this factor mentioned.

5 THE INTERINDUSTRY MIX OF FOREIGN TAKE-OVER ACTIVITY

IN ORDER to explain interindustry variations in the ratio of foreign to total (foreign and domestic) mergers in each industry, it is necessary to define this ratio more precisely. Acquisitions may be defined in terms of the numbers of firms acquired *in* the *i*th industry or, alternatively, *by* firms in the *i*th industry. The latter concept allows firms in one industry to acquire firms in other industries, as in vertical and conglomerate mergers. The former concept does not allow for this possibility, and there is no particular reason why there should be a relation between the number of acquired firms in an industry and the number of acquiring firms in that industry. Since the characteristics of the acquiring firms classified on an industry basis are important from the standpoint of testing some of the explanatory variables that we introduce later, N_{ib} and M_{ib} are defined in terms of the acquisitions *made by* firms in the *i*th industry. A second definition, which is more restrictive, limits N_{ih} and M_{ih} to those cases where both the acquiring and acquired firms are in the same industry, i.e., horizontal mergers. Thus, the two ratios—the interindustry variation of which is to be explained—are: $N_{ib}/(N_{ib} + M_{ib})$ and $N_{ih}/(N_{ih} + M_{ih})$, or NB_i and NH_i for short.

The approach adopted to explain interindustry variations in these ratios may be characterized as a search procedure intended to track down the probable influence of various possibilities suggested by *ad hoc* theorizing rather than an empirical test of a comprehensive prespecified theory of why such variations occur. This approach has been

dictated in large measure by the absence of any corpus of theory on this subject. Moreover, as will become apparent, the analysis has been further hampered by a small set of observations affording only limited degrees of freedom for testing hypotheses, as well as by a lack of satisfactory statistical data for many variables that one might wish to test in arguments explaining variations in the ratios in question.

In the series of experiments undertaken to explain variations in these ratios for manufacturing, the following explanatory variables were considered:

FN_i = the ratio of the number of foreign-controlled firms in industry i (F_{in}) to the total number of firms, foreign (F_{in}) and domestically controlled (F_{im}), in industry $i = F_{in}/(F_{in} + F_{im})$

R_{t_i} = the average tariff rate (duty collections ÷ value of imports) in industry i for all imports

R_{d_i} = the average tariff rate for dutiable imports

Q_i = the tariff-induced differential in marginal costs in industry i

Ly_i = the supply of internally generated funds (capital cost allowances + depletion allowances + profits − cash dividend payments) of profit and loss firms in industry i, relative to the size of assets in industry i, from 1948 to 1961

S_{in}/S_{it} = the ratio of the average size (total assets ÷ number) of foreign-controlled firms in Canada in industry i (S_{in}) to the average size of all firms (S_{it}) in Canada in industry i

ES_i = economies of scale in industry i

G_i = the average rate of growth in output in industry i from 1945 to 1961

PR_i = the average rate of profit for profit and loss companies in industry i, relative to net worth in industry i, from 1948 to 1961

T_i = foreign trade participation in industry i (imports + exports ÷ value added)

$R\&D_i$ = company-sponsored research and development expenditures in the United States in industry i, as a percentage of sales in that industry in the United States

The primary question posed in these experiments has been whether there is any evidence of a statistically significant association between variations in these variables and the interindustry mix of foreign merger activity, as reflected in the two ratios defined earlier. In order to investigate this question, a series of linear equations were fitted by ordinary least squares to a panel of cross-sectional industry data, including the foregoing variables singly, and in a variety of combinations, as explanatory factors. In interpreting the results, particular attention has been given to the value of the t-ratios and to the appropriateness of the sign of the estimated coefficient for each variable, to the stability of the estimated coefficient for each variable in successive tests, and to the value of the coefficient of multiple determination adjusted for degrees of freedom, $\bar{R}^2$. For the most part, the statistical analysis has been run on an eighteen two-digit industry classification. Two-digit industry classifications are quite heterogeneous and, as a consequence, may give rise to spurious results. In order to check out this possibility, some tests, where feasible, were also run on three- and four-digit industry classifications and on subperiods.

Before considering this evidence in detail, it may be helpful to summarize briefly the principal results. The evidence indicates a highly significant association between variations in the degree of foreign control of Canadian industry, FN_i, and NB_i or NH_i. Further, after allowance has been made for a common element applying to all industries, the estimates suggest that variations in NB_i and NH_i tend to be roughly proportional to variations in FN_i. In addition, the estimates provide evidence of a fairly significant association between variations in NB_i or NH_i and in the level of tariff protection—and, also, in the supply of internally generated cash flows. On the other hand, the little evidence does not warrant much confidence in an association between variations in NB_i or NH_i and in the indexes included in the analysis relating to the size of firms, economies of scale, growth in output during the sample period, average profit rates, trade participation, and research and development expenditures.

SIGNIFICANT ASSOCIATIONS

Consider first the degree of foreign ownership, FN_i. Suppose that there are two industries, X and Y, and that nonresidents control 25 per cent of the firms in X and 75 per cent of the firms in Y. Assume, also, that foreign- and domestically controlled firms have an equal propensity to engage in merger activity, are equally well placed to buy up other firms, are equally likely to become aware of firms likely to be for sale, have equal advantages to gain from mergers, and so forth. All other things being equal, one might expect approximately 25 per cent of the mergers in industry X and 75 per cent of the mergers in industry Y to be foreign mergers, as we have defined them. In other words, one might expect the distribution of foreign and domestic take-overs to be directly proportional to the initial distribution of foreign- and domestically controlled firms. In its simplest form, this hypothesis can be written [17]

$$NB_i = \beta FN_i, \qquad \text{where } \beta = 1. \tag{1}$$

A variant of this hypothesis might allow for a constant differential, α, between these two ratios:

$$NB_i = \alpha + \beta FN_i, \qquad \text{where } \alpha \neq 0 \text{ and } \beta = 1. \tag{2}$$

The constant term, α, allows for a constant proportion of all merger activity in all industries to be foreign merger activity even if $FN_i = 0$. This common factor across industries might reflect various influences, such as a difference between tax laws in Canada and the United States, for example. As for β, if one found its value was not significantly different from unity, one might conclude that foreign ownership has little influence on the interindustry distribution of foreign merger activity in the sense that variations in NB_i are proportional to variations in FN_i. If, however, β was significantly greater than unity, one might conclude that foreign ownership enhanced foreign take-overs; and if β was significantly less than unity, one might conclude that foreign ownership served to restrict foreign take-overs.

[17] Here, and in the equations that follow, reference is made only to NB_i but the empirical estimates were based on both NB_i and NH_i.

The estimates of equation (2), based on an eighteen two-digit industry classification, are as follows:

$$NB_i = \underset{(2.41)}{0.191} + \underset{(4.79)}{0.890}FN_i; \qquad \bar{R}^2 = .56 \tag{3}$$

$$NH_i = \underset{(3.43)}{0.206} + \underset{(7.15)}{1.004}FN_i; \qquad \bar{R}^2 = .75 \tag{4}$$

where t-ratios are shown in parentheses below the associated parameters.[18]

In both equations, the estimates of β are highly significant, lending, in addition, some support to the hypothesis that β is not significantly different from unity—though, of course, the best point estimate of β is that given in each equation. For equation (3), the probability of mistakenly rejecting the hypothesis $\beta = 1$ is about 50 chances in 100, while for equation (4), it is about 97 chances in 100. Hence, using conventional confidence limits, there is more reason for accepting the hypothesis than rejecting it. Finally, the values of $\bar{R}^2$ may be considered quite high.

A number of qualifications related to the data should be noted.[19] First, the definition of foreign control underlying FB_i and FH_i differs somewhat from that underlying FN_i. It made little difference to the results when the definition of FN_i was changed and the analysis rerun. Secondly, FN_i relates to 1962—the earliest year for which this information is available—while NB_i and NH_i reflect take-overs during the period 1945 to 1961. Acquisitions during this period presumably had some effect on the degree of foreign control at the end of the period. This difficulty is unavoidable, and one cannot check on its probable importance because of the lack of data on interindustry ownership and control patterns prior to 1962. To the extent that this effect is unevenly distributed among industries, the bias introduced may be unsystematic.

[18] When run on a four-digit-industry classification, equation (3) is as follows:

$$NB_i = \underset{(1.75)}{.129} + \underset{(4.89)}{.877}FN_i.$$

[19] For further details, see Reuber and Roseman, *op. cit.*, pp. 116–117. The source of FN_i is: *Corporations and Labour Unions Returns Act, 1962*. Ottawa, 1965. Tables 4A–22A. The data for FN_i are given in Reuber and Roseman, *op. cit.*, p. 119.

TABLE 2

Selected Estimates of Equation (5): Seventeen Two-Digit Industries
(NB_i or $NH_i = \alpha + \beta FN_i + \gamma_j X_{j_i}$)

Equation Number	Dependent Variable	$\hat{\alpha}$	$\hat{\beta}$	$\hat{\gamma}$	X_j	$\bar{R}^2$
1	NB_i	8.625	0.846	0.976	R_{t_i}	.70
		(1.00)	(4.93)	(2.23)		
2	NB_i	−5.775	0.913	1.312	R_{d_i}	.70
		(0.44)	(5.36)	(2.26)		
3 [a]	NB_i	24.81	0.742	43.39	Q_i	.64
		(0.91)	(3.78)	(1.79)		
4	NH_i	14.60	0.981	0.567	R_{t_i}	.80
		(2.08)	(7.05)	(1.60)		
5	NH_i	9.144	1.017	0.608	R_{d_i}	.79
		(0.83)	(7.11)	(1.25)		
6 [a]	NH_i	−2.583	0.898	24.41	Q_i	.78
		(0.12)	(5.93)	(1.30)		
7	NB_i	32.11	0.915	−182.1	Ly_i	.56
		(2.05)	(4.71)	(0.99)		
8	NH_i	43.90	1.053	−323.1	Ly_i	.82
		(4.47)	(2.79)	(2.79)		
9	NB_i	0.153	0.913	0.018	S_{i_n}/S_{i_t}	.54
		(0.62)	(3.80)	(0.16)		
10	NH_i	0.062	1.171	0.126	S_{i_n}/S_{i_t}	.77
		(0.36)	(7.01)	(1.67)		
11 [b]	NB_i	24.49	0.857	−4.538	ES_i	.52
		(0.15)	(3.167)	(0.032)		
12 [b]	NH_i	125.5	0.919	−93.54	ES_i	.74
		(1.10)	(4.78)	(0.92)		
13	NB_i	11.85	0.817	5.263	G_i	.60
		(0.82)	(3.59)	(0.60)		
14	NH_i	29.40	1.090	−6.476	G_i	.78
		(2.74)	(6.46)	(1.00)		
15	NB_i	31.24	0.921	−91.83	PR_i	.55
		(1.95)	(4.68)	(0.89)		
16	NH_i	41.776	1.064	−158.626	PR_i	.80
		(3.95)	(8.18)	(2.33)		
17	NB_i	19.83	0.934	−0.250	T_i	.60
		(2.36)	(4.56)	(0.74)		

TABLE 2 (*concluded*)

Equation Number	Dependent Variable	$\hat{\alpha}$	$\hat{\beta}$	$\hat{\gamma}$	X_j	$\bar{R}^2$
18	NH_i	20.05	0.973	0.0167	T_i	.77
		(3.14)	(6.25)	(0.65)		
19	NB_i	19.34	0.832	176.60	$R\&D_i$	.59
		(2.27)	(3.08)	(0.30)		
20	NH_i	20.65	0.998	19.65	$R\&D_i$	.76
		(3.19)	(4.86)	(0.043)		

[a] 16 observations; food and beverages excluded.

[b] 14 observations; machinery, electrical products, petroleum and coal products excluded.

Furthermore, given that the number of firms in Canada increased substantially from 1945 to 1961, and that throughout this period both foreign and domestic acquisitions accounted for only a small proportion of the firms in the country, it is not obvious that take-overs from 1945 to 1961 particularly constrained variations in FN_i.

Equations (3) and (4) leave some 45 to 25 per cent of the variation in NB_i and NH_i to be explained in terms of factors other than foreign control. Thus, one may expand equation (2) to include X_j, representing other factors influencing NB_i and NH_i,

$$NB_i = \alpha + \beta FN_i + \gamma_j X_{j_i}. \tag{5}$$

Selected estimates of this equation, including a number of possibilities for X_j, are presented in Table 2. It will be noted that the estimate of β remains highly significant in all of these tests, and that this coefficient is relatively stable, with a value close to unity. The estimated values of α, on the other hand, vary considerably in size and statistical significance. The two additional factors that seem to be significantly related to NB_i and NH_i, according to Table 2, are the level of Canadian tariffs and the supply of internally generated funds.

In the literature, it has long been recognized that tariffs tend to stimulate inflows of direct investment—e.g., in the discussions on

tariff factors[20]—and a number of empirical studies have tended to corroborate the influence of tariffs on direct investment.[21] The higher the level of protection afforded an industry, the greater the incentive for foreigners to increase their direct investments in that country. The relevant rate for evaluating the influence on investment is the tariff-induced differential in gross marginal costs, Q (resulting from the tariff on both output and inputs), relative to the pretariff price of sales in the importing country, rather than the nominal tariff rate on final output, R.[22]

Equations (1) through (6) of Table 2 include either R or Q as explanatory variables, defining R_t as the average rate of duty collections on all imports, and R_d as the average rate of duty collections on dutiable imports.[23] The t-ratios for estimates of γ indicate a statistically significant association between NB_i and R_{t_i} and R_{d_i}, and a close-to-significant association between NH_i and these variables. On the other hand, the estimated coefficients for Q_i[24] are highly insignificant, even though, in principle, one would expect Q_i to be more closely related

[20] Charles P. Kindleberger, *International Economics*, Homewood, Ill., Richard D. Irwin, 1968, 4th edition, pp. 110–112, provides a textbook example. Thomas Horst, in an unpublished Ph.D. dissertation entitled "A Theoretical and Empirical Analysis of American Exports and Direct Investments," University of Rochester, 1969, formally derives this conclusion using a behavioral model in which international firms choose an optimal production-sales-export strategy on the basis of profit-maximization principles. Ronald J. Wonnacott and Paul Wonnacott in *Free Trade Between the United States and Canada*, Cambridge, Mass., Harvard University Press, 1967, provide an extended discussion of the relationship between tariffs and the location of industry, and empirical evidence on this relationship for Canada.

[21] E.g., Donald T. Brash, *American Investment in Australian Industry*, Cambridge, Mass., Harvard University Press, 1966, *inter alia* (particularly Chapter III); Herbert A. Marshall, Frank A. Southard, Jr., and Kenneth W. Taylor, *Canadian-American Industry: A Study in International Investment*, New Haven, Yale University Press, 1936.

[22] This conclusion is derived formally by Horst, *op. cit.*, on the conventional assumptions made in the literature concerning effective protection.

[23] R_{t_i} and R_{d_i} were estimated from detailed data provided by the Dominion Bureau of Statistics. The data relate to 1966, which is well after the end of our sample period. Unfortunately, earlier data were not available in sufficient detail. Although some tariff changes occurred after 1961, it is assumed that these were not of sufficient importance to invalidate the use of 1966 data for our purpose here.

[24] The definitions for Q_i are those derived by Horst, *op. cit.* He also kindly provided the authors with his data. These data are necessarily subject to a number of limitations. Suspicion about their quality is increased by the disparity between Horst's estimates of nominal tariff rates by industry class and those derived by the authors from detailed Dominion Bureau of Statistics data. The simple correlation coefficient between R_{t_i}, as derived here, and the corresponding figure derived by Horst is .48.

to foreign merger activity than R. The most likely explanation is the inadequacy of the statistics for Q_i, which have necessarily been put together from a number of sources and are subject to major difficulties on several grounds.

Internal cash flow, Ly_i, is the other factor that, according to Table 1, is significantly related to NH_i,[25] Ly_i is negatively related to both NB_i and NH_i; the t-ratios for the estimates of γ are highly significant in equation (8) but insignificant in (7). The rationale for this influence is explored in greater detail in the next section. Its importance, as emphasized by Kindleberger, arises from the growth of firms and from capital-market imperfections giving large foreign firms access to cheaper and more readily available funds for expansion.[26]

When all these explanatory variables are combined to explain NB_i and NH_i one obtains

$$NB_i = \underset{(1.08)}{17.296} + \underset{(4.87)}{0.866}FN_i + \underset{(2.00)}{0.914}R_{t_i} - \underset{(1.04)}{169.320}Ly_i;\ \bar{R}^2 = .64 \quad (6)$$

$$NH_i = \underset{(3.46)}{37.327} + \underset{(8.60)}{1.032}FN_i + \underset{(1.32)}{0.406}R_{t_i} - \underset{(2.52)}{291.690}Ly_i;\ \bar{R}^2 = .83 \quad (7)$$

$$NB_i = \underset{(0.38)}{6.825} + \underset{(5.47)}{0.939}FN_i + \underset{(2.23)}{1.291}R_{d_i} - \underset{(1.04)}{169.320}Ly_i;\ \bar{R}^2 = .66 \quad (8)$$

$$NH_i = \underset{(2.67)}{32.77} + \underset{(9.04)}{1.064}FN_i + \underset{(1.43)}{0.568}R_{d_i} - \underset{(2.84)}{317.495}Ly_i;\ \bar{R}^2 = .84 \quad (9)$$

All coefficients retain the same sign as in Table 2, the coefficients for FN_i remaining highly significant and approximately unity. The coefficients for R_i are generally smaller; the coefficients for R_{t_i} and R_{d_i} are insignificant when NH_i is the dependent variable, but both are fairly significant in the equations explaining NB_i. The coefficients for Ly_i also change somewhat in size; they remain significant when NH_i is the

[25] Ly_i = (capital cost allowances + depletion allowances + profits − cash dividend payments)/(total assets) for profit and loss firms in industry i, 1948 to 1961. These figures were derived from the Department of National Revenue, *Taxation Statistics*. In three industries the data were regrouped to approximate the classification for NH_i and NB_i. These reclassifications are as follows: primary metals (FN_i) = primary iron and steel (tax data); metal fabrication = boilers and fabricated structural steel; machinery = machinery n. e. c.

[26] Kindleberger. *American Business Abroad*, pp. 17–18 and 23–25.

dependent variable and insignificant when NB_i is the dependent variable. The values of $\bar{R}^2$ may be considered quite high for cross-sectional data. A major problem with these relationships, of course, is that there are only 14 degrees of freedom, which allows only limited scope for cross-sectional variation.

As a further check on these relationships, the estimates were rerun on data that excluded acquisitions by firms that did not have operations in Canada prior to taking over a Canadian firm. This was done on the ground that foreign firms with existing Canadian operations are likely to be more comparable to acquiring domestic firms in terms of knowledge of Canadian market conditions and access to information about purchasable firms. This refinement did not materially alter the pattern of significant associations shown in Table 2.

As a second check, the relationships were rerun on two subperiods: 1950 to 1955, and 1956 to 1961. The period 1945 to 1950 was excluded on two grounds: first, this period was marked by postwar readjustment and the heavy inflow of foreign capital to develop Canadian natural resources; and, secondly, the data for Ly_i have been published only from 1948 onward. Besides dividing the remaining period into two periods of five years each, the end of 1955 represents a peak in the number of foreign take-overs. Subsequently, the number of foreign take-overs decreased rather sharply for two years, increasing, thereafter, beyond the 1955 peak.

As is evident from the Appendix, in the estimates for these two subperiods the coefficients for FN_i are all highly significant statistically, with t-ratios ranging from 5.9 to 2.8. The coefficients for Ly_i are statistically insignificant in estimates based on the first period, but they are fairly significant for estimates based on the subsequent period —with t-ratios ranging from 1.6 to 2.2. The coefficients for the tariff variable are marginally significant for both periods when the dependent variable is NB_i, with t-ratios ranging from 1.0 to 1.3; however, the coefficients for the tariff variable for both periods are insignificant when the dependent variable is NH_i.

INSIGNIFICANT ASSOCIATIONS

Among the other variables considered is the size of firm. In the next section it is argued that take-overs are possible because of differences in the constraints impinging upon buyers and sellers.[27] If one assumes that smaller firms are subject to greater constraints than larger firms, and that international firms, F_i, are generally larger than domestic firms, S_{it}, one might expect NB_i and NH_i to be systematically related to F_i/S_{it}. In statistical terms, however, it is difficult to define F_i in a meaningful way. Defining F_i as the average size of all firms, by industry, in the United States was considered unsatisfactory, since this would include a host of firms for which the prospects of taking over a foreign firm are negligible. Instead, F_i was defined in terms of the average size of foreign-controlled firms operating in Canada, S_{in}; the size variable becoming S_{in}/S_{it}. In another set of tests, the total value of the assets of foreign-controlled firms was related to the total value of assets for all firms in the industry, $A_{in}/(A_{in} + A_{im})$.[28] It is acknowledged that neither of these variables is very satisfactory, and not much significance can be attached to the evidence shown in Table 2, indicating that variations in these size variables are not significantly related to variations in NB_i and NH_i when these variables are added to equation (2).

Economies of scale in various industries, ES, is a related and equally difficult factor to take into account. The best available measure of economies of scale at the two-digit industry level in Canada is that derived by C. J. Hodgins,[29] using a cross-sectional analysis of establishment data based on a production-function approach. As the study emphasizes, these estimates are subject to many limitations, not the least of which is the question of product mix re-

[27] This view is elaborated in Penrose, *op. cit.*, pp. 156 ff., and also in Kindleberger, *American Business Abroad*, Chapter 1. Kindleberger discusses these constraints within the context of monopolistic competition.

[28] Data for $A_{in}/(A_{in} + A_{im})$ and S_{in}/S_{it} are for 1962, and were derived from *Corporations and Labour Unions Returns Act, 1962*. Ottawa, 1962, Tables 4A–22A. See Reuber and Roseman, *op. cit.*, p. 119.

[29] C. J. Hodgins, "On Estimating the Economies of Large-Scale Production: Some Tests on Data for the Canadian Manufacturing Sector." Unpublished Ph.D. dissertation, University of Chicago, 1968.

ferred to earlier. Hence, it is uncertain whether the failure to find a significant association between ES_i and NB_i and NH_i reflects the lack of any association or the inadequacy of the information available on economies of scale.

Another variable that is given considerable prominence in theories of the firm is growth, G, here defined as growth in output from 1945 to 1961.[30] One might argue that the more rapid the rate of growth in an industry, the more apparent will become the differences in the constraints impinging upon firms; moreover, these disparities may actually widen. If because of their size and diversity, their international characteristics, and other factors, the constraints bearing on foreign firms are less stringent than those bearing on domestic firms (including domestic buyers as well as sellers), one might expect NB_i and NH_i to be positively related to growth rates across industries. When tested empirically, however, on the basis of equation (5), the coefficient of G is highly insignificant statistically.

A further possible influence on the interindustry mix of foreign merger activity might presumably be the profitability of industries, PR.[31] Although this influence could be either positive or negative, one might very well think it more likely to be positive for at least two reasons. First, profitability might reflect the growth of the industry, which, as suggested earlier, one might expect to be positively associated with NB_i and NH_i. Inclusion of a profits variable on this rationale provides an indirect test of the growth hypothesis. Secondly, one might argue that foreign firms, less constrained in a number of ways than their domestic counterparts, could out-compete domestic firms for the acquisition of firms in more profitable industries, leaving those firms in less profitable industries for domestic absorption. This rationale is doubtful on logical grounds, since, presumably, the price paid for firms reflects their profitability in different industries. Nevertheless, it conforms with the picture painted in some popular commen-

[30] E.g., Kindleberger, *American Business Abroad*, pp. 6 ff. G is equal to the percentage change in the index of industrial production in industry i from 1946–47 (average) to 1960–61 (average). Dominion Bureau of Statistics, *General Review of the Manufacturing Industries of Canada, 1961*, Tables 5 and 6.

[31] PR is the unweighted average profit on net worth before tax, 1948 to 1961, as reported in Department of National Revenue, *Taxation Statistics*.

taries, depicting foreigners as taking over the most profitable sectors of the Canadian economy and leaving the dregs to local residents. The estimates of equation (5) do not confirm this picture. In fact, the coefficient for PR is consistently negative, suggesting exactly the opposite picture. In many of the tests run, the coefficient was insignificant, but in some it was significant. This result may be rationalized on the ground that profits have an effect on internal cash flows, which, in turn, according to the evidence presented earlier, influence foreign merger activity. With lower profits, cash flow is lower, thereby enhancing the probability of foreign take-overs, and vice versa.

Still another variable to be considered is trade participation, T_i.[32] This variable was included on two grounds. First, foreign-trade participation might reflect the degree of competitive pressure prevailing in an industry, which might conceivably be reflected in foreign take-over activity. Secondly, foreign-trade participation might serve as an index of import substitution and export prospects, which presumably might also influence foreign take-over activity. The estimates of γ failed, however, to suggest a significant association between T_i and either NB_i or NH_i.

The final variable to be considered is research and development expenditure, $R\&D_i$.[33] During the past decade, Raymond Vernon and others have focused considerable attention on this factor as an influence on international trade and investment.[34] The evidence adduced indicates a positive association between $R\&D$ expenditures in

[32] Based on United Nations data on sources of exports and imports, classified on a two-digit-industry basis, and on the Dominion Bureau of Statistics census of manufacturing data on value-added, also classified by two-digit industries. All data relate to 1964.

[33] Data provided by Thomas Horst, *op. cit.*, based on National Science Foundation, *Research and Development in Industry, Annual Report, 1963*, and U.S. Department of Commerce, *Census of Manufacturing, 1963*. In addition, estimates were made using (*i*) R and D expenditures in the United States, by industry, for the years 1958 to 1961 (excluding tobacco, leather, and printing); and (*ii*) R and D expenditures in Canada ÷ R and D expenditures in the United States, by industry, in 1963. These data were compiled from National Science Foundation, *Basic Research, Applied Research and Development in Industry, 1964*, and Dominion Bureau of Statistics, *Industrial Research and Development Expenditures in Canada*, 1965, p. 22, Table 3. The coefficients for $R\&D_i$ remained insignificant for both of these definitions of the variable.

[34] E.g., William Gruber, Dilup Mehta, and Raymond Vernon, "The R and D Factor in International Trade and International Investment of United States Industries." *The Journal of Political Economy*, Vol. 75, No. 1 (February, 1967), pp. 20–37, and the references cited there.

the United States and the propensity to undertake direct investments abroad. The theoretical rationale for this view is open to questions so far as trade and investment relationships between Canada and the United States are concerned, since it is not apparent why a firm with an advantage over its competitors in *R&D* should choose to establish subsidiary operations rather than to export its products.[35] The empirical evidence also raises some questions. For example, the information available suggests that foreign subsidiaries in Canada undertake as much *R&D* expenditure on the average as do domestically controlled firms.[36] If firms go abroad because of the advantage which *R&D* expenditure at home gives them in foreign markets, one might expect their *R&D* expenditures in the foreign market to be less than that of local firms. Nevertheless, leaving these and other questions aside, $R\&D_i$ was included in equation (5). As indicated in Table 2, there is no evidence of a statistically significant association between $R\&D_i$ and the relative level of foreign take-over activity.

There are a number of additional variables that one might wish to consider. Among these are the degree of concentration in various industries, the extent of merger activity in the corresponding industry in the United States—on the assumption that foreign merger activity in Canada in large part reflects a spillover of merger activity in the United States—and the incidence of commercial failures in various industries. A lack of satisfactory data precluded experiments with these and other possibilities.

[35] Two general reasons are suggested by Gruber, Mehta, and Vernon (*ibid.*, p. 21) for a relation between *R* and *D* and foreign investment: (*i*) the large-scale marketing of technically sophisticated products demands the existence of local facilities; and (*ii*) investment is necessary to protect the technology-based oligopoly of United States producers against infringement by other foreign producers and local producers. These reasons are not very persuasive as far as Canada is concerned. Not only is United States production located in close proximity to the Canadian market, but also local Canadian markets are frequently closer to United States producers than to Canadian ones. Moreover, leaving aside the tariff, it is not very convincing to suggest that any technology-based oligopoly which the United States may have in Canada is seriously threatened by competition from abroad, or by local competition—especially when this technology-based oligopoly is based on the principle of "keeping ahead of the pack" (as it appears to be in these discussions) rather than on a once-for-all differential which, over time, might become eroded as outside technology caught up with that in the United States.

[36] A. E. Safarian, *Foreign Ownership of Canadian Industry*. Toronto, McGraw-Hill, 1966, pp. 281–282.

6 MACROECONOMIC INFLUENCES AND INTERTEMPORAL VARIATIONS IN FOREIGN TAKE-OVER ACTIVITY

IN ORDER for a foreign merger to occur under competitive market conditions, the net present value of a local firm to a foreign buyer, NPV_f, must exceed its net present value to the local seller, NPV_s, and to all potential domestic buyers, NPV_b. It is apparent that a variety of differences in market circumstances and constraints impinging upon foreign buyers compared with those impinging upon domestic buyers and sellers might arise, which would result in $NPV_f > NPV_b > NPV_s$. On the demand side, there may be differences in expectations about market demand, differences in access to markets and market information, differences in access to marketing skills, differences in product range, and so forth. On the supply side, there may be differences in the price and access to factor inputs and financial resources, differences in the access to technology and managerial skills, differences in risk and attitudes toward risk-bearing, differences in the length of the planning horizon, differences in access to scale economies, as well as other factors. For the most part, smaller firms seem to be subject to more stringent constraints on both the demand and supply sides than are larger firms, reinforcing the tendency for larger firms to absorb smaller ones.

Related to this is the question of why foreign firms choose to buy existing facilities rather than to establish new facilities. Presumably this is because the NPV_s of firms taken over is less than the cost of establishing comparable new facilities—including goodwill and other intangibles—and of overcoming other barriers to entry.

In examining the influence of general economic conditions on year-to-year variations in the number of foreign mergers, one is in effect attempting to identify the particular features of the economic environment that give rise to year-to-year variations in NPV_f relative to NPV_b and NPV_s. The investigation of this question reported below is based on time-series analysis, applied by fitting a series of linear equations by ordinary least squares to annual data for the period 1945 to 1961. The first part of the analysis—like that in the previous sec-

tion—is essentially a search procedure, while the second part reports on several tests performed on the relationships that emerged from this search.[37]

In the tests undertaken in the first part of the analysis, the following variables were considered:

A = the number of mergers in the United States
F = the number of commercial failures in Canada
L = the supply of funds generated internally in Canadian corporations; the level of business activity in Canada, as measured by the level of unemployment, U; the index of industrial production, I; and profits per unit of manufacturing output, π
Z = the level of stock prices in Canada
x = deviations in Canada's foreign-exchange rate from \$1.00 Canadian = \$1.00 U.S.
i = the level of short-term interest rates in Canada
i_a = the level of short-term interest rates in the United States
i' = the difference between short-term interest rates in Canada and the United States, i.e., $i - i_a$
Z' = the difference between the level of stock market prices in Canada and the United States
V = the income velocity of circulation of money, as a proxy for credit conditions (money stock $\div$ GNP)
D = changes in antitrust laws and law enforcement in the United States
t = a time trend

ESTIMATED RELATIONSHIPS

The "best" estimate emerging from these experiments is

$$N = 3.32 + 0.0677A + 0.0329F - 20.46L. \qquad (10)$$
$$(5.15) \quad (3.40) \quad (2.17)$$
$$\bar{R}^2 = .92 \quad DW = 2.77$$

[37] The analysis concentrates throughout on the number of mergers, rather than on the value. The value of mergers reflects not only the number of firms but their average value, which can be expected to vary widely because of the size of the firms taken over and

N is the number of foreign mergers and DW is the Durbin-Watson statistic. In effect, this relationship suggests that variations in the number of foreign take-overs in Canada can be largely explained by a spillover of merger activity in the United States, conditioned by variations in the level of business activity in Canada and the liquidity of Canadian corporations. The rationale for including these variables and details on the tests run are discussed elsewhere; only a summary is presented here.[38]

As noted at the outset, a central premise of the methodology underlying this paper is that foreign take-overs in Canada may simply be, to a considerable extent, a manifestation of the more general phenomenon of industrial mergers occurring in North America. If so, one would expect a highly significant positive association between A and N, as is, in fact, indicated by equation (10) and all other tests run. A may be viewed as an index of the propensity of firms in the United States to engage in merger activity, reflecting attitudes toward long-run economic prospects, the most efficient method of expanding output and markets, attitudes toward market strategies, views about probable future developments with respect to antitrust laws and law enforcement, and so forth. The merger literature for the United States frequently refers to the merger "waves" that have occurred in the past, and attempts have been made to explain these waves, in part, at least, in terms of underlying attitudes and motivation of businessmen toward mergers.[39] If this applies within the United States, it is equally plausible to expect the propensity of businessmen to engage in merger ac-

other factors. At the same time, the average value of the firms taken over may have little or no relation to the reasons why firms are taken over, which is our primary interest here. A number of tests were run on the value of firms, but these seemed inconclusive and unpromising.

[38] Reuber and Roseman, *op. cit.*, Chapter 7; Grant L. Reuber, "Antitrust and the Take-Over Activity of American Firms in Canada: A Further Analysis." *The Journal of Law and Economics*, Vol. XII (October, 1969), pp. 405–417.

[39] *Economic Concentration* (cited in full in footnote 7): testimony by Mueller, pp. 505–508; Ralph L. Nelson, *Merger Movements in American Industry, 1895–1956*, New York, NBER, 1959, Chapter 5; Jesse W. Markham, "Survey of the Evidence and Findings on Mergers," in *Business Concentration and Price Policy*, New York, NBER, 1955, pp. 146–154; George F. Stigler, "Monopoly and Oligopoly by Merger," in *Readings in Industrial Organization and Public Policy*, The American Economic Association, Richard B. Heflebower and George W. Stocking, eds., Homewood, Ill., Richard D. Irwin, 1958, pp. 69–80.

tivity to be a factor influencing their merger activity in Canada. In addition, variations in A may serve as an appropriate proxy variable for a variety of economic factors that directly influence the willingness of firms in the United States to undertake mergers—such factors as credit conditions in the United States and changes in the business outlook. To the extent that A reflects underlying attitudes to merger activity in the United States and the effects of contemporary economic conditions, variations in A can be expected to reflect changes in the demand for Canadian firms. By including A in the relationship, one is, in effect, directly posing the hypothesis that take-overs in Canada by firms in the United States reflect, to some extent, a spillover of merger activity in the United States.

The other explanatory variables included in equation (10) reflect variations in economic conditions in Canada, which, though similar, are not identical to variations in economic conditions in the United States. The supply of internally generated funds, L, is negatively related to N, which is consistent with the evidence presented in the previous section. As internally generated funds become less readily available among Canadian corporations, the cost of capital can be expected to rise for both potential domestic buyers and sellers of local firms.[40] Ceteris paribus, NPV_f will rise relative to NPV_b and NPV_s as a consequence. It is evident that, to some extent, the supply of internally generated funds in Canada can be expected to vary independently of the supply of such funds in the United States. Moreover, variation in the supply of internally generated funds in the United States is allowed for separately, to some degree, via variations in A. In addition, since many acquiring foreign firms are larger than domestic firms, and have much more diversified and easier access to outside funds, any general reduction in corporate liquidity and tightening of credit conditions in North America can be expected to place foreign firms at an advantage relative to domestically owned Canadian firms—in other words, NPV_f will tend to rise relative to NPV_b and NPV_s.[41]

[40] For a theoretical elaboration of this view, see James S. Duesenberry, *Business Cycles and Economic Growth*. New York, McGraw-Hill, 1958, Chapter 5.

[41] Evidence that the incidence of tighter credit conditions is greater for small firms than for large firms is available from a variety of sources, of which three may be noted: *Employment, Growth and Price Levels*, "Answers to Questions on Monetary Policy and Debt Management," *Hearings*, Joint Economic Committee, Part 6C, 86th Con-

The number of commercial failures in Canada, F, is positively related to N. This association seems plausible for at least three reasons: (*a*) F relates to economic conditions in Canada and, therefore, is likely to have a more direct effect on local firms than on foreign firms, which will be influenced by foreign economic conditions as well; (*b*) the effect of business conditions on foreign demand for Canadian firms will to some extent be reflected in A, leaving F to reflect mainly the partial effect of this factor on the supply side of the market; (*c*) although owners may prefer to hold on to firms for a variety of noneconomic reasons as profits decline, this preference can only be indulged up to the point where bankruptcy is imminent. At that point, the pressure to give up the business is irresistible. Consequently, one would expect an increase in bankruptcies to be associated with an increase in mergers, and vice versa.

Two further points may be noted in connection with equation (10). First, the value of $\bar{R}^2$ is quite high, indicating that the relationship explains over 92 per cent of the variation in N, while the value of DW gives no evidence of significant autocorrelation in the residuals at the 95 per cent confidence level. Secondly, F and L are highly collinear ($r = .97$), which can be expected to reduce the size of the estimated t-ratios. Because of this bias, the association between these variables and N is probably even more significant than is suggested by the estimated t-ratios for the coefficients of F and L.

In the course of developing equation (10) an alternative relationship was developed, which, on strictly statistical grounds, is as satisfactory as equation (10).

$$N = \underset{}{41.95} - \underset{(7.51)}{2.195Z'} + \underset{(2.07)}{0.334Z} - \underset{(5.45)}{19.443i_a} + \underset{(3.90)}{5.080t} - \underset{(3.46)}{8.015U}. \quad (11)$$

$$\bar{R}^2 = .97 \qquad DW = 2.30$$

This relationship is consistent with equation (10) in pointing to much the same general influences on foreign mergers in Canada. At the same time, it does not lend itself as easily to sorting out the influence of

gress, 1st Session, Washington, 1959, pp. 1773–74; Bank of Canada, *Annual Report, 1959*, p. 6; John H. Young and John F. Helliwell, "The Effect of Monetary Policy on Corporations," *Report of the Royal Commission on Banking and Finance*, Appendix Volume, 1964, Ottawa, 1965, p. 387.

merger activity on the part of firms in the United States, on the one hand, and domestic influences, on the other. In addition, the tests to which each relationship was exposed indicated that equation (10) is preferable in a number of respects.

The rationale for including the explanatory variables in equation (11) will not be considered here at any length. Two of these variables (as well as some of those listed earlier) have been rationalized and pointed out as important in studies on merger activity in the United States: the current level of economic activity (as reflected by U or I or π) and the level of stock market prices.[42] Z' may be rationalized on the ground that variations in Z' reflect variations in the cost of capital between Canada and the United States, although it is conceded that it may reflect other influences as well. Variations in i_a may presumably be viewed as a proxy for variations in credit conditions in the United States. And t, as always, is included to allow for a variety of broad secular factors about which we know little or nothing.

No satisfactory and statistically significant association was established in any of the tests run between N and the other variables listed earlier—x, I, π, i', V, and D. A special word might be said about D—changes in antitrust laws and law enforcement in the United States; and x—the exchange-rate variable. It has been suggested that because of tougher antitrust laws and law enforcement during the 1950's, companies in the United States embarked on increased takeover activity in Canada.[43] As discussed elsewhere, this hypothesis does not stand up when it is examined in the light of the more comprehensive questionnaire data now available and the employment of more rigorous tests based on equation (10).[44] As for the exchange rate, one would expect this variable to be insignificant, since both the purchase price and future returns on the investment are denominated in foreign exchange from the standpoint of the foreign buyer. Moreover, since for most of the period in question, Canada had a free exchange rate, peculiarities related to the possible over- or undervaluation of the exchange rate do not enter the picture.[45]

[42] Mueller *op. cit.*, pp. 505–508; Nelson, *op. cit.*; Markham, *op. cit.*

[43] C. J. Maule, "Antitrust and the Take-Over Activity of American Firms in Canada." *The Journal of Law and Economics* (October, 1968), pp. 423–432.

[44] Reuber, *loc. cit.*

[45] Professor Kindleberger has pointed out that German authors, in particular, have sometimes ascribed U.S. investment in Germany to the overvaluation of the dollar in relation to the mark.

TESTS OF THE RELATIONSHIPS

Two relationships that seemed to explain changes in foreign mergers reasonably well having been derived; both were subjected to three tests.[46] The first test was to determine how plausible each relationship looked when fitted to data on the number of domestic take-overs. The second test was to see how well each relationship stood up to disaggregation. The third test was to assess the predictive power of each.

When M, the number of domestic mergers, was substituted for N in the initial tests of equations (10) and (11), the coefficients of all the explanatory variables except A and Z were insignificant. The "best" relationship explaining M was:

$$M = 2.44 + \underset{(6.31)}{1.894Z} - \underset{(3.19)}{32.52L}. \qquad (12)$$

$$\bar{R}^2 = .89 \qquad DW = 1.69$$

When A was added to this relationship, its coefficient was insignificant. Equation (12) is consistent with evidence for the United States cited earlier, indicating a relationship between stock-market prices and domestic mergers.[47] In addition, it reemphasizes the role of corporate liquidity.

The tests using disaggregated data were based on the following components of N: (*a*) acquisitions of only those firms previously controlled in Canada; (*b*) acquisitions in the manufacturing sector of the economy of Canadian firms and all firms; (*c*) acquisitions in the trade sector of Canadian firms and all firms; and (*d*) firms acquired in broad horizontal mergers, and in nonhorizontal mergers. Comparing the signs and t-ratios of the estimated coefficients for the explanatory variables, one may summarize the results of these disaggregative tests as follows:

(*a*) The signs of the coefficients of all the explanatory variables in the equations based on equation (10) are consistent and conform with the signs of the corresponding coefficients in the aggregate equa-

[46] These are described in detail in Reuber and Roseman, *op. cit.*, pp. 152–172.

[47] It is also consistent with econometric evidence indicating that increases in stock-market prices in Canada, presumably reflecting an anticipation of business prospects, are significantly and positively related to new investment in plant and equipment.

tions. The same is true of the constant term with one exception.

(*b*) The values of R^2 are consistently high, and the values of DW give no evidence of significant autocorrelation in the computed residuals at the 5 per cent confidence level.

(*c*) The level of significance remains fairly high for the estimated coefficients in the disaggregated equations. The coefficient for A is significant in all cases; the coefficient for F is significant in seven of the nine cases; and the coefficient for L is significant in five of the nine cases.

(*d*) Comparing the performance of equation (11) with that of equation (10), one finds (*i*) somewhat less consistency with respect to the signs of the estimated coefficients, (*ii*) somewhat lower $\bar{R}^2$ for the corresponding estimates based on equation (10) in six of the nine cases, and (*iii*) somewhat fewer—and a less consistent pattern of—significant *t*-ratios. These considerations, combined with the fact that equation (11) is based on 11 degrees of freedom compared with 13 for equation (10), suggest some preference for the latter.

One danger of concentrating attention on the number of mergers is that one may be unable to detect influences on merger activity that are related to the size of the acquired firm. Accordingly, it is particularly significant that relationships (10) and (11) stood up well on the foregoing basis when they were reestimated for small (less than 50 employees) acquisitions (N_s) and larger (more than 50 employees) acquisitions (N_l).[48]

The use of predictive tests was seriously impaired because the data could not be satisfactorily updated beyond 1961, as had originally been hoped. A much weaker test was devised, in which each relationship was fitted to the two subperiods 1945–59 and 1947–61. The power of each of these reestimated relationships to predict the two years preceding, or following, each of these subperiods was then com-

[48] $N_s = -4.77 + 0.033A + 0.0084F - 4.09L$; $R^2 = .84$
(3.71) (1.28) (0.64)

$N_l = 2.90 + 0.024A + 0.015F - 9.60L$; $\bar{R}^2 = .90$
(3.84) (3.20) (2.11)

$N_s = 22.13 + 0.042Z - 1.231Z' - 6.08i_a - 2.83U + 1.76t$; $\bar{R}^2 = .96$
(5.07) (8.44) (3.36) (2.41) (2.66)

$N_l = 10.93 + 0.18Z - 0.58Z' - 6.80i - 3.52U + 2.06t$; $\bar{R}^2 = .82$
(1.20) (2.10) (1.99) (1.59) (1.65)

pared with the other relationship, and with the predictive power of three naive models defined as follows:

$$\hat{N}_t = N_{t-1}; \tag{13}$$

$$\hat{N}_t = (\bar{N}/\bar{M})M_t; \tag{14}$$

$$\hat{N}_t = (\bar{N}/\bar{A})A_t; \tag{15}$$

where $\bar{N}$ and $\bar{M}$ are the average number of foreign and domestic mergers in Canada, and A is the average number of domestic mergers in the United States. These averages are based on 1947 to 1951 when predicting 1945 and 1946, and on 1955 to 1959 when predicting 1960 and 1961. In addition, the performance of the two relationships in question was compared with these naive models for the full period, employing mean values of M, N, and A for 1945 to 1961. Predictive power in these tests is measured by the square root of the average deviation between the actual number of mergers and the number estimated from the relationship, i.e.,

$$\sqrt{\frac{\Sigma\ (\text{actual} - \text{estimated})^2}{\text{number of observations}}}.$$

The results of this test may be summarized as follows:

(*a*) Equation (10) is a better predictor than equation (11) and any of the naive models of the years immediately preceding or following the subperiods specified for the tests.[49]

(*b*) The root mean of the squared deviations of the actual from the estimated number of mergers falls within the standard error of estimate of equation (10); it is more than twice the standard error of estimate for equation (11).

(*c*) The estimated coefficients for the subperiod equations are much more stable for equation (10) than for equation (11).

(*d*) Both estimates outperform the naive models for the full period 1945 to 1961. As one would expect from the higher value of R^2, equation (11) also outperforms equation (10) by a small margin for the full period.

[49] Equation (10) is slightly inferior to the predictions based on two of the naive models for 1945–46 but much superior to any of the naive models for 1960–61.

7 SUMMARY AND CONCLUSIONS

PERHAPS the most serious deficiencies that run through most of the preceding analysis are: (*a*) lack of a tightly knit, fully specified, testable theory of business behavior as it relates to merger activity, and (*b*) lack of reliable data that would make it feasible to run more rigorous empirical tests, not only on any new and better theories that might be developed but also on the *ad hoc* workaday theories that are the common currency in this area at present. Although the data on which the foregoing discussion is based represent a considerable extension in the information available on foreign take-overs in Canada, it is evident that many dark corners remain. In order to illuminate the subject more clearly, more comprehensive and up-to-date information of better quality is required on a wide range of variables for descriptive, as well as analytical, purposes.

Secondly, it is evident that only a limited range of questions have been considered in this paper and that other important aspects of the issue of foreign ownership and control have not been considered, e.g., questions relating to the policies, practices, and performance of foreign-controlled firms; the benefits of foreign investment; and so forth. Some of these questions have been explored by other authors.[50]

Subject to these caveats, what are some of the main implications and conclusions to be drawn from the analysis? One is methodological. As noted at the outset, a central feature of the approach adopted has been to evaluate foreign take-overs in relation to domestic take-overs occurring at the same time, on the ground that the approach places foreign take-overs within the appropriate framework of economic analysis, provides a clearer perspective on the phenomenon, and enhances the testing power of available analytical tools.

On the substantive side, the analysis suggests that variations in the number of take-overs are partly explained over time by the level of merger activity in the United States, and that variations across industries are roughly proportional to the existing pattern of foreign con-

[50] See Safarian, *op. cit.*, and the references cited there; and Rudolph G. Penner, "The Benefits of Foreign Investment in Canada, 1950 to 1956," *The Canadian Journal of Economics and Political Science* (May, 1966), pp. 172–183.

trol among industries. In addition to these "exogenous" variables, variations in the number of foreign take-overs appear to be sensitive to a number of policy variables: tariff policy; the flow of internally generated corporate funds, which is influenced by government financial policies; and the level of business activity, which is conditioned by government stabilization policies.

Viewed within the context of the literature on direct foreign investment and industrial organization, neither of the two "exogenous" variables noted above has received much, if any, attention. At one place or another, limited attention has been given to the three policy variables mentioned. The influence of tariff policy has been noted in the literature on direct investment, and the level of economic activity has been pointed to as an influence on domestic merger activity. Relatively little attention has been given to internal cash flows in either branch of the literature. At the same time, it is noteworthy that the foregoing analysis raises some doubts concerning the influence of a number of other variables that appear in the literature as factors affecting mergers and direct foreign investment—e.g., growth; economies of scale; size; research and development; and changes in United States antitrust laws and law enforcement.

Within the context of Canadian economic policy, the evidence suggests a number of general conclusions. First, only a relatively small portion of the level of foreign control of Canadian industry in 1962 is attributable to take-overs per se from 1945 to 1961. Secondly, relative to the number of firms in Canada, the number of take-overs has been small. Thirdly, though differing somewhat, the characteristics of foreign take-overs may be considered to be broadly similar to those of domestic take-overs, not exhibiting characteristics that pose obvious causes for alarm.

Finally, there is the question of what, if any, attention has been given to foreign take-overs in formulating policy, and what influence policies have had on take-over activity. In Canada, it seems fair to say that in the past, each of the policy variables noted above has been regulated largely without recognition of the relationship between these variables and take-over activity or its importance. Failure to recognize the relationships in question has frequently given rise to paradoxical situations where the strongest advocates of economic nationalism es-

pouse, in one context, policies that, in another, have indirectly tended to increase the foreign take-overs which they oppose. Evidence of such situations may be found in the record of Canadian tariff policies,[51] as well as in the record of Canadian fiscal,[52] monetary, and debt-management policies.[53]

Aside from providing yet another illustration of the universal principle that everything is related to everything else, the record of Canadian policy during this period suggests that active concern about foreign take-overs adds still a further objective to the already overloaded objective function of government, further complicating the exercise of tariff, fiscal, monetary, and debt-management policies. For this additional objective to be allowed for rationally in formulating policies, it is evident that more must be known about foreign direct investment and take-overs than is currently the case.

[51] The authors are unaware of any suggestions that tariff reductions be implemented to reduce foreign investment and take-overs. There is some evidence of attempts to use the tariff to increase the inflow of direct investment. This usually is expressed in words to the effect that if Canada reduces its tariffs without taking additional steps, investors will locate their plants in the United States and export to Canada rather than maintaining and expanding their Canadian plants. This concern was voiced, for example, in discussions of the Canada–U.S. automotive agreement. See Wonnacott and Wonnacott, *op. cit.*, Appendices A and B.

[52] Royal Commission on Taxation, *Report*. Ottawa, 1966, Vol. VI, pp. 158–162. See also the papers by R. A. Musgrave and Arnold C. Harberger reviewing the *Report* in *The Canadian Journal of Economics* (February, 1968), pp. 178–182 and pp. 186–194.

[53] The most striking paradox is, perhaps, evident in the case of monetary and debt-management policy. In common with most countries, Canada pursued increasingly restrictive monetary and debt-management policies from 1945 to 1961. Two features, however, particularly distinguish Canadian policy during the late 1950's. One was a massive Conversion Loan in 1958, which, in the course of three months, increased the average term to maturity on the public debt from eight years to fourteen years nine months. The second was the very tight monetary policies pursued from 1958 to 1961 while the unemployment rates ranged from 5.5 to 7.8 per cent, averaging 6.8 per cent. Both measures tended to reduce corporate liquidity and raise the cost of capital. In addition, these restrictive policies tended to increase the number of commercial failures. From both standpoints, therefore, our evidence suggests that the policies in question tended to increase the number of foreign take-overs. The paradox is that all of this occurred under the aegis of a government that came to office in 1957 on a platform of reducing, or at least arresting, the growth of foreign control over Canadian industry—a policy that was actively supported by the then Governor of the Bank of Canada.

APPENDIX

Selected Estimates of Equation (5) for Two Subperiods: 1950–55, 1956–61
(NB_i or $NH_i = \alpha + \beta FN_i + \gamma_j X_{ji}$)

Equation Number	Dependent Variable	$\hat{\alpha}$	$\hat{\beta}$	$\hat{\gamma}$	X_j	$\bar{R}^2$
			1950–55			
1	NB_i	17.841	0.922			.55
		(1.97)	(4.27)			
2	NB_i	−6.128	1.027	1.224	R_{d_i}	.56
		(0.25)	(4.33)	(1.05)		
3	NB_i	15.001	0.911	0.367	Ly_i	.52
		(0.92)	(3.96)	(0.21)		
4	NH_i	12.811	1.282			.70
		(1.48)	(5.34)			
5	NH_i	5.218	1.301	0.406	R_{d_i}	.67
		(0.21)	(5.06)	(0.33)		
6	NH_i	22.874	1.330	−1.325	Ly_i	.69
		(1.60)	(5.36)	(0.89)		
			1956–61			
7	NB_i	24.162	0.693			.33
		(2.33)	(2.80)			
8	NB_i	−2.237	0.809	1.348	R_{d_i}	.33
		(0.08)	(2.97)	(1.00)		
9	NB_i	42.596	0.724	−2.787	Ly_i	.40
		(2.77)	(3.08)	(1.56)		
10	NH_i	25.836	0.877			.41
		(2.49)	(3.05)			
11	NH_i	22.141	0.886	0.198	R_{d_i}	.35
		(0.74)	(2.87)	(0.13)		
12	NH_i	49.299	0.870	−3.398	Ly_i	.56
		(3.49)	(3.50)	(2.15)		

NOTE: Equations explaining NB_i exclude furniture and tobacco; equations explaining NH_i exclude rubber, furniture, tobacco, and petroleum. These industries were excluded from these equations because either the numerator or the denominator of the ratio was equal to zero.

COMMENTS

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As several papers make clear, portfolio-adjustment or stock-adjustment models are certainly "in" as a way of analyzing foreign investment. Prachowny makes a good case for concluding that this approach is logical for direct investment as well as for financial investment. In the end, however, I find the model that he produces, neat as it is, unconvincing for two reasons. First, I do not think that it catches most of the motivations for direct investment. Second, even if the model were good in theoretical terms, the data used for estimating the coefficients are so far from the variables that they are supposed to represent that I am highly skeptical regarding his interpretation of the coefficients and their use for policy recommendations.

The basis for his model is the argument that the share of its assets a firm will hold abroad depends on the relative rates of return at home and in foreign countries, adjusted for the relative risk. The model offers no theory as to why foreign investment becomes more or less profitable relative to domestic, but, rather, puts forward an explanation of the way in which corporations react to differences in the profitability of investment. As Prachowny states, it would be hard to find a theory that categorically denies the assumptions that he makes, although his contention is really true only until he defines his variables more precisely.

Even at this general level, there is an unstated assumption—not so much in the theoretical model as in the realization—which I think illegitimate. This is that the foreign and domestic operations of a company, or of all companies together, are essentially independent. The foreign investment does not affect domestic profitability, and domestic investment does not affect foreign profitability. Without this assumption, the author could not argue that the relevant return on foreign investment is the ratio of profits earned abroad to investment abroad. If the investment abroad adds to domestic profits, or domestic investment adds to foreign profits, the model is seriously undermined.

While the assumption may be valid in some cases, it must surely be invalid for others. Domestic profitability for some companies must be affected by foreign investments in, say, copper mining or petroleum, or banana production; or by foreign manufacturing which competes with exports or domestic sales, or promotes exports (an automobile assembly plant). Presumably the company will consider the impact on total profit, domestic or foreign, of any investment here or abroad. Perhaps this is what the author had in mind in his theoretical discussion, since he speaks only of the expected rate of return on each type of asset, without defining the rate.

When we come to the empirical implementation of the model, we are in a world that often I do not recognize. It is assumed that the desired stock of assets is achieved within a year, on the ground that titles to direct investment assets "can be bought and sold with not much more difficulty than other long-term portfolio assets." That seems highly unlikely if one thinks, for example, of the time required to develop new sources of minerals, or of the difficulty of selling an assembly plant geared to American cars to a European or Japanese producer. The author himself says later that direct investment assets "rarely enter the market," a fact which suggests that such assets are not readily traded.

The variable for the stock of American direct investment abroad is the estimate by the U.S. Department of Commerce of the book value of this investment, and it is compared with the market value of corporate stock outstanding in the United States to show the share of corporate assets invested abroad. As is pointed out, a book value is being compared with a market value here, but the consequences of that disparity are not noted. There is probably a serious downward bias in the estimate of direct-investment assets, since Canadian and U.K. stock prices almost tripled over the period covered, and prices of equities in other countries rose by similar amounts. In the face of this rise, the residual change in the estimated value of American direct investment—that is, the change other than that from investment flows and reinvested earnings—was negative in all but two years, a strong indication that capital gains from this source did not enter the estimates or that American firms were making very poor investments.

Not only the trend but the year-to-year fluctuations in the ratio

of holdings of foreign assets to holdings of domestic assets reflect this mixture of book values and market values. The large decline from 1953 to 1955, for example, results from the rapid rise in stock prices during those years, and the major increases in the ratio reflect poor performance of the stock market in the United States, as in 1953, 1957, 1960, 1962, and 1966. Of course, these stock-price movements may reflect current or anticipated changes in profits, but I suspect that relationship is not what the author had in mind.

The earnings variables seem to have a similarly odd relationship. The foreign earnings relate to all types of direct investment, including investments in natural-resource industries such as petroleum. The domestic-earnings rate applies only to manufacturing, and the ratio between them may be as likely to reflect the relation of petroleum earnings to manufacturing earnings as the ratio of foreign to domestic earnings.

Aside from the differences in coverage between the two earnings series, I am skeptical of the earnings data in general. These are, after all, comparisons of earnings within the same companies, as shown on the books of these companies. There must be a good deal of leeway for a company in allocating profits to the affiliate or to the parent, as tax or other considerations dictate, by determining intracompany prices, charges for services, and other elements of cost. If that is the case, it is hard to be sure that the earnings comparisons we see are the ones that govern the investment policy of the companies.

These rates of return are adjusted for the risk involved in each type of investment, the risk being measured by the variability of the earnings rate in the time series. I doubt that this measures the main elements of risk involved in foreign operations, which I would take to be that of expropriation or other hostile actions by host governments; or, in some industries, of actions by other countries (including the United States) that affect the size of the market an affiliate can serve. To capture the risks facing an investor, a cross-sectional measure reflecting the range of experiences within an industry might be more appropriate than a time-series measure.

If I am correct in thinking that the variables used here—and, therefore, the coefficients obtained—do not measure what they are supposed to measure, what do they represent? The level of direct-invest-

ment assets rose very steadily throughout the period, without many changes in the rate of growth. The level of the value of stock outstanding of American companies, however, showed large changes in rates of growth and declined in several years, and the movement of this series can be traced largely, although not entirely, to changes in stock prices. Thus, the fluctuations in the ratio of foreign to domestic assets largely represent fluctuations in stock prices in the United States.

The independent variable representing the ratio of foreign to domestic earnings mainly reflects the fluctuations of domestic earnings, since direct-investment earnings abroad were comparatively stable, at least after 1958. It seems quite possible, then, that the relationship between domestic/foreign-earnings ratios and the corresponding asset-holdings ratios reflects the impact of changes in corporate earnings in the United States upon stock prices, and that no effect on direct investment is caught here at all, except to the extent that movements of stock prices might affect direct investment.

Despite these criticisms, I think that the approach to analyzing direct-investment decisions through discrepancies between desired and actual holdings of direct-investment assets is potentially a revealing one. Perhaps the variable to be explained should be, in fact, the rate of flow of new capital from the United States, as in the flow models described, or the rate of expenditure on plant and equipment, since these variables are under the control of individual companies. The ratio of foreign to total assets is only partially under the control of the parent companies, and the amount of investment required to reach an "appropriate" ratio in some sense is absurdly large at times. To keep the ratio constant between 1953 and 1954, for example, would have required an investment of over $7 billion at a time when the annual outflow was averaging something more like $700 million. A fairly long period should, therefore, be allowed in the model for adjustment to the desired investment levels.

The main problem in Prachowny's paper is one that afflicts quite a few of the other papers put forward at this conference. The authors have, for the most part, tried to follow the virtuous route of creating a theoretically sensible model and then estimating an empirical counterpart, carefully avoiding fishing expeditions that might land

variables that are statistically significant but not part of the model. However, since at least some of the variables in the model have no empirical counterpart, the creators of the model must search for proxies, some of which are related to the corresponding variables in the model mainly by hope. The proxies are then renamed to present them as the proper variables. In effect, the fishing expedition has been transformed from fishing for variables to fishing for proxies, and I am not sure the degree of virtue achieved is as great as is sometimes claimed.

The paper by Reuber and Roseman is somewhat difficult to comment on in any general way, owing to the lack of a theoretical structure to explain differences in take-over rates among industries. Various attempts are made to account for the rate of merger activity, but I miss here what several of the other papers included: some definition of the goals that the firm is attempting to reach by its merger activity, and an explanation of why there should be differences among industries in either the goals or their effects on merger activity. My main comments, then, are on the specific empirical findings and on the questions which they raise.

A problem with the data in general is the reliance on numbers of mergers, rather than on the aggregate assets or employment involved, for many of the analyses. There is an advantage to this procedure, in that single large cases do not overwhelm the evidence of many smaller examples, but there is also the disadvantage that it is difficult to assay the significance of numbers for the activity of the economy without some measures of the values involved.

One finding mentioned in Section 2 is that the number of take-overs of Canadian firms by firms in the United States is small compared with the number of take-overs by Canadian firms, particularly in view of the much greater number of firms in the United States. This comparison may be affected by differences in the definition of a firm in the two countries, and by the industrial composition of each one's business population. The United States might have, for example, many more small banks, retail stores, private landlords, and others who inflate the figure for the total number of firms.

Since 73 per cent of the foreign acquisitions of Canadian firms

were made by Canadian affiliates of foreign firms, it is obvious that the tendency toward such take-overs was far stronger among firms already in Canada than among the general run of firms in the United States. It might be interesting to compare take-overs by Canadian-owned firms with those by foreign-owned Canadian firms to test whether the latter show the same propensity toward growth by merger as do the domestically owned firms.

The question of industrial composition may also affect another of the results. Foreign mergers are shown to be vertical, both forward and backward, to a much greater extent than are domestic mergers, while domestic mergers are predominantly horizontal. It is not clear from the data presented here (although it may be in the original source) whether this difference between foreign and domestic firms reflected their ownership or only their industry composition, since the type of merger may be dependent on the industry to a large extent.

The main part of the paper is an analysis of the factors determining the share of foreign-owned companies in merger activity within individual industries, as represented, once again, by numbers of mergers. One of the variables used is the share of foreign ownership in the number of existing firms, but I believe that there is a misinterpretation of the coefficients of the equations in the first statement of the results. Given the relation

$$NB_i = \beta FN_i,$$

where NB_i is the share of foreign firms in mergers and FN_i is their share in ownership, $\beta = 1$ is said to imply that "foreign ownership, per se, has little influence on the interindustry distribution of foreign merger activity." On the contrary, if the $\bar{R}^2$ is high, the distribution of foreign ownership determines the distribution of foreign merger activity in this case. We can say, however, if we ignore the constant term in the equations, that a coefficient of one implies that foreign ownership does not affect the level of total merger activity in an industry, since foreign and domestic firms have the same propensity to merge. A coefficient greater than unity implies that foreign firms have a higher propensity toward mergers than domestic ones, and that foreign ownership works to increase the tendency toward mergers.

A second variable found to be significant, in general, is the nominal

level of tariffs, as represented by the ratio of tariff collections to total or dutiable imports in the industry. These ratios are subject to the objections usually made to such measures of the tariff level in comparisons among countries: a tariff high enough to exclude a product does not appear in this calculation at all; and any high tariff, by reducing imports of the product subject to it, reduces the weight of that product in the tariff ratio. Thus, of two industries with the same average tariff rates on pretariff imports, the one with a mixture of very high and very low rates may appear to have a lower average tariff level after the imposition of the tariff, because its tariffs distorted the composition of trade to a greater degree, shifting it toward the low-tariff items.

In a number of cases, it would be interesting to know what the results would have been had the share in assets, rather than the share in numbers of firms, been used as the independent variable. This might be a reasonable way of estimating even the number of mergers if a firm with $100 million in assets is ten times as likely to take over another firm as one with $10 million in assets. Relating the share in the number of firms to the share in the number of mergers seems to imply that larger firms will make larger mergers—but no more mergers—than small firms.

It does not seem overly surprising that the tariff level does not have much influence on NH_i, intraindustry mergers. Since most firms in the United States involved in mergers are already established in the given industry, they have already taken advantage of the tariff, and it is not clear that a merger within the industry would add anything to that advantage. It might be more likely that the tariff level would influence the number of take-overs by firms in the United States not previously in the Canadian industry.

Another possibility for the tariff variable would be changes in the level of tariffs. One might suppose that the degree of ownership by firms in the United States at any time represents some adaptation to tariffs and other economic circumstances. A take-over implies that the adaptation was incomplete. Would it not be sensible to expect that one would find foreign take-overs more frequent at a given tariff level when that level represents a large increase over the past level than when it represents a long-standing tariff? This is particularly logical because a take-over is a way of adding capacity quickly, instead of slowly from

internal growth, and might be thought of as the expected response to an unexpected change in circumstances.

Among the variables that failed to explain the distribution of mergers was the relation between the average size of foreign-owned firms and the average size of all firms in the industry, the expectation being that where foreign-owned firms are larger, they will be subject to fewer financial constraints and more able to take over Canadian firms. Probably the relevant variable here would not be the size of the Canadian affiliate of the American firm but the size of the latter, since this size would determine the ability to raise funds for take-overs. Such a variable would be fairly easy to insert in an equation, the expectation being that firms in the United States would account for a relatively high proportion of mergers in those industries in which the parent companies are particularly large relative to Canadian companies.

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A number of logical and statistical problems in Prachowny's analysis create difficulty in interpreting his empirical results. These difficulties seem endemic in estimating flows of foreign investment in general, and direct investment in particular.

UTILITY, DEMAND, AND NET WORTH

Prachowny starts off by specifying a utility function $U(R)$, which he does not use to generate his asset-demand function (page 444) as given below; that depends on much more than R:

$$A_1 = A_1(R_1, R_2, \sigma_{R_1}, \sigma_{R_2}, \sigma_{R_{12}}, \sigma_e, W),$$

where $W = A_1 + A_2$.

Since the utility function is not spelled out, neither is the maximization process which motivates the representative corporation. Hence, the reader is given no guidance as to what a priori restriction

one might impose on the form of the demand function. Specifically, given the known limitations of mean-variance analysis—not to mention mean-variance-covariance analysis—it would be nice to know what could plausibly be assumed. For example, is the corporation maximizing expected utility through time (appropriately discounted), or is it maximizing the present net worth of its outstanding common shares, or is it maximizing the market value of all its outstanding securities? Perhaps all of these maxima lead to the same estimating equation, but the reader is left in the dark as to whether this is true.

In the actual estimation procedure, Prachowny imposes the condition that the elasticity of A_1 with respect to W is unity, but there is no a priori justification provided. Intuitively, one feels that it would not be plausible for a firm in the middle of an overseas diversification program (which might take several years to complete) to keep the value of its net worth abroad proportional to domestic net worth.

Much direct investment overseas has been largely financed by overseas bond issues and bank-borrowing by the parent firm, which then uses the proceeds to set up, or invest in, a subsidiary. Again, the relationship to the net worth of the parent firm hardly seems binding in choosing the level of overseas investment. This kind of financial manipulation is important for testing the effectiveness of the U.S. voluntary restraint program, as the author does later on, because it would be a form of direct investment which complies with the program and which, indeed, was induced by the program. A well worked-out utility function or maximization procedure would be a big help in isolating these issues.

The author makes a useful point in showing that certain flow variables—such as reinvested earnings and capital outflows—cannot be used formally to predict complete changes in the balance-sheet position abroad because C, as defined below, does not enter international payments.

$$\Delta A_1 = Q + S + C$$

where

Q = capital outflow,

S = reinvested earnings, and

C = correction for windfalls, expropriations, and other unexpected events.

But, unfortunately, he includes depreciation flows in C and suggests that companies "may want to offset depreciation during the period by new capital flows." However, if overseas earnings are accounted for correctly, they are net of depreciation, and there is no need for continuously compensating capital outflows.

THE STATISTICAL TECHNIQUES

Consider the estimating equation which Prachowny used:

$$\frac{D_t}{W_t} = \alpha_0 + \alpha_1 \left(\frac{R_t^*}{R_t}\right) + \alpha_2 \left(\frac{\sigma_R^*}{\sigma_R}\right) + \alpha_3 \sigma_{RR}^* + \alpha_4 B_{t-1} + U.$$

The construction of R_t^* (per cent earnings on direct investment abroad) and R_t (per cent earnings on United States manufacturing) is not discussed in detail, but it appears as if these signify current profits divided by the market valuation of net worth. In the case of R_t^*, book value of foreign assets had to be used although the author would have preferred their market valuation. Thus, R_t cannot represent the "real" rates of return on the underlying physical assets.

For example, if profitability goes up in home investment and this increase in profitability is perceived as such, the stocks will be revalued upward, so that the apparent rate of return is unchanged. Correspondingly, swings in stock-market valuations could introduce large differences in R_t and R_t^* which are as hard to interpret as the animal spirits that guide year-to-year fluctuations in the stock market. Thus, the immediate implications of short-term variance in R_t, denoted by the truncated σ_R, are difficult to see. The use of σ_{R^*R} is a complete puzzle, not discussed anywhere by the author. Given the data and conceptual difficulties in constructing R_t^* and R_t, one might like to run each separately to see which one was providing the explanation.

The deficit of the United States in its balance of payments on a liquidity basis—lagged one period—is included as a measure of risk. There are all kinds of questions regarding the liquidity definition. Witness 1968 and 1969, when the liquidity deficit became very large even by past standards, but the official-settlements measure of the balance showed a surplus. From a purely statistical point of view, the use of B_{t-1} very likely introduces simultaneity bias into the estimation pro-

cedure as long as there is some year-to-year correlation in the B's. The author makes some additional *ad hoc* adjustments in his estimating procedures to get a "better fit," but it is beyond my capacity to judge their statistical verity.

A principal consideration in setting up stock-adjustment models has been to avoid the necessity of specifying instantaneous adjustment within the time period for which data are collected. One can look at observed flows over several periods as an adjustment to a preferred stock position. This would seem to be important here, as one would not expect firms to adjust their portfolios of direct investment within one year if there was a change in foreign relative to domestic profitability. Yet Prachowny does not make lagged adjustment a significant part of his model, as he himself notes.

In conclusion, I am quite prepared to believe, with Prachowny, that the voluntary restraint program was not effective, but I have not reached this conclusion on the basis of the analysis provided here. It is difficult to generate believable models which predict capital flows and direct investment in isolation from other international payments.

THE NORTH AMERICAN ECONOMY

The paper by Reuber and Roseman examines the merger activities of American firms in Canada. Their analysis is virtually unique in terms of the comprehensiveness of the data and the thoroughness of the statistical procedures used to test various hypotheses. Although Canada is significantly different from most other recipients of foreign direct investment, it has had long historical experience in this area, and foreign direct investment has been very large. Mergers or take-overs represent an important part of that investment. The contribution of the two authors is a significant one, both for Canada and for its implications elsewhere.

In order to project the Canadian experience for other countries, it is necessary to decide whether Canada behaves simply as part of the North American economy or has, in fact, some relevant characteristics of its own which set it apart as a distinct economy. Here the authors offer two conflicting pieces of evidence:

1. The ratio of foreign to domestic mergers in Canada has been of the order of 1:2, whereas the ratio of the numbers of firms in the United States and in Canada has been of the order of 12:1. It is, however, difficult to get an appropriate measure of geographical proximity. It could well be that, within certain regions of the United States, the ratio of "foreign" to "domestic" mergers is closer to the ratio for Canada. It also appears that take-overs in Canada by firms in the United States were only 2.6 per cent of total mergers in the United States, whereas the Canadian economy is probably about 8 per cent of the size of the American one.
2. On the other hand, waves of merger activity within the United Sates through time seem to be fairly strongly reflected in Canada, and the authors use an index of total mergers in the United States to explain a high proportion of the variance in Canadian mergers through time. Without a more fundamental explanation, this would suggest that there are similar forces operating in both economies, while Canada still maintains a distinctive economic identity for this purpose.

COMPARATIVE ADVANTAGE

One interesting aspect of the analysis is the tendency for ownership by American firms in Canada to concentrate and stabilize in particular industries, even if one disaggregates down past the two-digit industries. Those sectors of mineral extraction and manufacturing which were dominated by foreigners prior to 1945 remain dominated by subsequent merger activity and internal growth. Oil and gas exploration and automobile manufacturing are extreme examples. Correspondingly, there is only a limited tendency for foreign firms to branch out into other activities.

Foreign domination seems particularly marked in what might be called "tradable"-goods sectors, inclusive of manufacturing and mineral extraction, but it is less strong in the nontradables sector, where services are heavily represented. This tendency seems to be borne out by the positive correlation between foreign merger activity and tariff

barriers, as one would predict from the old "tariff factory" argument. That is, those manufacturing industries with higher tariffs are more subject to foreign take-overs. This is welcome statistical support for a venerable hypothesis.

Within the tradable-goods sectors, it would be interesting to go further into explaining why foreigners may have competitive advantages in some areas, but not in others. I realize that this more general investigation of foreign comparative advantage may lead the authors too far afield from their announced intention of simply explaining merger activity. However, if there is a tendency for foreign control to stabilize and limit itself to particular activities, this would be valuable information for countries where foreign direct investment is as yet less pronounced than it is in Canada.

THE FINANCIAL CONSTRAINT

The impact on merger activity of an internal financial constraint within Canadian firms was particularly interesting to me. The authors show, in equations (10) and (12), that both domestic and foreign mergers are quite sensitive to the internally generated flow of funds. The fact that mergers seem to take place with the least immediately profitable, or illiquid, Canadian firms is contrary to prevailing Canadian mythology. Moreover, if we could construct proxy variables for the relative tightness of credit in the two countries, we would expect tight money-market conditions in Canada vis-à-vis the United States to be an important determinant of merger activity and new direct investment. Unfortunately, interest-rate proxies may be quite poor measures of ease or tightness. Notwithstanding this, the authors do find some statistical evidence (equation (11), page 495) that the American rate of interest is negatively correlated with foreign mergers.

If the absence of internal funds and the inadequacy of domestic money markets are important reasons for the acceptance of mergers —particularly foreign ones—on the part of Canadian firms, this would suggest that Canada might be less prone to foreign take-overs than would be a less developed economy with a more primitive banking system. Even Canada may have followed financial policies which arti-

ficially accentuated foreign mergers. In the 1945–61 period, there was a low ceiling (approximately 7 per cent) on what Canadian commercial banks could charge for loans. This, of course, led to substantial non-interest rationing, which might partially explain why the authors could not get a significant Canadian interest-rate variable. During the latter part of the period under consideration, Canada was subjected to unusually tight and disruptive monetary policies by James Coyne, Governor of the Bank of Canada. Taken together, the effects of these two factors on foreign take-overs may have been not insignificant.

To help one understand fully the importance of the financial constraint in foreign take-over activity, it would have been desirable had the authors obtained information on the net financial transfers (or balance-of-payments effect) of a given amount of foreign direct investment—since foreign direct investment could, in principle, be financed from the Canadian money market. However, they have tried, and this material was not available. One can speculate that a badly functioning domestic banking system would not only attract direct investment from abroad, but make it easier for large, well-known international corporations to get local finance by issuing bonds or commercial paper. Lesser known, but possibly quite efficient, domestic entrepreneurs may be shut out because of ceilings on bank deposit and lending rates.

In summary, Reuber and Roseman have succeeded admirably in their goal of showing how monetary and tariff policy may have accentuated merger activity in Canada. Their analysis immediately suggests how the greater distortions in foreign trade and finance in less-developed countries may—in the absence of other inhibiting controls—accentuate direct investment there far beyond the level which could be described as socially or economically optimal.