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DETERMINANTS OF FOREIGN DIRECT INVESTMENT
BY FOOD AND TOBACCO MANUFACTURERS

By
John M. Connor*

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*Head of Food Manufacturing Research, Economic Research Service, USDA.
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Contents

Introduction

The principal purpose of this paper is to review the empirical economic
literature on determinants of foreign direct investment (FDI) into and
out of the U.S. food manufacturing industries. These studies mainly
refer to horizontal investments. Vertical investments by manufacturing
firms—backward into agriculture or forward into food wholesaling or
retailing—appear to occur for quite different reasons than do investment
involving geographic product extensions (Caves 1971). Little attention
will be given to the FDI activities of particular food firms, except
insofar as examples illustrating more general patterns.

The plan of the paper is as follows. First, I briefly sketch the
importance of foreign investment—its size, growth, and policy significance.
Second, I highlight certain stylized facts about FDI that set it apart
from other related economic phenomena and that adequate theories should
seek to incorporate. Third, I outline the principal theoretical models
that have been developed to explain FDI flows. Finally, the major part
of the paper reviews and assesses several quantitative studies of FDI
involving U.S. manufacturing, including three studies that specifically
examine food manufacturing.

The Importance of Foreign Direct Investment

FDI is the management control of a foreign enterprise through the
ownership of equity or long-term debt. Other forms of international
involvement—exports, franchising, licensing, technical service contracts,
royalty agreements, and portfolio investments—may accompany FDI, but these
do not have the unique combination of management rights derived from
ownership. Foreign owners of a productive assets can be individuals or

governments, but nearly all FDI is carried on within multinational corporations (MNCs). Once a foreign affiliate begins to sell goods or services, FDI is often termed "international production" or the "foreign content" of MNCs. For the purposes of this paper, a manufacturing MNC owns a significant share in one or more active foreign companies; all other firms are national corporations (NCs).

Table 1 shows recent foreign content ratios for 877 of the world's largest manufacturing enterprises, whether MNCs or NCs, about half of which are based in the U.S. Over one-quarter of the sales of these firms is accounted for by international production, which excludes export sales. U.S. MNCs are slightly more multinational than average, but far less so than European MNCs. The 60 or so U.S. food-and-tobacco-manufacturing MNCs included in Table 1 have substantial foreign content, though it is lower than their European counterparts. U.S. beverage MNCs tend to be more multinational than MNCs from other countries. Connor and Mather calculated that in 1975 the 180 largest U.S. food and tobacco manufacturers had a foreign sales content of about 15%.

Though the 500 largest firms account for over 90% of the world's FDI, not all MNCs are large. A comprehensive 1974 survey by the Commission of the European Communities identified 9,481 parent companies with one or more foreign subsidiaries (5,865 with two or more) (United Nations 1978). These MNCs altogether owned 170,000 active subsidiaries, of which 48% were foreign affiliates. U.S. parent firms accounted for 27% of the 9,481 MNCs, but their sales amounted to 47% of the total. Altogether there were about 550 food and tobacco manufacturers found (365 with two or more subsidiaries) based in 22 countries; the leading home countries

Table 1. Foreign Content Ratios of the World's Largest Manufacturing
Enterprises, 1977

Principal Industry of Enterprise	Home Countries of Enterprise				
	U.S.	Europe	Japan	Other	All
	(%)				
Food manufacturing	18.9	55.2	2.1	5.8	28.8
Beverage manufacturing	23.6	20.5	—	3.7	17.4
Tobacco manufacturing	29.0	52.1	—	—	40.8
Total	27.4	35.1	6.1	11.5	26.6

Source: Dunning (1981): 5.
[1] Proportion of sales of foreign affiliates (excluding goods exported
intrafirm for resale)to worldwide sales of 877 companies.
— = No companies in cell.

were the U.S. (18.4% of company numbers), U.K. (16.9%), West Germany
(14.4%), France (11.2%), Netherlands (7.4%), and Canada and Italy (4.1%
each).

The most common source of aggregate data on FDI are from the balance
of payments accounts of countries, supplemented with occasional censuses
or annual sample surveys. The stock of FDI is the accummulated book
values of a foreign investor's equity in and long term loans to their
foreign affiliates. Because of minority ownership by foreign investors
and loans by third parties, FDI typically accounts for less than half of
total accounting assets of foreign-controlled affiliates. Nevertheless,
it is a useful measure of relative national stocks and changes in the
stocks (flows) of FDI.

At the end of 1981, the stock of FDI from all the developed market
economies exceeded $500 billion (Dunning 1981: 75). U.S. companies own
45% of the world's FDI, a share that has fallen from over 60% in the
early 1950s. Prior to World War II most FDI was concentrated in public
utilities and raw materials ventures in the less developed areas, but by
the mid 1970s about half of all FDI was in manufacturing facilities,
most of which are located in highly industrialized countries.

U.S. FDI (also called outward investment) in food manufacturing
totalled $9.1 billion at the end of 1981 (10% of total U.S. FDI in
manufacturing) (U.S. Department of Commerce). This would make food
manufacturing rank about fifth among the 20 major industry groups of
manufacturing. Two-thirds of U.S. FDI in food manufacturing is located
in Canada or Europe. U.S. investments in food manufacturing abroad grew
at an average compounded annual rate of 9.8% during 1950-79, slightly

lower than the all-manufacturing average of 11.2%. During 1977-81 U.S. food FDI grew at 13.3% per year.

FDI in the U.S. (also called inward investment) is smaller than the stock of U.S. FDI, but it has grown faster in recent years. In 1975, FDI in the U.S. accounted for about 11% or more of the world total (Hood and Young). Connor (1981a) calculated that it was at about this time that the U.S. surpassed Canada as the largest recipient country for FDI. The year 1981 may be a watershed for the U.S.—the first year in which inward FDI exceeded outward FDI. Inward FDI in food manufacturing in 1981 totalled $4.8 billion (about 16% of all manufacturing FDI in the U.S.), which was slightly over half of outward FDI. Inward investment in tobacco manufacturing was around $800 million, or 3% of the all manu-facturing total. Food manufacturing ranks third in total inward FDI among the 20 major industry groups (Connor 1981c). Rates of average annual growth in food manufacturing FDI in the U.S. have accelerated: from 4% during 1959-74, to 13% during 1974-79, to 37% during 1979-81. Over 95% of food manufacturing FDI in the U.S. is owned by Canadian or European MNCs.1/ Foreign affiliates control about 6% of total assets and 4% to 5% of total sales of the U.S. food and tobacco industries (U.S. Department of Commerce 1976).

FDI is important for reasons other than its large and increasing size. There are many ways in which that operations of MNCs may undermine the functioning of markets. A U.S. Tariff Commission report first pointed out the enormous potential for mischief that MNCs have in international currency markets; the liquid reserves of MNCs are about three times the

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1/ Foreign ownership refers to the first foreign parent, not necessarily the ultimate parent. Many UK MNCs use Canadian affiliates as holding companies for their U.S. investments.

total reserves of all central banks (Dunning 1981: 239). The operations
of MNCs also may contribute to thinning international-commodity-trade
markets. The United Nations (1978) estimated that international trade
between affiliated parts of the same MNCs (intra-firm trade) accounts
for 30% to 60% of the exports of various countries. Helleiner and Lavergne,
in a careful study of 1977 intra-MNC imports accounted for 48% of the
total value of U.S. commodity imports. The proportion of trade that is
intra-firm increases with the degree of processing—over 64% for finished
foods and beverages. Data such as these challenge the assumption of
arm's-length transactions upon which orthodox trade theory rests. Caves
(1974a) has performed one of the few tests of the effect of FDI on host-
country performance. Using data from Canada and Australia, he found that
FDI apparently promoted greater allocative efficiency and technical effi-
ciency. Finally, there is some evidence that the extent of multinationality
positively affects the domestic profitability of U.S. firms (Pagoulatos
and Sorenson; Bergsten, Horst and Moran). Whether greater profitability
is evidence of greater industrial efficiency or heightened market power
is a topic of great import.

Many important public policy issues are raised by FDI, particularly
inward investment (Katzenstein). While the U.S. is light years away
from the degree of foreign penetration seen in Canada (about 56% of
total sales are foreign controlled), Caves, et al. note that foreign
dominance "...has eclipsed all other issues of Canadian policy toward
business..." (p. 80). The cause for concern arises because of the inevitable
clashes that occur between the global profit-maximizing strategies of
MNCs and the national welfare-maximizing goals of countries (Connor 1981b;
Gilpin). Conflicts may arise over corporate income-tax-avoidance, national

aspirations of food security, "foreign content" rules for importers, international transfers of sensitive technological innovations, or the applications of antitrust policies where extraterritorial violations may have occurred. While MNCs may well improve the efficiency of international allocation of resources, the ensuing redistribution of income is not neutral between home and host countries or between capital and labor (Frank and Freeman). This last issue is of special concern to investments in the late developing countries (United Nations 1981).

Distinctive Features of FDI

Dunning (1981) and Hood and Young have done an admirable job of synthesizing the major characteristics of FDI and its conduit, the MNC. This section briefly summarizes these facts, focusing on those relevant to the invstement by food and tobacco manufacturers.

FDI flows are largely, if not exclusive, the domain of large, diversified firms that have developed multidivisional, multilayered internal structures of authority, information flows, and decision making. The experience developed by multiplant domestic firms serving geographically segmented markets, especially those crossing jurisdictions, would appear to be directly analogous to the situation facing potential MNCs. However, in some food processing industries with the greatest extent of multiplant ownership (fluid milk, bread, and beer), FDI has been historically slight. Indeed, FDI in the U.S. has been greatest for nonperishable packaged grocery products like chocolate, soluble coffee, dried soup, tea, and cigarettes, all of which have quite low unit transportation costs (Connor 1981c). More likely to be transferrable internationally are corporate

skills related to advertising, trade promotions, market data gathering, shelf placement, consumer attitudes, quality control, and other poroduction techniques. Indeed, FDI is best understood as package or bundle of resource transfers, both tangible (equity capital, loans, machinery, or material inputs) and intangible (access to corporate technology, patents, trademarks, management methods, technical assistance, credit ratings, and the like).

The origins and destinations of FDI flows are concentrated, both geographically and industrially. The number and type of home countries that account for the bulk of FDI are very limited; though the proportion held by the top two countries (U.S. and U.K.) has declined, 90% or more of the world stock of FDI has been held by 8 countries since the end of World War II. The major home countries are also the major host countries for manufacturing FDI; even those developing countries receiving the most industrial FDI (India, Brazil, and Mexico) tend to be the most industrialized. There are six or seven industries that both give and receive the bulk of FDI, most of which are oligopolistic in significant ways. These patterns of FDI, termed cross-penetration, distinguish it from portfolio investment, which tended to be unidirectional for long periods. Cross-penetration of capital applies at more aggregated, sectoral levels than at the level of individual products.

Modes of entry by MNCs are crucial to understanding the FDI process and its impact. Approximately half of all affiliates established by U.S. MNCs are acquired as going concerns rather than de novo or greenfield ventures. In the early 1950s, only a third of new affiliates were acquired. A new survey of inward FDI in the U.S. provides evidence on

the mode of entry by non-U.S. MNCs (U.S. Department of Commerce). These data for 1980 show that 43% of the 1,659 businesses started by foreigners were acquired; however, in terms of value of investment outlays, 95% of all new manufacturing affiliates and 100% of all new food manufacturing affiliates were acquired. Thus, explanations of the causes of FDI must essentially encompass the motives for mergers and acquisitions. More importantly, theories of FDI must identify the advantages that foreign investors have over host-country firms in the market for firms.2/ One advantage foreign companies enjoy over many of their U.S. rivals is the potential for purchasing leading firms in their industry.3/

Theories of FDI

Contemporary theories of the determinants of FDI are eclectic blends of industrial organization, pure trade, and location theories with an occasional dash of theories of the firm, firm financing, and political economy. A rough tripartite typology has evolved of sources of advantages that potential parent MNCs might have over host-country national corporations (NCs) operating in the same industry. Corresponding to the ancient

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2/ These advantages are somewhat easier to understand in the case of acquisitions in LDCs by MNCs from advanced countries (see Newfarmer and Mueller). Other factors that should be addressed are that (1) most acquisitions are by already established affiliates of the foreign investor (unless these are simply a legal convenience), (2) ownership preferences (full, majority, minority) appear to vary systematically by home country and industry, and (3) methods of financing initial investments and reinvestments depend heavily on host country sources (90% in the case of majority-owned foreign affiliates of U.S. MNCs) and must, therefore, reduce parent MNCs' perception of risk on rates of return because their investments are so highly leveraged.

3/ U.S. antitrust laws can in theory reach over national boundaries. In the 1966 U.S. vs. Jos. Schlitz case, Schlitz's acquisition of John Labatt, Ltd. of Canada was overturned because Labatt was a leading potential entrant in the U.S. beer market. On the other hand, the Nestle' acquisition of Stauffer was permitted even though Nestle' is the leading frozen food manufacturer in Europe. See Long on this issue.

economic distinction of firm, industry, and national economy, the
three sets of advantages are termed <u>ownership-specific</u> (or firm-specific),
<u>industry-specific</u>, and <u>location-specific</u> (or country-specific).

One may envision a potential foreign investor ranking the return on
a foreign investment relative to all other feasible investments in three
distinct (but not necessarily sequential) steps. First, the firm gauges
its probability of investing relative to its domestic rivals in the same
industry by evaluating its <u>ownership-specific</u> advantages. These intangible
assets have public-good characteristics within the firm, <u>i.e.</u>, they are
assets that can be transferred between divisions of the firms at low
marginal cost. Examples of firm-specific assets include patents, trademarks,
consumer loyalty to its brands, a positive enterprise image, R&D resources
yielding technological leadership, effective data gathering and information
systems, special relationships with sources of financial capital,<u>4/</u> and
so on. These assets have particular influence on the decision to invest
rather than license or export.

Second, there are advantages available at equal cost to all firms in
the industry regardless of nationality. Examples of <u>industry-specific</u>
advantages include stable or growing demand conditions, open wholesale
distribution systems, standard guarentees or warrentees, industry quality
grades recognized by purchasers, machinery or other inputs available
from other industries, market information for purchase, special industry
subsidies for exporting, and so on. These advantages accrue equally to
all specialized firms in the industry, but diversified firms with unique
product portfolios will derive a unique combination of such advantages.

_4/ Examples include not only banks or money market funds for large firms,
but also farmer-owned cooperatives and small-business loans._

Thus, in practice, it may be empirically fatuous to distinguish firm from industry advantages.

The third step in calculating the propensity to invest, and especially the direction that the investment will take, involves location-specific advantages of the home country compared to the host country. These assets are available equally to all firms and all industries in the country; they are attributes embodied in factors of production that are mobile within the country but not between countries. Examples of location-specific advantages are worker education levels, climate, language facility, knowledge of business and general customs, military procurement programs, the power or prestige of the government, barriers to trade effectively protecting domestic commerce, and so on.

This theory has not yet received a formal algebraic or geometric treatment. It remains a rather rough guide to empirical testing that is static or cross sectional. There is no dynamic replacement for the appealing, but somewhat discredited product-life-cycle theory (Vernon 1979).

Empirical Studies

In this section, I review quantitative studies that have sought to measure the major determinants of FDI. These studies began to be published about ten years ago (Horst 1972) and have since appeared with increasing frequency. Hood and Young and Dunning (1981) have provided creditable surveys of twenty or more empirical studies of the determinants of FDI that appeared up to the late 1970s (not counting studies of foreign investment by particular multinational firms, industries, or countries). In this survey, I focus mainly on selected cross-sectional studies involving outbound foreign investment by U.S.-based industrial firms or inbound

investment into U.S. manufacturing by non-U.S. corporations. Particular
attention is paid to studies dealing with the food industries, utilizing
superior data sets, or incorporating methodological advances. Space
limitations often will necessitate too brief mention of underlying hypotheses
and omission of details on index construction, significance levels, and
unimportant control variables.

Following Lall and Siddharthan, the studies are grouped into three
broad categories. First are studies that analyze differences between MNC
and NC firms from the same home country, seeking determinants of the
probability of FDI that are mainly firm-specific. A second group of
studies examines variation in the FDI propensities across industries or
firms; this set of studies has tested determinants arising primarily
from the structures of the home-country industries. The final type of
studies analyzes variation in FDI penetration across industries of single
host country; the major determinants tested are features of host-country
industry structure or variables involving comparisons of home-and host-country
industrial characteristics. The degree of foreign involvement is sometimes
measured by a simple binary classification, but generally is the proportion
of foreign sales, assets, or profits relative to global or national
totals.

FDI Probability

One of the first reasonably comprehensive directories of U.S. MNCs
was assembled by the Harvard Multinational Project (Vaupel and Curhan).
Drawn from among the 500 largest industrial firms of 1964, a multinational
enterprise was defined as a firm with one or more manufacturing operations
outside the U.S. Almost half of the MNCs had operations in six or more

countries. These data demonstrated quite convincingly that MNCs are larger, more profitable, and more involved in marketing highly differentiated or high-technology products than their uninational counterparts (Table 2). U.S. MNCs were also found to be more diversified and pay high wages than the non-MNCs. More recent collections of data confirm these differences for non-U.S. manufacturing MNCs as well, most of them headquartered in Western Europe or Japan (Dunning 1981).

Lipsey and Kravis recently compiled an ambitious data set comprising about 1000 U.S. manufacturing firms, most of them publically owned. The authors' method permits them to decompose the differences between national and multinational firms into the portion due to the industry composition and the part due to differences among firms within the same industries. They argue that this approach allows the analyst to distinguish ownership-specific advantages of MNCs from industry-specific advantages. Because the firms are classified dichotymously, the results can be used to identify determinants of the probability of investing rather than the propenity to invest; that is, they identify factors that form thresholds or barriers to an initial investment, not the proportion that FDI will reach.

The results of the Lipsey-Kravis analysis are summarized in Table 3. The most striking difference between MNCs and NCs is their size—MNCs are six to nine times larger for the manufacturers as a whole. MNCs are also strikingly more profitable 5/ and more R&D-intensive. In all three

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5/ Rugman has matched MNC and NC firms in the same industry and found that the variability of profitability over time is significantly lower for MNCs. He attributes this stability to the lack of perfect correlation in demand and factor costs among nations. If the owners or managers of companies are risk averse, this provides an additional incentive for FDI.

Table 2. Characteristics of the Largest U.S. Companies, 1964

Characteristics	National enterprises	Multinational enterprises
Number	125	366
Average sales ($ million)	160	322
Net profits on capital, 1960–64 (%)	6.7	8.1
R&D expenditures-to-sales (%)	0.6	2.1
Advertising expenditures-to-sales (%)	1.7	2.2

Source: Vaupel and Curhan (1969).

respects, the source of the differences is partly a characteristic of their industries participation and partly a characteristic of MNCs relative to NCs in the same industry. Capital-intensity and skilled-labor differences are wholly explained by industry composition, whereas the higher growth rates of MNCs are entirely company-derived. These distinctions are helpful in interpreting regression analyses that use industry aggregates as explanatory variables for the FDI activity of MNCs within the industry.

Caves and Pugel used 1969-72 IRS data on 73 U.S. manufacturing industries to examine closely the relationship between the characteristics of firms and the likelihood of investing abroad (using as a proxy the ratio of foreign affiliate dividends plus foreign tax credits to assets). Not surprisingly, they found the propensity to invest abroad positively associated with size in 52 out of 73 industries in 1972, including most of the food and beverage industries. Further analysis showed that this positive relationship is stronger in industries with both high concentration and high advertising intensity; on the other hand, these data indicated no FDI-size correspondence related to differences in R&D intensity or sales concentration per se. They infer that smaller firms in producer-goods or technology-intensive industries are not disadvantaged relative to large firms in this ability to invest abroad.

Dunning and Pearce compiled a data set consisting of the 642 largest industrial firms in the world in 1972, one-third of which are non-U.S. They also found that the degree of multinationality of firms was related to large firm size and high R&D intensity, firm growth, and profits. There are no comparable studies available for food firms exclusively, but

Table 3. Characteristics of U.S. Manufacturing Companies With Foreign Investments Compared to Noninvestors, 1972

Characteristics (number of indexes)	Average of Investors over Noninvestors	Sources of differences	
		Industry Composition	Companies Within Their Industries
	(%)	(Proportion)	
Size of firm (3)	500–800	1/2	1/2
Profitability (2)	50–60	1/3	2/3
R&D intensity (4)[1]	40	1/2	1/2
Capital/labor intensity (4)	20	1	0
Growth rates (3)	0–20	0	1
Skilled labor intensity (2)	0 or negative	1	0

Source: Lipsey and Kravis.
[1] Source of differences was ambiguous.

there is no reason to expect food MNCs to differ from other manufacturing
MNCs.

FDI Propensity of Manufacturers

The empirical literature exploring the degree of FDI by U.S. firms or
industries is somewhat richer. The explanatory variables used primarily
refer to home-country industry characteristics, though the argument is
often made that these are proxies for firm-specific advantages. These
models attempt to explain the extent of foreign relative to domestic
production, not the initial decision to go abroad.

A seminal article by Gruber, Mehta, and Vernon was probably the
first econometric study of the determinants of FDI among U.S. industries.
Though their intent was to verify the predictions of the product-life-
cycle theory of trade and investment, it early established a central role
for various measures of technological intensity as positive determinants
of FDI propensity.

Wolf developed 1963 data on the propensity of foreign sales for 95
manufacturing industries using an interpolation procedure on the same index
as Caves and Pugel (Table 4). Only two industry factors (both positive)
explained about 33% of the variance in FDI—average firm size and the
proportion of scientists and engineers in industry employment. While the
latter variable is interpreted as a proxy for accumulated technical
knowledge of firms, the size variable is interpreted variously as representing
economies of firm size in production, marketing, or financing; Wolf
interprets both as proxies for underutilized firm resources that can be
transferred costlessly within the firm abroad. However, the size variable

Table 4. Selected Cross-Sectional Studies of the Determinants of Foreign Direct Manufacturing Investment

Type of Study	Firm or Home-Country Determinants[1]								Locational Determinants[1]							
	Firm Size	Firm Diversi-fication	CR	R&D	ADV	Market Barriers	Pro-fits	Growth	Trade Barriers	Host Size	Host CR	Host R&D	Host ADV	Host Market Barriers	Host Wealth	Host Growth
FDI Probability:																
1. Vaupel & Curhan	+	+	+	+	+	..	+	..	..	..	..	..	..	..	..	..
2. Caves & Pugel	+	..	+	..	+	..	..	..	..	..	..	..	..	..	..	..
3. Lipsey & Dravis	+	..	..	+	..	+	+	+	..	..	..	..	..	..	..	..
4. Dunning & Pearce	+	..	..	+	..	..	+	+	..	..	..	..	..	..	..	..
FDI Propensity:																
5. Wolf	+	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..
6. Pugel	..	..	+	+	+	0	..	..	..	..	..	..	..	..	..	..
7. Baldwin	..	..	+	..	+	..	..	..	0	..	..	..	..	..	..	..
8. Lall	..	..	..	+	+	+	..	..	..	+	..	..	..	..	..	−
9. Dunning	..	..	..	+	..	..	..	..	−	..	..	..	..	..	+	−
10. Bergsten, Horst, Moran	+	..	..	+	+	..	..	..	..	..	..	..	..	..	..	..
11. Horst (1974)	+	..	+	..	+	..	..	..	..	..	..	..	..	..	..	..
12. Murphy & Connor	+	+	0	0	+	0	0	0	..	..	..	..	..	..	..	..
FDI Penetration:																
13. Horst (1972)	+	..	..	+	+	−	..	..	..	..	..	..	..	..	..	..
14. Caves (1974)	..	..	+	+	+	+	..	..	0	..	0	+	+	+	..	..
15. Gorecki	..	..	..	..	..	..	..	..	0	+	..	0	0	0	..	+
16. Caves, et al.	..	+	..	+	+	..	..	..	+	..	..	+	+	..	..	..
17. Lall & Siddarthan	..	+	..	..	..	..	..	..	+	..	−	0	0	−	..	..
18. Connor (1981a)	+	+	+	..	+	..	0	0	0	0	−	..	0	0	..	..

[1] Definitions of the determinants and their symbols are given in the text.

.. = Not applicable
+ = Positive, significant determinant of FDI
− = Negative, significant determinant of FDI
0 = Insignificant determinant of FDI

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is very likely to be related to domestic product diversification or, because it eliminates most smaller firms, sales concentration.6/

Pugel developed 1970 data on FDI from IRS sources and related it to market structure variables for 71 U.S. manufacturing industries. He interprets the positive influence of R&D intensity (R&D) and advertising-to-sales (ADV) as evidence of firm-specific intangible assets that generate advantages for MNCs over host-country rival firms. U.S. sales concentration (CR) influences FDI because of oligopolistic reactions by U.S. MNCs or because it is a proxy for "most-favored-entrant status" into similarly structured foreign markets. Pugel employed two-stage-least-squares to support his ordinary-least-squares results.

Four statistical studies recently published by Baldwin, Lall, Dunning, and Bergsten, Horst, and Moran all used the same data source to calculate FDI propensity, a U.S. Tariff Commission report of 1970 exports and foreign-affiliate sales of U.S. companies.7/ Lall and Baldwin examined FDI from 23 to 25 manufacturing industries flowing to all geographic areas outside the U.S.; Bergsten, Horst, and Moran created many more observations (184) by considering the proportions of foreign-affiliate sales in each of 5 different host regions and 3 host countries; likewise, Dunning (1981) analyzed foreign production in the 7 largest recipient

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6/ Ray derived a simple testable model of FDI In manufacturing and tested it against the 1966 benchmark survey of U.S. FDI by estimating production functions across 38 host-geographic areas. Because the model assumes identical production technologies in all areas and homogeneous products, it is of little interest to students of the food industries.

7/ There is a study by Swendenborg of FDI propensity using quite precise data on foreign asset ownership of Swedish-owned industrial firms. She found a significant negative relationship between FDI and the ratio of physical capital to sales and industry scale economies and a positive relationship between FDI and skilled labor intensity and technical employment ratios.

countries of U.S. FDI. Because all four analyses used grouped data, the extent of explained variation ranges from about 45% to 70% using only 5 to 8 independent variables.

The results of these four studies contain a number of consistent conclusions. Using different indexes, all four studies show that technological levels in the U.S. industry (R&D expenditures) or highly skilled industry labor (education levels or proportion of technical employees) positively influence FDI propensities. In the three analyses including such a variable, industry product differentiation (advertising intensity) also has a positive impact. All of the studies include other variables that are either sources of (concentration, economies of plant scale) or effects of (average wage levels) host-country market power; in every case they influence FDI positively. In short, all four studies support the hypothesis that FDI propensity is highest where firm-specific advantages arising from technical, marketing, or market-power advantages are greatest.

Three of the four studies also include variables that are location-specific. Baldwin found that average international transportation costs from the U.S. to the host-countries and average nominal host-country tariffs play no role in the degree of FDI. Bergsten, Horst, and Moran estimated that host-country GNP, host-country per capita consumption expenditures, and the proportion of host-country imports accounted for by U.S. exports; all exercized positive influences on FDI propensity. Dunning (1981) has similar results for an analogous import variable and for a variable that captures the size of the host-country industry relative to the comparable U.S. industry. In sum, U.S. FDI takes place most often

in relatively rich host-countries with industry compositions resembling that of U.S. manufacturing; it parallels U.S. commodity exports but is not deflected by barriers to trade.8/

FDI Propensity of Food Manufacturers

There are two studies available explaining FDI propensities among U.S. food manufacturing firms. Both analyses suffer from greater data limitations than the four studies just reviewed. Horst (1974) analyzed variations in the estimated proportions of foreign assets held by 36 large U.S. food manufacturers using 1971 data. His main finding was the FDI was directly explained by firm asset size, advertising intensity, and the degree of geographic concentration of the industry (this last factor is known to be positively related to industry concentration).

The second study by Connor and Murphy of U.S. food and tobacco manufacturers employed data from Connor and Mather on the 1975 foreign content rtios of 84 companies.9/ Following Horst (1974), only companies

8/ However, an interesting result from Baldwin is that the 1966-70 change in FDI relative to the change in domestic U.S. investment was positively related to tariff levels. Thus, tariffs may affect new FDI flows but not the accumulated stocks of FDI. Also note that all four studies examined export propensities and found significantly different explanatory factors operating.

9/ The unpublished regression analysis was performed in 1980 by Donna Neilson Murphy and subsequently extended under my direction. The FDI propensity variable includes export sales for a few firms, but these are small relative to foreign-affiliate sales. To remove the effect of nonlinearities in the model, the model reported in the text uses the square root of FDI propensity; using the untransformed ratio reduces the fit by 10 percentage points or so. All independent variabes are firm-specific or based on U.S. industry data weighted by firm sales in those industries. There was no strong evidence from an examination of the regression residuals of a heteroskedasticity problem. However, there was some evidence of multicollinearity among the independent variables. In particular, firm relative market shares are highly correlated with SIZE and ADV. Profits are somewhat correlated with SIZE, average market shares, ADV, DIV, and R&D. Also, R&D is correlated with both SIZE and DIV. The results for DIV are not very sensitive to the choice of index (see MacDonald).

with at least 50% of their total sales in SIC 20 or 21 were included, and cooperatives, privately held firms, and distillers were excluded. One of the best ordinary-least-squares regression results was:

$$FDI = -0.57 + \underset{(0.0002)}{0.0009} \text{ SIZE} + \underset{(0.48)}{1.04} \text{ R\&D} + \underset{(0.30)}{0.78} \text{ DIV} + \underset{(6.88)}{34.4} \text{ ADV}, R^2 = 0.65,$$

where SIZE is total firm sales, DIV is the entropy index of firm diversification, R&D is weighted research-and-development expenditures intensity, ADV is U.S. weighted media advertising intensity, and standard errors are given in the parentheses. All independent variables are significant at the 5% level or better. Other explanatory factors were considered but were generally insignificant—company financial profits and weighted industry CR4 are two such factors. Weighted industry 1972-74 growth was always positive in sign but was significant only when the relatively slow growing sugar and beer firms were excluded from the sample. A final interesting result concerns R&D. When technological progressiveness is measured by an output index (number of patents issued per firm during 1969-75) instead of an input index (R&D expenditures), no influence on FDI is found. Moreover, restricting the sample to the 36 U.S. food firms with significant, reported R&D expenditures (the other 48 reported none and were assumed to have none) also reduced the R&D-FDI relationship to zero. Thus, R&D programs in food firms appear to have a threshold effect on FDI—they affect the probability but not the propensity of FDI.

FDI Penetration of Manufacturers

The third group of studies reviewed here examine the phenomenon of the inward FDI, usually measured by the extent to which sales or assets of a host-country industry are controlled by foreign owned companies. The

determinants of investment are sought principally in host-country-industry

features, though home-country advantages are sometimes considered. This

group of studies is most revealing about MNC advantages vis-a-vis host-

country barriers to market entry.

There are at least four published studies that investigate the

determinants of FDI penetration into Canadian manufacturing industries.

These studies are relevant to understand U.S. FDI because four-fifths

of FDI in Canadian manufacturing is U.S. owned. Canada is also an

interesting case bacause export barriers are low for most goods, national

preferences are so close to those in the U.S., and FDI penetration is so

extreme—about 60% of its manufacturing assets foreign owned.

Horst (1972) authored the first study of FDI penetration in Canada

in 1963. He showed that the proportion of sales controlled by MNCs in

18 Canadian manufacturing groups was positively related to R&D intensity

of the comparable U.S. industry. Perhaps more important was Horst's (1972a)

analysis of the probability that large U.S. MNCs would establish an affiliate

in Canada; controlling for interindustry differences, the probability of

FDI increased steadily with firm size (e.g., 50% at $125 million in firm

sales and 90% at $500 million). Cave's (1974) study of FDI into Canada

was richer in hypotheses and detail than Horst's. He found considerable

support for MNC advantages representing intangible assets (R&D and ADV)

and multiplant economies of scale but found no evidence that underutilized

entrepreneurial resources or trade barriers affected FDI. Caves (1974)

linked U.S. industry data to approximate the advantages of U.S. MNCs in

Canadian industry, but Gorecki explained gross entry by all foreign

affiliates (over 50% foreign owned) during 1964-67 employing only Canadian

industry data. The only factors influencing foreign entry were the size
and growth rates of Canadian industries—both positive. Foreign affiliates,
which may have entered de novo or by acquisition, were undeterred by factors
that usually constitute barriers to market entry: high concentration, adver-
tising intensity, R&D intensity, and capital requirements. An original
contribution of the Gorecki paper was that all four potential barriers
exercized significantly negative influences on entry by Canadian-owned
companies. This study provides persuasive evidence of the power of MNCs,
most of them from the U.S., to overcome barriers to entry that host-country
firms find daunting.

The final study of FDI into manufacturing is part of a large scale
examination of nearly all aspects of industrial organization in Canada
(Caves, et al.). In addition to such previously estimated determinants as
firm-specific production, technology, and marketing skills, Caves, et al.
also introduced variables representing Canadian entry barriers and traditional
comparative advantage factors from pure trade theory (relative unit costs
of production, transportation costs, and tariffs). Their results support
Gorecki's finding that MNCs are not repelled by Canadian entry barriers
into manufacturing and that FDI penetration (the proportion of value of
industry shipments from foreign-owned establishments) is unaffected by
neoclassical comparative advantage. Another innovation of the Caves, et al.
study was to examine the impact of sales concentration (both U.S. and
Canadian) in FDI. They interpret the strong positive relationship for
CR as verifying the Knickerbocker thesis that oligopolistic coordination
encourages a "bunching" of investments in foreign markets.10/

10/ Knickerbocker, using data on the time of establishment of overseas
manufacturing subsidiaries of the 187 largest U.S. MNCs, found that the
investments in particular host-countries and particular industries tend
to come in waves that were statistically close in time. The extent of
this bunching was correlated with concentration of the parent MNC's
industries.

Graham extended Knickerbocker's empirical work by looking at the temporal patterns of the beginning of ownership of manufacturing subsidiaries of 187 U.S. MNCs in Europe and of 88 European MNCs in the U.S. during 1950-70. Graham's results indicate that defensive reactions by European MNCs to initial entry by U.S. MNCs occurred in 12 major industry groups, including food manufacturing where lags were calculated to be between 2 to 11 years.

One study of FDI into U.S. manufacturing is by Lall and Siddharthan. Their results may challenge important assumptions about the nature of FDI made almost exclusively from generalizing about FDI from the U.S. They argue that the sources of market power for U.S. MNCs may not be the same sources as for non-U.S. MNCs because the U.S. is unique in its pattern of technological development, government policies, and marketing and management methods. Barriers to foreign entry into U.S. industries may be effective against even those MNCs with formidable ownership-specific advantages--high R&D capacities, differentiated products, large size, and the like. To test their hypothesis, they analyzed the sources of variability in the proportion of sales from foreign owned subsidiaries in 45 U.S. manufacturing industry groups; data are from the 1974 benchmark survey of FDI by the U.S. Department of Commerce (1976). Since the focus of their study is the relative monopolistic advantages of U.S. to non-U.S. MNCs, they eliminate the 40 U.S. industry groups with no foreign presence on the grounds that locational disadvantages probably overwhelm potential firm-specific advantages. The empirical results indicate that FDI into the U.S. is encouraged by effective tariff levels and the

extent of multiplant ownership, discouraged by high concentration or economies of scale, and unrelated to advertising intensities, R&D intensities, or management skills. These last results are at variance with previous tests of outward U.S. FDI, so a degree of skepticism is warranted with respect to the symmetry of inward with outward FDI.

FDI Penetration of Food Manufacturers

There is one published study of FDI into the U.S. food and tobacco industries (Connor 1981a). It examined both the U.S. FDI propensity and penetration (at the 4-digit SIC industry level) of 120 of the largest non-U.S. food manufacturers using data from the mid 1970s. Data were developed to examine the influence of firm-specific and locational (country) characteristics as well as industry organization in both the home and host-countries.

In the regressions explaining the proportion of U.S. to total company sales, six factors were found to have a significant positive influence: per capita home-country advertising expenditures, firm's food and tobacco advertising intensity, firm sale size, firm sales-diversification index, extent of firm specialization in food and tobacco sales, and a qualitative variable for firms having publically traded stock. Several factors were unrelated to U.S. FDI propensity: home-country per capita GNP, U.S. industry import intensity (positive but not quite significant), U.S. sales concentration, and U.S. plant and multiplant economies of scale. Thus, the most likely candidates for investing in the U.S. food industries are large, highly diversified, publically owned firms with experience in marketing highly differentiated food products in their home country.

For a subsample of 76 firms for which data were available, weighted home-country market share was found to exert a significant positive influence; including market share reduced the size variable nearly to insignificance. For a subsample of that excluded Japanese and LDC firms, the fit and significance levels markedly improved, indicating that socio-cultural distance may foster barriers to FDI in differentiated consumer-products industries. Finally, for a subsample of 38 Canadian and U.K. firms, the most interesting finding was that average home-country concentration was a strong positive predictor of FDI while high U.S. concentration (in the industries in which the firm produced worldwide) repelled U.S. FDI. In genral, these results are consistent with previous findings (Table 4).

The Connor (1981a) study calls into question some of the findings of Lall and Siddharthan. To be fair, the food industries accounted for only 5 of their 45 observations. However, one of the strongest findings in Connor (1981a) was that non-U.S. MNCs with sufficient marketing expertise in home-countries with highly developed advertising industries can become active rivals of U.S. MNCs in their home territory. The Connor (1981a) results may apply to a broad array of frequently purchased, low-unit-value products made with unsophisticated technologies and sold through grocery and drug store channels.

The Connor (1981a) study also suggests some important future refinements in empirical studies of the determinants of FDI. First, one of the most consistent previous findings was the strong influence of firm (or average firm) size. It seems very likely that firm size has been serving as a proxy for other underlying factors: the ability to create and manage widely diversified enterprises and experience in developing

strategies to gain high market shares in relatively concentrated markets.

Second, provision must be made for controlling for the presence of

cooperative, government-owned, and family-controlled firms, all of which

appear to be disadvantaged in FDI relative to management-controlled firms.

Finally, previous studies may not have modeled the influence of oligopolistic

structures in a sufficiently rigorous way. Tests of defensive rivalry

and international oligopolistic interdependence have so far been very

crude. The results in Connor (1981a) relating to market shares and

relative concentration levels in home vs. host industries suggest that

further development along these lines may be fruitful.11/ Data constraints

are admittedly rather daunting.

Conclusions

At the same time as popular interest in the subject of the MNC has waned,

passionate debate on the economics of FDI has come to be replaced by

statistical hypothesis testing. Our knowledge of determinants of FDI has

increased markedly during the last decade. The empirical studies reviewed

in this article reveal a number of consistent findings, particularly those

concerning the characteristics of MNCs and their home-country industries.

Yet many limitations remain to be overcome. These studies often exhibit

ad hoc specifications, inappropriate data, and inconclusiveness about

causality. For example, it seems quite likely that variables representing

firm size may be serving as proxies for other underlying factors—the

11/ A promising exmaple of how this might be approached is the unpublished
study of the world coffee industry by Domike and Borgolz. They were
able to obtain market shares and concentration ratios for the major
producing firms and consuming countries for several time periods. An
interesting study of the cigarette industry that takes a similarly global
viewpoint was published by UNCTAD.

ability to create or manage widely diversified enterprises, success in developing strategies to gain high market shares, or simply high levels of market concentration. In general, extant studies are rather weak on modelling locational factors. Further testing of models incorporating aspects of home-country vs. host-country market structures or levels of development appears to be warranted.

There appears to be an emerging concensus about the theory of foreign direct investment. It is an eclectic blend of the theories of the profit-maximizing firm, the market structure-performance relationships within industries, and international commodity trade. This amalgam has not yet been fused into an organic alloy, lacks sufficient empirical verification, and still fails to explain one or two distinct features of FDI. The thesis, associated with the writings of Williamson, that MNCs are internalizing imperfections in existing markets, has received scant empirical verification, as Dunning (1981) acknowledges. The internalization hypothesis is incompatible with the market-power hypothesis in the sense that they imply contrary impacts on efficiency and income transfers. In my view, the suggested benefits from internalization of markets by MNCs would likely apply more to vertical investments (e.g., grain-trading companies) (Caves 1977) than to horizontal investments (e.g., breakfast cereals manufacture). Moreover, even if internalization by MNCs does increase the efficiency of imperfect markets, it remains possible that the MNC is a second-best solution compared to other institutions.

Two features of FDI that I believe have been inadequately incorporated into the reigning theory or extant empirical tests are the existence of oligopolistic interdependence and the prominance of entry via takeover.

Oligopolistic interdependence is a fancy term for collusion on a world scale. As such, it is a form of conduct arising from market structures seen from a global perspective. If MNCs see the whole world as their oyster and if the numbers of leading sellers are small enough, collusion is likely to arise. Of course, Knickerbocker has tested this notion in a rough sort of way, but studies that look at more than home-country concentration are sorely needed. Given the state of conduct-structure studies of domestic phenomena this may sound like the counsel of perfection, but I believe such studies may be possible in the near future. The second feature inadequately woven into the ecletic theory is that the preferred mode of entry by MNCs is via acquisition.

A theory is needed that explains the advantages that foreign companies have over local companies in bidding on the market for firms. In a country like the U.S. where the takeover game is played with such finesse and where there are so many merger midwives, one wonders why U.S. firms are increasingly losing out to non-U.S. MNCs (i.e., why the trend toward net inward FDI has persisted for so many years). While I am personally resistant to conspiracy theories involving international financiers, the close relationships that some foreign investors have with their banks (or U.S. banks for that matter) should be examined to explain the ease with which acquisitions are being financed.

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