FOREIGN INVESTMENT IN UNITED STATES MANUFACTURING

AND

THE THEORY OF DIRECT INVESTMENT

by

David Stanley McClain

B.A., University of Kansas

1968

Submitted in Partial Fulfillment

of the Requirements for the

Degree of Doctor of

Philosophy

at the

Massachusetts Institute of

Technology

September, 1974

Signature of Author . . . .

Department of Economics, August 12, 1974

Certified by . . . .

Thesis Supervisor

Accepted by . . . .

Chairman, Departmental Committee on Graduate Students

ABSTRACT

FOREIGN INVESTMENT IN UNITED STATES MANUFACTURING AND THE THEORY OF DIRECT INVESTMENT

David Stanley McClain

Submitted to the Department of Economics on August 12, 1974 in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

This three-part study presents historical and institutional, theoretical, and empirical analyses of foreign direct investment in the United States. In Part I, after a brief introduction, Chapter 1 traces the role of foreign direct investment in the United States economy from colonial times to 1950. Chapter 2 continues the narrative to the present day, and discusses the current institutional and political environment for foreign investment in the United States. In Chapter 3, the foreign investment decision processes of two companies in each of two industries, automobiles and minicomputers, are compared; in each case one of the companies has a subsidiary in the U.S., while the other does not.

In Part II, Chapter 4 contains a brief description of the various theories of direct investment and discusses the application of these theories to the experience of foreign direct investment in the United States, as given in the literature. Chapter 5 presents two theoretical frameworks for microeconometric and macroeconometric analyses of foreign direct investment in the United States. The most general approach, used with the microeconomic data, views the foreign investment decision process as a Markov decision process with the act of making a direct investment represented by a transition between states in such a process. The macroeconometric framework is a general disequilibrium variant of the neoclassical theory of optimal capital accumulation in several locations, and features variable speeds of adjustment of actual to desired stocks.

Chapter 6 begins Part III with an analysis of the decisions of 114 non-U.S. multinational corporations to locate 2051 manufacturing subsidiaries in or out of the United States. The probability of a transition to the United States, as opposed to elsewhere, is estimated via the multinomial logit probability model as a function of subsidiary, parent, industry and national characteristics, suggested in part by the conclusions of Chapters 3 and 4. By exploring the fashion in which the estimated probability depends on the various characteristics, inferences can be made about the validity of various theories of direct investment. The results of the analysis lend strong support to the industrial organization paradigm description of direct investment behavior, though there are some interesting differences in the characteristics of subsidiaries located in the U.S. and subsidiaries located elsewhere.

In Chapter 7, the aggregate Department of Commerce data on foreign investment in United States manufacturing are analyzed, with particular focus on country effects and parent-subsidiary financial considerations. Chapter 8 concludes the thesis by discussing theoretical and methodological issues in the analysis of direct investment, summarizing the empirical findings, suggesting future research, and examining the policy implications of the empirical results.

Thesis Supervisor: Charles P. Kindleberger
Title: Professor of Economics

PREFACE

My profound thanks go to the members of my thesis committee, Professors Charles P. Kindleberger, Franklin M. Fisher, and Lester Thurow. I consider it a privilege and my good fortune to have studied under such a distinguished and engaging teacher and scholar as Professor Kindleberger. His rapid replies to and valuable suggestions for my draft chapters, especially but not exclusively on matters of history and political economy, improved the quality of the final product measureably. He is to be commended for standing firm in the face of "human wave" assaults of split infinitives and dangling modifiers; if some remain in the text, they are only testimony to the volume of my attack.

Professor Fisher was kind enough to review in detail the contents of the theoretical and empirical chapters, and clarified the exposition and improved the econometric specification in several instances. Professor Thurow gave the finished work an expeditious yet thoughtful reading.

I owe my opportunity to undertake an original piece of econometric research on this subject to Professor Raymond Vernon of the Harvard Business School Multinational Enterprise Project. Professor Vernon permitted the use of confidential data on over 17000 subsidiaries of 228 non-U.S. multinational corporations collected by the Project. His research associate Joan Curhan facilitated my access to the data and George Middleton provided data security and programming assistance.

Professor Jens Lubbert of the University of Hamburg kept me informed on the situation in the West German automobile industry and Joan Greenwood of Charles River Associates, Cambridge, Mass., made available up-to-date material on the European computer industry.

My good friend and fellow student Michael Aho kept me abreast of the latest developments in the American government's attitude toward inward investment in his capacity as a consultant to the President's Council on International Economic Policy. William Presson of the Dewey Library at M.I.T. went out of his way to provide me with all the latest published material on the subject.

Martin Holmer first suggested that it might be profitable to view direct investment as a Markov decision process. Others besides Aho and Holmer who answered my questions and made comments on different parts of the manuscript were Robert Taggart, James Kearl, Takeshi Yano, Dominique Hardy, and Ellen Burton; Rick Kasten gave advice on the use of the Cross Section Package computer program and helped me overcome one particularly baffling problem in the econometric estimation. Professors Svend Hylleberg of the University of Aarhus, Robert Hall and Jerry Hausman of M.I.T., and Herbert Glejser of the Free University of Brussels provided comments on various portions of the econometric work. Finally, I benefitted from presentation of various parts of this work before the International Economics Workshop at M.I.T.

My thanks go to Mrs. Aimee von Karolyi for an extremely professional job of typing the first six chapters under a pressing time constraint and in the face of all manner of "natural disasters," and to Marie-Claire Humblet and Michael McKee for translating assistance.

My way this past year was made much smoother by the financial support I received from the Project in International Business of M.I.T.'s Center for International Studies and from a National Science Foundation Graduate Fellowship. Professor Everett Hagen of the Center and the Center's Administrative Officer, Kathleen O'Sullivan, were both quite responsive to my research needs.

I would be remiss if I failed to recognize my long-standing obligation to a most unforgettable teacher and a poet in the truest sense of the word, Professor Franklyn Nelick. He is an expert on what economists have crudely labeled "non-economic objectives."

Words cannot express my gratitude to my wife, Gayla, for her strength, support and good sense of humor during this effort, and to my daughter, Molly, for bringing me laughter at the end of many a long day. I hope to do as well by my wife as she now takes her turn in graduate school.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

TO MY MOTHER AND FATHER

INTRODUCTION

Investment by citizens of one country in the real assets of another for purposes of controlling these assets ("direct investment") is perhaps the characteristic of the postwar international economic system that most distinguishes it from earlier times. Many studies have been made of this phenomenon; most have been descriptive, a few analytic. But almost without exception, they have focused on what is admittedly the most striking aspect of this experience--the explosive American corporate expansion into both the industrialized and less-developed countries. In the context of "Le Defi Americain" theories have been promulgated and occasionally tested. These theoretic formulations have been inputs into the formation of public policies designed to resolve the complications in corporate-government and intergovernmental relations engendered by the development of multinational corporations. Unfortunately, a significant body of foreign direct investment has been generally ignored in this literature--the experience of foreign investors in real assets in the United States. It is my intention in this thesis to rectify partially this lacuna.

It was a discrete event--the currency realignments of 1971-1973--that brought such investment to general attention. Subsequent to the exchange rate changes, popular business publications were filled with articles concerning foreign (mostly Japanese) direct investment in the United States. The energy difficulties in the fall of 1973 generated another wave of journalistic descriptions of Arab sheikhs craftily scanning the New York Stock Exchange listings, deciding which undervalued American company to buy with their windfall profits. The impression transmitted was that foreign direct investment in the United States was a new phenomenon.

However, as shown in chapter 1, foreign involvement in United States business has a long history which serves to emphasize the temporally continuous nature of foreign direct investment, so often overlooked in discussions of the postwar experience of American corporations. This history provides a valuable laboratory for the analysis of the implications of such investment for relations among the industrialized countries of the world, since the overwhelming majority of foreign direct investment in the U.S. comes from industrialized economies. Theories of direct investment which are validated by both the postwar American experience in Europe and by the foreign (especially European) experience in the United States may be considered to be generally valid for the industrialized countries as a whole and would thus provide a sounder basis for public policy decisions by national and supranational governments. It is similarly valuable to identify those theories which are applicable to only one country or a small group of countries.

If continuity is one defining characteristic of foreign direct investment in the United States, so is the imprecision of the facts known about it, as will become apparent in chapters 1,2, and 4. Before 1950, only the impetus of two world wars compelled the U.S. government to discern accurately the extent of foreign corporate operations in the United States. In the postwar period, one survey was conducted in 1959 by the Department of Commerce; otherwise U.S. government studies of foreign direct investment have concentrated on the American experience abroad. Until very recently governments also devoted little effort to collecting statistics concerning the overseas investments of corporations based in their countries. However, the recent surge of foreign investments in the United States has stimulated a flurry of congressional interest, and in late 1973 Senator Inouye (D-Hawaii) introduced a bill to fund a two-year study of the phenomenon; as of July 1974, this bill had passed the Senate.

Fortunately, statistical analysis for foreign direct investment in the United States need not wait until the Inouye study is funded and conducted. First, the Department of Commerce has annually updated its 1959 survey; these data can provide the basis for statistical analysis at a macroeconomic level. More important, the Multinational Enterprise Project at the Graduate School of Business Administration at Harvard University began in 1965 to collect information on approximately 400 of the largest corporations in the world and their subsidiaries. By late 1973, it had compiled data on 28000 subsidiaries, 17000 of them belonging to 228 large corporations with headquarters outside the U.S. These data provide for the first time a basis for a microeconomic analysis of foreign direct investment in the U.S.

The purpose of this study is to model and test theories of direct investment, using the data described. The focus will be primarily on foreign direct investment in manufacturing industries. It is these industries in which the American "invasion" of Europe has been concentrated and which have been analyzed in the greatest detail. This should enhance the comparability of the results obtained here with earlier studies. However, mining, agriculture, wholesale and retail trade, and finance and insurance are also sectors which at some point in time have been relatively important recipients of foreign direct investment, though in recent years manufacturing has represented an increasing share of the total. These other sectors will receive no analytic treatment in this study.

This thesis is organized into three parts. Part I provides a descriptive overview for the analysis to follow. Chapter 1 is devoted to a brief history of foreign direct investment in the United States before 1950. Chapter 2 continues that history through 1974, placing foreign direct investment in the U.S. in the context of international investment worldwide, and concludes with a description of the legal and institutional environment faced by foreign investors in the United States. Chapter 3 contains two case studies for the automobile and computer industries, focusing on a comparison in each industry of one firm which has invested in the U.S. and one which has not.

Part II is concerned with the theory of direct investment. Chapter 4 reviews the literature on various theories of direct investment, and discusses the (scarce) literature in which these theories have been discussed in the context of foreign direct investment in the U.S. In chapter 5, I formulate the theoretical frameworks within which I test the various theories. The macroeconomic framework is a variation of the neoclassical theory of optimal capital accumulation, reflecting my belief that capital accumulation, rather than capital allocation as in a portfolio model, is at the heart of decisions to invest in the United States.

The microeconomic framework is much more general. The basic conception is that of an industry evolving through time. One choice facing each (perhaps profit-maximizing) firm in that industry is the decision of whether to export its product to the U.S., to license its production here, or to make a direct investment in the U.S. At each moment in time, a firm has a given probability of switching from exporting or licensing to direct investment, and a given probability of continuing to export, to license, or to operate a direct investment. The probabilities (which may be interpreted as the transition probabilities in a Markov decision process) depend on variables, external to the process, representing the various theories of direct investment.

Part III contains the empirical analysis of the theories discussed in Part II. Chapter 6 discusses the econometric specification of the microeconomic framework and reports the results. Chapter 7 does the same for the macroeconomic analysis. The macroeconomic relations are estimated via standard nonlinear simultaneous equations techniques, while the probabilities in the microeconomic analysis are estimated using the multinomial logit specification. Chapter 8 concludes by discussing the implications of the empirical findings for public policy.

PART I: DESCRIPTIVE ANALYSIS

Chapter 1

FOREIGN DIRECT INVESTMENT IN THE UNITED STATES: COLONIAL TIMES TO 1950

Any review of the evolution of foreign direct investment in that part of the world known as the United States must be precise about the subject under discussion. The meaning of "direct investment" was given at the beginning of the Introduction. Though the degree of ownership of assets which allows the investor to control their use is always uncertain and differs from case to case, it is not necessary to specify the exact percentage giving control here. Any historical treatment must, however, decide whether "foreign" direct investment could be said to take place before 1776 in the territory which did not declare its independence from another sovereign state until that date. It serves to emphasize the continuous and, of course, initially crucial role that foreign capital played in the development of what later became the United States if such investments of the colonial era are considered; the appendix to this chapter treats this phenomenon in detail. Attention there and here will be confined to assets controlled by foreign governments or quasi-corporate entities. It is these asset holders which will be of principal concern in the modern context; and while information on them in colonial times is not abundant, it is much more readily available than histories of individual investors.

Foreign-Controlled Companies in the 19th Century and Early 20th Century

Railroad, Land, Banking, and Insurance

The sectors in which foreign participation was initially pronounced (see the appendix to this chapter) were the recipients of much of the flow of foreign capital for most of the 19th century. Land and mortgage companies and banking and insurance companies rapidly came into existence and often just as rapidly declined. As the frontier moved westward, foreign capitalists formed mining, cattle and oil operations. Not until the end of the 19th century were foreign-controlled manufacturing establishments initiated in any great number, and then primarily in the brewery and liquor industries. Surprisingly, American railroads, financed by immense amounts of European (principally English) portfolio capital, were almost never controlled by their foreign bank and stockholders.[1]

One exception was the Atlantic and Great Western Railway connecting Cincinnati and New York, an enterprise whose construction was linked with the historic failure of Overend Gurney in England in 1866.[2] Promoted by the Irish-American James McHenry, it was financed by British capital and built by British labor working for a British contracting firm. The construction expense was enormous, but McHenry proposed to recoup his expected loss by selling the railroad to the New York and Erie, which, regrettably was near bankruptcy. To bolster credibility of the venture, he enlisted the aid of the Queen of Spain (who owned some of the right-of-

---

[1]The material for much of this section is drawn from Cleona Lewis, _America's Stake in International Investments_ (Washington: The Brookings Institution, 1938).

[2]Leland H. Jenks, _The Migration of British Capital to 1875_ (New York: Alfred A Knopf, 1927), pp. 252-262.

way as a result of the failure of the Second Bank of the United States) and of Sir Morton Peto, one of the foremost railroad builders in England. Despite Peto's assurances, the road became insolvent in 1866. This and other such ventures led to the demise of Overend Gurney in that year.

Other aberrations from the norm were the Oregonian Railroad, built and owned by a Scotch company in 1879; the Buffalo, Brantford and Goderich Railroad, operated by its bondholders in 1855; and the Alabama, New Orleans, Texas and Pacific Junction Railways Co. Ltd. which controlled three railroads in the South from 1881 on into the 1920's. English stockholders are said to have devised the plan that wrested control of the Erie from Jay Gould in 1872. In 1877, the English stockholders of the Illinois Central visited the U.S. to advise the management on how a higher dividend payout rate could be achieved.

Finally, mention should be made of border railways owned by neighboring countries. As of 1914, Canada and Mexico owned, respectively, $82 million and $3.2 million worth of railroad assets.

In the main, however, foreign investors were content to receive their dividends and clip their coupons. As Leland Jenks put it,

> . . .Frankfurt and London...made the acquaintance of a wide selection of bonds, without having much of anything to do with railway management and promotion in the United States. The bulk of the shares as well as the bonds were owned by Englishmen in the New York and Erie, the Illinois Central, the Philadelphia and Reading and the Baltimore and Ohio...only the Atlantic and Great Western...required the talents of a British contracting organization.[3]

---

[3]*Ibid.*, p. 169.

Railroad capital often was an indirect route to control over land, however. Especially after 1850, the promoters of various land-grant railroads looked to Europe to find a market for the land they received from the government as well as for their securities. Examples are the sale of 500,000 acres in Iowa by Dubuque and Pacific in England in 1857 and the sale of 40,000 acres, also in Iowa, by the Sioux City and St. Paul to the Iowa Land Co. Ltd. in 1881.

Often land was given as a bonus to purchasers of a railroad's stocks and bonds, handed over in settlement of claims against a railroad,[4,5] or directly exchangeable for bonds at the option of the bondholder. When the Texas and Pacific defaulted on its bonds in 1886, the result of floods in Louisiana and a cotton crop failure in Texas, foreign creditors received title to over 500,000 acres of land in Texas held in trust for them with the Fidelity Insurance and Safe Deposit Company in Philadelphia against just such contingencies. Nearly $750,000 of bonds on the Vicksburg, Shreveport and Pacific Railroad had been converted into land before the railroad was forced into receivership in 1900. Jay Cooke's well-known 7.3% Northern Pacific bonds were convertible at 110% of face value into land priced at $2.50 per acre, and after the Panic of 1873 many a foreign investor took up the option.

---

[4]For an exciting account of the fortunes of one such portfolio investment, see Virginia H. Taylor, The Franco-Texan Land Company (Austin: University of Texas Press, 1969).

[5]Certainly acquisition of assets via bankruptcy proceedings is an unusual way of "making" a direct investment. Nevertheless, on the balance sheet such an investment has occurred.

A similar route to the acquisition of land was through foreign portfolio investment in governmental institutions. In 1818-1819, the Second Bank of the United States acquired most of Cincinnati and 50,000 acres in Ohio and Kentucky in liquidation of debts due; when it was dissolved in 1843, its many European creditors received some of this property. Holders of the numerous defaulted state obligations of the 1820's and 1830's, issued to finance public works, sometimes accepted payment in land when those states who repudiated their debts in the early 1840's resumed payment as trade revived after 1845. Post-Civil War bond defaults by southern states were also settled in this fashion. The Alabama Coal, Iron, Land and Colonization Company, established in England in 1882, administered and developed land which its owners had acquired when Alabama defaulted on 8% 1870 bonds in 1876. This particular venture was enormously profitable, consistently paying dividens in excess of 25%. Despite liquidation of some of its holdings, the company still held 460,225 acres in 1914.

Almost all of the land which came into foreign (mostly British) hands was held for appreciation and/or sold to immigrants. A few, including the Fine Cotton Spinners' and Doublers' Association, Ltd., which held land in the South, invested to profit from agricultural developments, such as cotton or fruit, or to secure access to timber or coal resources. The number of such registered land companies peaked in the 1880's then declined as the Granger movement and Populism grew stronger. Twenty-nine foreign companies established in the U.S. from 1879 to 1911 identified by Ms. Lewis represented an initial investment of $52 million dollars. When the acreage held by the 14 survivors of this group in 1914 is added to that owned by a separate set of 53 companies compiled in the Philadelphia Bulletin in 1909, the total comes to 30-35 million acres held by foreign corporations a few years before the First World War.[6]

Some of the land not suitable for agricultural purposes was sold by the railroads as range land for cattle. According to Ms. Lewis, eighteen companies were registered in Great Britain to raise cattle in the U.S. in the period 1880-1890.[7] Their investment totaled $27 million and they controlled over 4 million acres of land. Though many of them, including the first (the Prairie Cattle Co. Ltd.) paid handsome dividends, nearly 50% had folded by 1900. At the same time many British-owned packing houses (two of which, in Cincinnati, dated from 1842[8]) which received the cattle were sold to U.S. interests, with Swift and Company buying into the Anglo-American Provision Company and purchasing the Kansas City plant of G. Fowler, Son and Co. in 1902. Fowler sold its Omaha plant in the same year to Armour. Only five of the original 13 remained active at the start of world War I.

With such a large portfolio investment in American railroads and a substantial investment in American lands, it was natural that European investors should soon become involved in finance and insurance. Commerical firms all along the coast financed trade with England in the

---

[6]Lewis, op. cit., p. 85.

[7]Ibid., p. 87.

[8]Ibid., p. 100.

early 1790's. In 1844 Baring's bought the Merchant Exchange in New York City. Foreign-held mortgage companies were established early in the 19th century in the East; in the West, most were organized after 1870. Among the most successful were the American Freehold-Land Mortgage Company of London, Ltd. (est. 1879); the Texas Land and Mortgage Co. Ltd. (1882); and the Oregon Mortgage Company Ltd. (1883). In her search for those mortgage companies established in the U.S. after 1874, Mrs. Lewis found 15 that originated in England, of which 7 were still surviving at the start of World War I, with a capital of $45 million, and loans outstanding of $110 million, mostly in the Pacific Northwest. A comparison set of a dozen Dutch mortgage banks doing business in the mid-West and West had loans outstanding of $40 million two years later.[9]

Foreign insurance companies were also established very early in the country's history. In 1804, the Phoenix Assurance company established a branch office in the U.S. The Phoenix closed this branch in 1810 because of hostile legislation, and did not reopen it until 1879. In the interim, however, several other foreign insurance companies opened branches in the United States, including the Liverpool and London and Globe (1848), the Royal Insurance Company (1851), the Northern Assurance Company (1854), and the British America Assurance Company (1874). Foreign interests also held substantial shares in the New York Life Insurance and Trust Co., the American Life Insurance & Trust Co., and the Ohio Life Insurance and Trust Company. Like other foreign ventures in the 19th

---

[9] _Ibid._, p. 86.

century, those in the insurance sector experienced rapid turnover. From 1861-95, Ms. Lewis reports, 32 foreign insurance companies closed their doors, while from 1896-1915, 21 more branches were terminated. Ms. Lewis found none of these closings to be related to the natural disasters (e.g. the Chicago fire of 1871, the San Francisco earthquake of 1906) that caused the failure of many American insurance companies before World War I.

Foreign participation in banking was severely limited, of course, by state banking laws enacted in the 1830's to prevent the excesses of "wildcat" banking and New York "free" banking. Banks organized under the laws of other states or countries were (and are) generally prohibited from conducting business in the state in question, unless special authorization was obtained. Nevertheless, it is noted in the appendix that British interests controlled the Manhattan Bank Company in New York, and we have seen that European interests were substantial in both the Bank of North America and the Second Bank of the United States. European capitalists also owned 8,000 of the 30,000 shares of the Girard Bank of Philadelphia before it closed in 1842, and held substantial interests in the New York Farmer's Loan and Trust Company, the Morris Canal and Banking Company, and the Schuylkill Bank.[10]

Railroads and their financing brought some of Europe's ablest citizens to the U.S., some of whom contributed to the country for generations. One example is Henry Hilgard, Villard, who handled the

---

[10]*Ibid.*, p. 22.

financial affairs for German bondholders in Pacific railways. Villard was also a journalist, and won fame for his reporting of the Civil War, and was a secretary of the American Social Science Association. He also organized the Edison General Electric Company in 1889 and later acquired control of the Edison Lamp Company and the Edison Machine Works. His son, Oswald Garrison Villard, called an "aristocrat of liberalism", was publisher and editor of the New York _Evening Post_ from 1897-1918. In its pages he opposed U.S. participation in the Spanish-American War and entry into World War I. He was a suffragist, and a founder of the N.A.A.C.P.[11]

Extractive Industries

Foreign interest in developing the mineral resources of the United States dates to before the Revolution.[12] In 1770, London financiers backed two expeditions to explore the Lake Superior area for silver and copper, but neither stayed through the winter and neither made a substantial discovery.[13] Interest in minerals was rekindled by the discovery of gold in California in 1849 and of copper in Michigan a few years earlier. Just prior to the middle of the 19th century British interests had investments, mostly of the portfolio variety, in the Union

---

[11] _Encyclopedia Americana_, Volume 28, pp. 122-123.

[12] And has produced a wealth of historical material. See in particular Clark C. Spence, _British Investments and the American Mining Frontier 1860-1901_ (Ithaca: Cornell University Press, 1958) and W. Turrentine Jackson, _The Enterprising Scot: Investors in the American West After 1873_ (Edinburgh: Edinburgh University Press, 1968).

[13] A good history of the development of Michigan copper deposits is William B. Gates, Jr., _Michigan Copper and Boston Dollars_ (Cambridge: Harvard University Press, 1951).

Gold Mining Company of Virginia, the Pennsylvania Bituminous Coal, Land, and Timber Company, the Hazelton (Pa.) Coal Company, and the Lehigh Coal and Mining Company.

Many companies appeared just long enough to sell stock, then disappeared from sight. Ms. Lewis reports that of 40 companies registered between 1870 and 1895 found in the 1886 and 1896 issues of the London Stock Exchange Official Intelligence, none were still active on the eve of World War I.[14] With such a record of failure, it is not surprising that in the latter part of the 19th century foreign involvement in the mining industry was almost always on a direct investment, rather than a portfolio, basis. However, even the Rothschilds of London were taken in by the diamond hoax of 1872, in which it was (erroneously) reported that rubies, emeralds, sapphires and diamonds were found in abundance in the Rocky Mountains of Colorado.

Among the most profitable foreign mining ventures were the British De Lamar Mining Co., Ltd. (est. 1891), the British Boston Consolidated Copper and Gold Mining Co., Ltd. (est. 1898), the Scottish Arizona Copper Co., Ltd. (est. 1882), the Tom Boy Gold Mines, Ltd., the Yuba Consolidated Gold Fields, and the Camp Bird, Ltd. The last three were owned, respectively by Exploration Co., Ltd., Gold Fields American Development Co., and Venture Corporation, technically sophisticated British exploration and development companies.

Exploration Co., Ltd. was in part controlled by the Rothschilds of France, which purchased a quarter interest in Anaconda in 1895. The

---

[14]Lewis, op. cit., p. 89.

French were also represented in the Utah Copper Company, with a 6% share, and in the Southern Aluminum Company.

Belgian interests controlled the Belgian-Bohemian Mining Company and the Jualin Alaska Mines, while German interests controlled the American Metal Company, Ltd., established in 1887. American Metal soon diversified into smelters, refineries, chemical manufacture, coal mining and shipping.

The British also held at the start of World War I the majority of shares of the Ducktown Sulpher, Copper and Iron Company (est. 1891), and Borax Consolidated, Ltd. (est. 1899), which had investments in potash deposits, a railroad, and refineries and factories in the West. British, French and German interests were jointly represented in Amalgamated Coppers Co., formed in 1899.

Foreign interest in the exploration for oil was just as intense as in mining. Six years after the first oil well in the world was drilled, in northwest Pennsylvania in 1859, the English Petroleum and Mining Company was organized and drilling in Pennsylvania. As with American oil companies, prosperity came with the development of the automobile.

In 1902, the Shell Transport and Trading Company (established in Great Britain in 1897) bought an interest in the Union Petroleum Company. In 1907, Shell merged with the Royal Dutch Petroleum Company to form the Royal Dutch-Shell Group. Three years later the combine acquired oil producing properties in Oklahoma, as their giant competitor, Standard Oil, launched a price war in Royal Dutch-Shell's marketing territories in the Far East. The group counter-attacked by invading the West Coast market in 1913 with oil imported from Indonesia, then bought up California Oilfields, Ltd., turning it over to their American subsidiary, Shell of California in 1914. It is estimated that U.S. holdings of the Group in 1914 were not less tha $17.7 million.[15]

Other British investments made before the First World War were not so large nor so long-lived. The Fremont Oil Co. Ltd. bought up another British firm, Texas Oilfields, Ltd. in 1913, but folded itself five years later. A similar fate befell the Oklahoma Oil Co., Ltd. (organized in 1910) after the war. However, some others prospered modestly, including the Kansas, Oklahoma Oil and Refining Co., Ltd., founded in 1912 and the Kern River Oilfields of California, Ltd.

French, Belgian, and Dutch groups financed the development of major Wyoming oilfields. The Société Belgo-Américaine des Pétroles du Wyoming was formed in 1905, while in 1908 a Dutch corporation, Petroleum Maatschappij Salt Creek, purchased some claims. By 1914 these and some French claims were held by the Midwest Refining Company, nearly half of whose directors were foreign. The French Union des Pétroles d'Oklahoma, incorporated in France in 1911, had acquired before the war 4,000 acres of land from the British Permier Petroleum Company, in addition to all the shares of five other American companies. It has been estimated that the value of the assets controlled by foreign oil corporations at the end of 1914 was $35 million.[16]

---

[15] _Ibid._, p. 95

[16] _Ibid._, pp. 106-107.

Manufacturing

In manufacturing, foreign participation in the early nineteenth century remained small. As Cleona Lewis put it:

> The very diversity of these industries, the small size of most firms, and the prevalence of the individual and partnership types of business organization all served to discourage foreign participation in American enterprise. The advent of the industrial corporation marked the beginning of large-scale industry and eventually was instrumental in drawing foreign capital into outstanding American undertakings of various kinds.[17]

As stated in the appendix, quasi-corporate forms of organization were well-known in the 17th century, but were reserved to projects involving the public interest in some way, such as trading companies, financial institutions, or canals, turnpikes and railways. "In manufacturing, however, the corporation was almost unknown until the early part of the nineteenth century when New England textile manufacturers began to petition their state legislatures for charters."[18]

Such state-conferred charters were not uniform in the privileges they granted to each applicant; hence entrepreneurs urged the passage of a general corporation law. New York passed such a law in 1811, Connecticut in 1837, and by 1850 over twenty states had done so. These laws, however, were not as broad in scope as the British Companies Act of 1862, which soon was emulated in the United States and elsewhere.

Though European portfolio investors maintained their preference for railroad issues into the 20th century, they did add to their holdings after such corporation laws went into effect shares in communications

---

[17] *Ibid.*, p. 69.

[18] *Ibid.*

companies, such as Western Union and American Telephone and Telegraph, and in public utilities. Among manufacturing concerns, United States Steel was a favorite, with 25% of its common and 9% of its preferred stock held abroad in 1914. Other concerns whose shares were held abroad on a portfolio basis were Eastman Kodak (which had one British director as late as 1915), United Fruit Company, General Electric and Moline Plow.

Direct investments in manufacturing before 1850 were few, but included the Mount Savage Iron Works in Maryland, manufacturers of railway iron from 1844, owned in the main by the English. A few foreign corporations in this time, such as W.R. Grace, established in Peru in 1854 and Melchior, Armstrong and Dessan, founded in Copenhagen in 1795, made investments in the United States and then gave up their foreign headquarters to become completely American; in the case of Grace, at least, this is hardly surprising, since the founder was an American citizen.[19]

The period from the close of the Civil War to the start of World War I saw the first substantial influx of foreign manufacturing concerns into the United States. Friedrich Bayer took a share in an aniline plant at Albany, New York, in 1865.[20] In 1889 another German chemical concern, Roessler & Hasslacher Chemical Co., invested in the U.S.; they were followed two years later by Merck & Co. Before World

---

[19]Mira Wilkins, The Emergence of Multinational Enterprise: American Business Abroad from the Colonial Era to 1914 (Cambridge: Harvard University Press, 1970), pp. 11-12.

[20]Christopher Tugendhat, The Multinationals (New York: Random House, 1972), p. 38.

War I, Degussa also had a manufacturing plant in the U.S., as did the Swiss firm, Geigy.[21] Kny-Scherer Corporation, established in 1896, was the largest vendor and manufacturer of surgical instruments in the U.S. before World War I. The German firms Dewitt and Hertz and Siemens and Halske were also leaders in this field, though the Siemens electrical venture failed.[22] Bosch Magneto Co. and Eiseman Magneto Co. produced half of the magnetos sold in the U.S. prior to the first world war. "...when the Edison General Electric Company was incorporated in the United States in 1889, A.E.G. was a parent in its formation as one member of the German syndicate involved;"[23] of course, this is the second derivative, since Edison and GE's Thomson-Houston helped start A.E.G. The Daimler Motor Co. was founded in 1888, and after importing Daimler cars, brought out an "American Mercedes," manufactured in the U.S. Its plant was closed after a fire in 1913.[24]

The British were also well represented in their specialties, textiles and primary metals. An English firm founded an entire town, South Pittsburgh, Tennessee, and constructed a blast furnace operation; the enterprise failed after the death of its promoters.[25] In 1881 British interests constructed the largest ironworks in the country in Rockbridge County,

---

[21]Lawrence G. Franko, "The Other Multinationals: The International Firms of Continental Europe 1870-1970", Centre d'Etudes Industrielles mimeo, Geneva, December, 1973, II.4.

[22]*Ibid.*

[23]Wilkins, *op. cit.*, p. 57.

[24]Louis T. Wells, Jr., "National Firms in an International Industry: The Europeans and the Automobile", Harvard University Graduate School of Business Administration mimeo, May 7, 1973

[25]V.S. Clark, *History of Manufactures in the United States*, Volume 2 (New York: McGraw-Hill, 1929), p. 213.

Virginia.[26] The Otis Steel Company was founded by British interests in Ohio in 1895, and on the Pacific Coast the Olympic Portland Cement Co., Ltd. was British-controlled.

In textiles, the entire block of common stock in the American Thread Company, (established 1899) valued at $514 million, was owned by its parent, the English Sewing Cotton Co., Ltd. Linen Thread Co., Ltd., formed in 1898, owned all the stock of five U.S. subsidiaries. J&P Coats & Co., the largest thread manufacturer in Great Britain, acquired several branches in America when it bought up four English firms, and as a result was said to control one third of the thread production in the U.S.[27] Courtaulds, Ltd. manufacturers of artificial silks, established a subsidiary in 1909 which was reorganized in 1915 as the American Viscose Company.

Other British investments in the U.S. included some well-recognized names. Lever Brothers, Ltd. established a subsidiary in the U.S. in 1899, though it was not particularly profitable before World War I, earning exactly $733 on sales of $800,000 in 1913.[28,29] Pillsbury-Washburn Flour Mills Co., Ltd. incorporated in 1889 in Great Britain, operated six flour mills in Minneapolis until it went into receivership in 1909, at which time it leased them to another company. In 1899 the Dunlop Pneumatic Tire Co., Ltd. established an American subsidiary in the U.S.

---

[26] Ibid., p. 212.

[27] Wilkins, op. cit., p. 180.

[28] Nicholas Faith, The Infiltrators (London: Hamish Hamilton, 1971), p. 57.

[29] The subsidiary's headquarters were for a time at 50 Memorial Drive, Cambridge, Mass.--the current residence of the Department of Economics, Massachusetts Institute of Technology!

One area of particular concentration of British and German investments in manufacturing was the beverage industry. Seventeen British and twelve German brewing and liquor companies were operating in the U.S. in 1914, with the British assets valued at $58 million and the German at about $5 million. Almost all of these had been acquired in the 1880's by purchasing American operations, and they were located in almost every major city.

Other countries had fewer manufacturing investments in the United States. The Belgian Corporation Solvay & Cie held $11.5 million of the stock of the American companies that were later included in the formation of the Allied Chemical & Dye Corporation. French interests included a subsidiary of Andre Michelin & Cie, the Italians were represented by a FIAT factory in Poughkeepsie, N.Y. (later sold to the Duesenberg Motor Company[30]), while Dutch investments were principally confined to the petroleum sector, discussed earlier. The Swiss were represented by Geigy, mentioned earlier, and by Nestle.[31] Canadian investments were few in number, but one, the Canadian Car and Foundry Co. Ltd., was quite large, with assets valued at about $15 million. Ms. Lewis has estimated that foreign direct investments in manufacturing-related industries (excluding petroleum and brewing and including certain trade and transportation categories) before the first world war totaled about $73 million, with $36 million British, $24 million Canadian, and $13 million French and Belgian.

---

[30]Wells, op. cit., p. 3.

[31]Franko, op. cit.

Since it is the principal aim of this thesis to investigate the motives for foreign direct investment in U.S. manufacturing industries, it is appropriate to analyze reasons various authors have given for the early entry of the firms just discussed. Such an analysis will be deferred until Chapter 4, where a unified treatment of hypothesized motives for investment in the United States will be presented.

One reason why certain direct investments did not take place, of course, was the presence of cartel-like agreements among producers of various nations in several industries. In 1896 the U.S. Alcoa and the Swiss AIAG agreed to respect each other's markets and were joined by three other producers in 1901.[32] James Duke's American Tobacco Co. invaded the English market by purchasing Ogdens, Ltd. in 1901; thirteen English firms combined to form Imperial Tobacco Co. Ltd. to retaliate. The conflict was resolved when the two companies agreed that each should have its own national market, and created British-American Tobacco (2/3 owned by American, 1/3 by Imperial) to service the rest of the world.

Another graphic example of collusion is given by Ms. Wilkins:

> In 1896 an American company, Aetna Powder Company shipped dynamite to South Africa. Britain's major explosive manufacturer, the Nobel-Dynamite Company, claimed South Africa was 'its territory.' To counter the American company's intrusion and to provide competition, the British and German producers of black powder, detonators and high explosives announced in 1897 that they would build factories in New Jersey.
>
> Faced with this threat, du Pont, Aetna and other associated American companies sought out the

---

[32]Tugendhat, op. cit., p. 20.

> Europeans and reached a new accord with them on October 16, 1897. ... The Europeans agreed not to build factories in the United States and the Americans in turn promised they would not erect factories in Europe.[33]

It has already been indicated that Shell's investments in California in 1913 were motivated by the failure of the international oil cartel at that time. General Electric and AEG agreed in 1903 not to sell in each other markets, and such agreements were also made in the sulphur, match, and roller bearing industries. Prima facie, these agreements may only have inhibited exports. But since exporting often leads to direct investment, in the fashion of the product cycle, some foreign investments in the U.S. were undoubtedly inhibited.

This is also a natural place in the discussion to present quantitative estimates of the volume of foreign direct investment in the United States. However, these estimates are primarily available as a consequence of the first world war and the effects it had on foreign direct investment in the U.S. Accordingly, this brief five-year period will receive our attention first.

Liquidation During World War I

With the month after the assassination of Archduke Francis Ferdinand, foreigners began to divest themselves of their long-term holdings of American assets. After Austria's declaration of war on Serbia and Germany's decision to go to war, this divestment movement became a torrent, forcing some European exchanges to close on Monday, July 27, and the New York exchange to close the following Friday. Though an

---

[33]Wilkins, op. cit., pp. 88-89.

alternative center of trading developed in New Street, by the end of August security prices had rebounded and by December 15, 1914, the New York exchange resumed completely unrestricted trading.

The British divestments, of course, helped fund her war needs. In late 1915, when it became apparent that American loans (requiring collateral) would also be necessary, insurance and trust companies in Britain were asked to give the Bank of England lists of dollar issues available for sale or loan to the government. The American Dollar Securities Committee was established to supervise these transactions. Its list of American securities wanted ballooned to nearly a thousand and the British government became the sole authorized buyer of the securities before the war ended. The Dollar Committee was dissolved in March 1919, when it had served its purpose of assisting in the financing of the war.

The British liquidation was almost entirely in the portfolio end of the spectrum, with 70% of their portfolio holdings liquidated, most of these in rails. Among direct investments, in the main, land mortgage companies suffered, as the British government encouraged them to restrict their outstanding loans, and railroads were also sold. The British Alabama, New Orleans, Texas and Pacific Junction Railways Co. Ltd. sold the New Orleans and Northeastern Railroad to the Southern Railway in 1916. The De Lamar Mining Co. Ltd. was also sold.

The French experience was different in character. They quickly liquidated the major railway loans taken in Paris between 1900-1910, with the securities first passing into French government hands and then onto the American market. Through a mobilization plan similar to that of the English, if slightly less successful, the French liquidated approximately 70% of their portfolio of U.S. securities, most of this amount before America entered the war.

However, the major French investments were also liquidated. Their $5.5 million interest in the Southern Aluminum Company and their $6.6 million interest in the Utah Copper Company were both sold in 1915, the former to the Aluminum Company of America. Their other major investments, in the petroleum industry, in Union des Pétroles d'Oklahoma and in the Midwest Refining Company, were sold, respectively, to Pure Oil Co. and Standard Oil of Indiana near the end of the war.

Germany also organized its foreign security holdings somewhat later, in 1916. British vigilance prevented the Germans from using their securities in America as collateral for loans, intercepting shipments of suspected securities and blacklisting dealers who did business with the Germans. But neutral nations could still transact business for Germany until, on October 6, 1917, the U.S. Congress created the Office of the Alien Property Custodian. "Its function was to take over and liquidate all classes of enemy-owned property, including both the physical properties of foreign-owned enterprises in the United States and the enemy-owned securities of American enterprises."[34] It was clear that German enterprises were aiding the Fatherland. The Atlantic Communications Co. built a wireless station to communicate with the

[34] Lewis, op. cit., p. 124.

Telefunken plant at Nauen, near Berlin. Telefunken was, of course, the joint venture of AEG and Siemens.[35] Enemies included not only Germany, but also Austria, Bulgaria, and Turkey. Since the bulk of long-term portfolio issues had been liqudiated by German interests before the office was established, the report of the Alien Property Custodian gives a particularly good picture of the extent of German direct investment in the United States at the time of the war.

Originally the Alien Property Custodian was directed only to conserve seized foreign assets; then Congress passed amendments to the Trading with the Enemy Act authorizing the sale of foreign assets. The Alien Property Custodian sold the stocks and bonds in the German portfolio for $275 million. The assets of 330 firms were seized; those sold yielded a similar figure, though these undoubtedly brought only fire-sale prices. Firms sold included the American subsidiaries of eight major German chemical firms--Badische, Bayer, Berlin, Hoechst, Casella, Kalle, Roessler & Hasslacher, and Hayden; the three American subsidiaries of the German metal triumvirate, American Metal Co. (Metallgesellschaft), L. Vogelstein & Co. (Aron Hirsch & Sohn) and Beer Sondheimer Co.; Bosch and Eisemann, manufacturers of magnetos; Botany, the textile concern; Kny-Scherer, in surgical instruments; and FAO Schwarz, the toy merchandiser.[36] Bayer, which was the only German dyestuff firm with substantial manufacturing

---

[35]Office of the Alien Property Custodian, Alien Property Custodian Report (Washington: U.S. Government Printing Office, 1919), p. 102.

[36]F.A.O. Schwarz recently returned to European ownership when purchased by the Swiss firm Franz Carl Weber. (New York Times, May 6, 1974).

facilities in the U.S., was sold to Sterling Drug Co. which still markets Bayer's leading product at the time, aspirin.[37]

Before selling these assets, the Alien Property Custodian was able to force these German concerns to contribute to the U.S. war effort. Bosch provided $\$2\frac{1}{2}$ of magnetos to the armed forces, Botany contributed \$6 million of yarn and shirts, and Kny-Scherer provided \$2.1 million of surgical instruments.[38]

In what smacks of an unholy alliance between business and government, seven days before the Armistice was signed Congress amended the Trading with the Enemy Act to allow the sale of patents held by German firms. American chemical manufacturers formed the Chemical Foundation, Inc. to buy up these patents and hold them as a trustee for American industry, hoping thereby to relax the pre-war German stronghold on chemical manufacturing in the U.S., which admittedly had been preserved by a series of unfair business practices. The availability of the patents no doubt was instrumental in the success of Allied Chemical and Dye Co., formed in 1920, but it did not keep German manufacturers out of the U.S.[39]

Two amendments to the Trading with the Enemy Act, in 1919 and 1920, the Winslow Bill of 1923, and the Settlement of War Claims Act of 1928 all resulted in the proceeds of these sales with interest being remitted to the original German owners. By 1934, when the Office of the Alien

---

[37] Office of the Alien Property Custodian, op. cit., pp. 38-39, 71, 120.

[38] Ibid., p. 10.

[39] Ibid., p. 60.

Property Custodian was terminated, property still on hand totaled $65.8 million and repayments to former enemies came to $596 million.

Other liquidations which occurred near the end of the war included the closing of eight Russian insurance companies, owing to the Revolution. The British Olin Steel Company was sold to American interests in 1919 for $13 million. And of course, the enactment of prohibition in 1919 made the British brewery and liquor properties relatively worthless, though the estimated loss of $150 million does not consider alternative uses of the plants, such as manufacturing temperance beverages.

Of course, even in the climate of liquidation, some foreigners continued to make direct investments in American assets. The Dutch liquidated much of their substantial holdings in U.S. Steel, but Royal Dutch-Shell increased its holdings in the U.S. from $17.7 million to $38.5 million. The Chinese controlled Wah Ching Mining and Smelting Co., Ltd. established a trading agency in the U.S. in 1914 and expanded rapidly, being capitalized at $2 million in 1919. As a result of the U.S. Supreme Court's breakup of the American Tobacco Company in 1911, British American Tobacco began manufacturing in the U.S. in 1914, though originally only for export.[40] The Dutch Margarine Uni (later Unilever) made an investment in the United States during this time, as did SKF, the Swedish ball-bearing concern. Rolls-Royce established a subsidiary for manufacturing aircraft engines in Springfield, Mass. in 1917, and produced twenty cars before closing its doors there in 1918.[41] Another

---

[40] Wilkins, op. cit., pp. 91-93

[41] One of the automobiles produced by this plant is located in the Edaville Railroad Museum and Amusement Park, South Carver, Mass.

subsidiary was established by Rolls the next year elsewhere in the U.S.

As suggested earlier, the war had the salutary side effect of providing a fairly reliable data base for the evaluation of the magnitude of foreign direct investments in the United States. Early efforts to fix the magnitude of long-term foreign investments date back to the work of Blodgett, as quoted in Hacker[42] in 1803. Table 1-1 contains various estimates of this quantity from that date through 1919. Ms. Lewis arrived at her figure for direct investments in 1914 by using the reports of the Alien Property Custodian and the Report of the American Dollar Securities Committee, augmented by reference to the work of Sir George Paish,[43] the reports of railroad securities held abroad by L.F. Loree, president of the Delaware and Hudson Railroad, and various financial manuals. A country-by-country breakdown of her findings for 1914, given in Table 1-2, indicates that the book value of British "foreign controlled enterprises" was twice as large as that of her nearest rival, Germany. After the confiscation of German property, of course, British predominance was even more marked, as the figures for 1919, also in Table 1-2, indicate. It should be recalled that "control" here was defined subjectively, rather than some fixed percentage of the total book value of a particular investment. Table 1-3

---

[42]Louis M. Hacker, The Course of American Economic Growth and Development (New York: John Wiley & Sons, 1970), p. 67. See the appendix to this chapter for a breakdown of Blodgett's total.

[43]The most detailed of Paish's studies is "Great Britain's Capital Investments in Individual Colonial and Foreign Countries", Journal of the Royal Statistical Society 74 (January, 1911), 167-200.

Table 1-1

LONG-TERM FOREIGN INVESTMENTS IN THE UNITED STATES
(in billons of dollars)

Year	Direct	Other	Total	Long-Term and Short-Term
1803	*	*	*	.075
1843	*	*	*	.225
1853	*	*	*	.385
1869	*	*	1.4	
1899	*	*	3.1	
1908	*	*	6.4	
1914	1.3	5.4	6.7	
1919	.9	1.6	2.5	

* - not available

Sources: For 1803 and 1853, Lewis, *op. cit.*, p. 560. For the rest of the dates, U.S. Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1957* (Washington: U.S. Government Printing Office, 1960).

Table 1-2

BOOK VALUE OF "FOREIGN CONTROLLED ENTERPRISES" IN THE UNITED STATES, BY COUNTRY, 1914 AND 1919

(millions of dollars)

Country	1914	1919
Great Britain	600	500
Germany	300	a
The Netherlands	135	160
Canada	132	169
France	45	20
Austria-Hungary, Turkey, and Bulgaria	30	a
All others	50	50
	1292	899

a - As of 1919, German and other enemy property was still administered by the Alien Property Custodian or had been sold.

Source: Lewis, *op. cit.*, p. 546.

Table 1-3

MAIN CREDITOR COUNTRIES AND DEBTOR REGIONS, 1913
(billions of dollars)

Country	Gross Credits	Region	Gross Debits
United Kingdom	18.0	Europe	12.0
France	9.0	Latin America	8.5
Germany	5.8	United States	6.8
Belgium, The Netherlands, Switzerland	5.5	Canada	3.7
United States	3.5	Asia	6.0
Other countries	2.2	Africa	4.7
	44.0	Oceania	2.3
			44.0

Source: Bri-ley Thomas, "The Historical Record of International Capital Movements to 1913," in J.H. Adler, ed., Capital Movements and Economic Development (New York: St. Martin's 1967), pp. 3-32.

also displays the main creditor countries and debtor regions in the world in 1913. In a rough comparison with the previous table it indicates the French under-representation in the U.S.

Indeed, it may also be noted that, whereas British long-term holdings in the U.S. in 1913 were 20.3% of her total at that time, and German holdings in the U.S. and Canada were 15.7% of her total, French holdings in the U.S. and Canada in 1913 were only 2.2% of her worldwide total.[44]

A complete industry breakdown of reasonable reliability is not available for 1914, but one can get an idea of the importance of manufacturing (excluding petroleum) by recalling that the totals of foreign investment in breweries plus other manufacturing and related industries (principally trade and transportation) given earlier were $63 million plus $73 million = $136 million. Even allowing for incomplete coverage as Ms. Lewis insists must be done in the manufacturing sector, foreign direct investment in manufacturing must have been less than 15% of the total. Gauging manufacturing's importance in 1919 is even more difficult. However, it is known that all the German enterprises were sequestered with the Alien Property Custodian, and since these were principally manufacturing ventures, it is quite unlikely that the proportion of foreign direct investment in manufacturing increased during the war.

Interwar Investments

The immediate postwar climate was a favorable one for all types of long-term investments. In addition to the large loans made by Americans to Germany, American direct investments abroad spurted, with General

[44]Eugene Staley, War and the Private Investor (Chicago: University of Chicago Press, 1935), p. 11.

Motors, Ford and I.B.M. all making investments at this time. For various reasons, large foreign international corporations continued to establish facilities in the United States as well.

One vehicle for the establishment of a foreign interest in United States assets was the merger. In 1920, the properties of Solvay Process Company and Semet Solvay were included in the Allied Chemical and Dye merger, with the Belgian corporations receiving 20% of the stock and holding 25% of the seats on the board of directors. The next year a joint venture was initiated, the Belgian American Coke Ovens Corporation.

The prosperous Scotch company, the Arizona Copper Co., Ltd. sold its U.S. properties to Phelps Dodge Corp. in 1921, in exchange for sufficient stock to give it a voice in Phelps Dodge management. In petroleum, the British Amerada Corporation was formed in 1920 to operate mid-west oil fields. In 1921, the joint U.S.-Great Britain joint venture in the Hadfield Penfield Steel Company was announced. Wellman Smith-Owen Engineering Corp. of London bought a half interest in a Cleveland concern in 1923. The Ideal Sewing Machine Co. established a subsidiary with assets of $1 million. Explosive Trades, Ltd. bought $36 million worth of General Motors stock. In 1927 British American Tobacco purchased Brown and Williamson and thus secured a base from which to sell to the U.S. market.[45]

The size of French investments rebounded from the low achieved by wartime liquidation. In 1920, the French traded their patents on a

---

[45]Faith, op. cit., p. 64.

viscose rayon process for a large block of Dupont stock, and increased their holdings in 1923 in exchange for cellophane patents. In 1922 Coty, Inc. was established, soon to be followed by Revillon Frères and numerous other cosmetics manufacturers. The next year Etablissements François Masurel Frères bought a Rhode Island textile mill, followed in 1924 by Prouvost-Lefebvré. The former next established the French Worsted Company, again in Rhode Island, which was a favorite site because of the large French Canadian population. In 1921, the International Ores and Metals Selling Corporation (the forerunner of INTSEL, the largest French trading concern in the U.S.) was founded.[46]

An important Swiss entry into the U.S. occurred in 1925 when Brown-Boveri, makers of electrical locomotives, invested $35 million.[47] In the late 1920's the Swiss chemical firm Ciba joined Geigy in the U.S. with the establishment of a plant, as did Sandoz.

Of course, the motivating force behind these Swiss investments, as well as the investments of the German I.G. Farben, and the Dutch AKU was the American Selling Price system (ASP). The ASP system required that a tariff be placed on foreign imports of benzinoid dyestuffs such that these imports sold at the same price as American-produced dyestuffs. This requirement represented almost a 100% tariff on the foreign product, so naturally foreign producers found it less expensive to produce in the U.S.

---

[46]Jacques Bojin, "French Investments in the United States," (Master's thesis, Alfred P. Sloan School of Management, M.I.T., 1964), 59.

[47]Though Jack N. Behrman reports that this venture was unsuccessful. See his "Some Patterns in the Rise of Multinational Enterprise," Graduate School of Business Administration Research Paper #18, University of North Carolina, 1969, 49.

German firms entered the U.S. in other sectors as well, despite the recent seizure of their property, though they rarely went in alone. In 1923, the joint venture entitled the Goodyear-Zeppelin Corporation was begun, and German and Dutch interests formed the American Bemberg Corporation to manufacture rayon.

Dutch (and British) investments increased markedly in this period because of the success of Royal Dutch-Shell. In 1922 Shell's assets in the U.S. totaled $205 million, six times their size only three years earlier in 1919. Not all of Shell's acquisitions went smoothly, however. Efforts to increase its participation in Union Oil of California above 25% failed owing to a series of anti-Shell articles by the leading columnist of the Hearst Press, Arthur Brisbane, instigated by Albert Fall, President Harding's Secretary of the Interior who was later convicted in the Teapot Dome scandal.[48] Despite such impediments, Shell prospered until it tried to enter the eastern U.S. market in that unpropitious year, 1929. The result was disastrous, yet Shell recovered and by the end of the 1930's the subsidiary was given responsibility for providing the research base for the Royal Dutch-Shell group's entry into chemicals.

During this time the operations of Unilever, the Dutch-British transnational company operating in the U.S. expanded markedly as its products Lux Flakes (perfectly suited to the latest rayon fabrics) and Lifebuoy soap won substantial approval. (Unilever was formed in 1929 by the merger of Lever Bros. Ltd. and Margarine Uni.)[49]

---

[48] Faith, op. cit., p. 49.

[49] Ibid., p. 55.

Other well-known international corporations which located manufacturing operations in the United States included the French glass manufacturer Saint Gobain, the Dutch electrical firm Philips, and the world match monopoly, Swedish Match.[50] And, of course, the termination of prohibition in 1933 led to substantial reinvestment in breweries and distilleries, mostly by British and Canadian interests.

The economic disequilibrium of the 1930's led to a substantial short-term capital inflow to the U.S., representing initially liquidation of American short-term loans abroad and then European flight owing to political and economic instability. In general, no such forces are discernible in the flow of direct investment into the United States during this period. However, just before World War II, the chairman of Hoffmann-LaRoche, the Swiss chemical concern, viewed the invasion of Switzerland as a definite possibility and established a subsidiary in the U.S., staffing it with LaRoche's key scientists.[51]

As before the war, the attempts at forming cartels in reaction to over capacity in certain industries prevented some direct investments from taking place. The steel cartel established in 1933 was one of the more successful, benefitting from recovering world demand throughout the 30's and the German government's military requirements. The oil cartel begun in 1928 included Shell, Anglo-Persian (now British Petroleum) and Standard Oil (New Jersey), and aimed to divide the non-U.S. market. Obviously an entry by Anglo-Persian into the U.S. would have

---

[50]Franko. op. cit, II.5.

[51]Faith, op. cit., p. 77.

disrupted this effort. Most cartels were, of course, unsuccessful, as for example the rayon cartel formed in Europe at the instigation of Courtaulds in 1927 to limit exports to the U.S.[52]

In 1934 the flow of long-term foreign funds into the United States (especially into common stocks), prompted the Department of Commerce to initiate a study of the long-term capital account of the balance of payments in order to improve the estimation of its components. The need to gauge more precisely interest and dividend payments remitted abroad led to a government survey of all foreign direct investments in the United States in that year. Tables 1-4 and 1-5 present the results of that survey in detail.

The total of all investments, $1518 million, is 69% larger than the 1919 total given by Ms. Lewis, and exceeds her 1914 estimate of $1292 million by 17%. British investments continued to represent over 40% of the total, with Canada in second place on the strength of her control of American border railroads and The Netherlands third through the presence of Royal Dutch-Shell. Germany, which was the source of nearly 25% of the total in 1914, is included in Other Europe, which represents less than 5% of the total. However, undoubtedly some German investments are represented in the Swiss total.

The industrial composition of investment has evidently undergone a rapid change, with manufacturing now having a plurality and representing 37% of the total, as compared to no more than 15% in 1914 and 1919. Assets controlled in the finance sector, representing principally British

[52]Tugendhat, _op_. _cit_., pp. 20-22.

Table 1-4

FOREIGN DIRECT INVESTMENTS IN THE UNITED STATES BY INDUSTRIAL GROUPS AND BY COUNTRIES OR AREAS, END OF 1934

(In thousands of dollars; book values)

	Canada	U.K.	France	The Netherlands	Switzerland	Other Europe	Latin America	Rest of World	Total
Manufacturing	76772	305127	9966	61806	69335	38678	415	2684	564783
Distribution	10030	37442	1866	606	4624	7545	4667	19632	86412
Transportation	201077	31954	1476	1074	460	6205	280	3061	245587
Public Utilities	7936	0	109	0	0	0	0	0	8045
Petroleum	11550	25714	2778	159042	3859	851	641	2569	207004
Mining	8494	26190	0	0	0	116	1	0	34801
Finance	50436	241680	8234	1197	12516	14194	150	31385	359702
Miscellaneous	540	10230	0	325	0	353	25	683	12156
	366745	678337	24429	224050	90794	67942	6179	60014	1518490

Source: U.S. Department of Commerce, Foreign Investments in the United States (Washington: U.S. Government Printing Office, 1937).

Table 1-5

FOREIGN DIRECT INVESTMENTS IN UNITED STATES MANUFACTURING BY COUNTRIES OR REGIONS, 1934

(in thousands of dollars; book values)

	Canada	United Kingdom	France	The Netherlands	Switzerland	Other Europe	Latin America	Rest of World	Total
Automotive	[a]	[a]	0	0	0	0	0	0	[a]
Iron and Steel	[a]	2257	0	0	0	[a]	0	0	3028
Machinery & Mfg. Equipment	14903	4910	0	0	0	16768	0	[a]	36581
Heating & Electrical Equipment	1483	3837	[a]	[a]	[a]	4514	0	29	9880
Hardware, Tools, and Other Metal Products	14982	1675	0	[a]	[a]	2608	0	0	20021
Building & Construction Materials	0	7389	[a]	[a]	0	1478	0	0	12706
Paper & Wood Products	16591	211	0	0	0	570	0	0	17372
Chemicals & Drugs	2933	50397	1658	985	64341	8045	[a]	691	129050
Textiles	1228	137349	6690	55550	3443	1274	0	698	206232
Food, Beverage, Tobacco	23889	49750	0	147	[a]	2949	[a]	0	77194
Other Manufacturing[b]	763	47352	1618	5124	1551	927	415	1266	52719
Total	76772	305127	9966	61806	69335	38678	415	2684	564783

[a]Included in "other manufacturing".

[b]Does not add across because all but two items referred to by footnote a have been added to their proper industrial group in the "Total" column.

Source: See Table 1-4.

insurance companies and banks, are the next most numerous, followed by the transportation and petroleum sectors.

Within manufacturing the broad strength of the British industrial base is evident via that country's pre-eminence not only in textiles, but also in chemicals and food and beverage production. The 1934 report notes that this latter category includes "The liquor investment, which has grown to substantial size since 1933 (the repeal of Prohibition)..."[53] The Swiss in chemicals, the Dutch in textiles, and the Canadians in food and beverage products were Britain's strongest foreign competitors, while Canada and Germany were also strong in machinery and metal products.

Data on the number of American corporations and branches controlled by foreigners in 1934, exclusive of the 129 branches and affiliates of insurance companies, are given in Table 1-6. As expected, manufacturing firms have a plurality, as do firms from the United Kingdom. But note the large number of firms in "Other Europe" category. This may indicate that German firms were maintaining small "listening posts" in the U.S. market, but were reticent to commit any substantial assets.

In a subsample of 210 of the 657 subsidiaries and branches reported in Table 1-6, the report found 17 active in 1934 that originated before 1898. Six of the 17 were manufacturing firms.

The increased capital flight to the United States in the five years following 1934 occasioned another study of the U.S. capital account

---

[53]U.S. Department of Commerce, Foreign Investments in the United States (Washington: U.S. Government Printing Office, 1937), p. 31.

Table 1-6

NUMBER OF FOREIGN DIRECT INVESTMENTS (OTHER THAN INSURANCE) IN THE UNITED STATES, END OF 1934, BY INDUSTRY AND COUNTRY

Industry	Number
Manufacturing	216
Distribution	210
Transportation	92
Public Utilities	9
Petroleum	18
Mining	45
Finance (other than insurance)	43
Miscellaneous	24
	657
Country	
Canada	176
United Kingdom	210
France	27
The Netherlands	27
Switzerland	39
Other Europe	113
Latin America	17
Rest of World	48
	657

Source: See Table 1-4

in 1940. The data base of this investigation were the 1937 withholding tax returns filed with the Bureau of Internal Revenue, available because of the Revenue Act of 1936 which proved for U.S. taxation of nonresident individuals and corporations. These data allowed a check on the 1934 efforts and resulted in adding over 385 companies, mostly small enterprises in distribution, to the list of foreign subsidiaries and branches in the United States. The estimated total book value of direct investments in 1934 was increased to approximately $1800 million (double the 1919 estimate) from $1518 million. The 1937 estimates disaggregated by major industry and country are presented in Table 1-7, and the manufacturing sector is further disaggregated in Table 1-8, though no breakdown by country is available.

The 1937 total was $1883 million, an increase of only $28 million a year since 1934. Britain had 44% of the total, followed by Canada (25%), The Netherlands (10%) and Switzerland and Belgium, each with 4%. Manufacturing represented 39% of the total, while again finance was second with 22%. Within manufacturing, chemicals replaced textiles as the sector of principal importance, with food, beverages and tobacco a strong third. The total number of foreign subsidiaries and branches in the 1937 sample was 1172.

Table 1-9 presents estimates from the 1940 report and elsewhere of the international investment position of the United States in 1914, 1919, and 1939. During this period the U.S. changed from a debtor to a creditor in the world economy, though the capital inflow of the 1930's reduced the U.S. net creditor position. On the long-term capital

Table 1-7

FOREIGN INVESTMENTS IN THE UNITED STATES BY PRINCIPAL COUNTRIES AND INDUSTRIES, 1937

(in thousands of dollars; book values)

	United Kingdom	The Netherlands	Belgium	Germany	Switzerland	France	Sweden
Manufacturing	366,547	27,825	65,662	45,805	24,175	24,109	24,998
Distribution	29,674	5,009	3,573	6,279	12,864	7,411	1,433
Transportation	30,285	1,032	142	2,467	172	1,490	736
Public Utilities	925	0	0	0	0	0	0
Petroleum	92,940	142,551	0	38	2,276	10,078	0
Mining	13,146	325	112	0	0	0	0
Finance	277,074	1,266	1,071	147	28,045	11,629	2,569
Miscellaneous	22,752	511	630	249	6,400	1,786	0
Total	833,343	178,519	71,190	54,985	73,932	56,503	29,736

	Other Europe	Canada	Latin America	Japan	Rest of World	Total
Manufacturing	11,937	130,873	2,205	927	3,606	728,669
Distribution	3,446	11,008	13,975	16,531	7,958	119,161
Transportation	2,801	215,624	5	1,757	491	257,002
Public Utilities	0	8,057	200	0	0	9,182
Petroleum	0	34,987	149	0	431	283,450
Mining	0	10,199	55	0	65	23,902
Finance	13,077	45,742	1,516	21,805	8,424	412,365
Miscellaneous	7,895	6,205	292	10	2,142	48,872
Total	39, 156	462,695	18,397	41,030	23,117	1,882,603

Source: U.S. Department of Commerce, Foreign Long-Term Investments in the United States, 1937-39 (Washington: U.S. Government Printing Office, 1940).

Table 1-8

FOREIGN DIRECT INVESTMENTS IN UNITED STATES MANUFACTURING, 1937
(in thousands of dollars: book values)

Industry	Value
Automobile parts	34821
Iron and Steel	6348
Non-ferrous metals	24200
Transportation equipment	1790
Machinery	31977
Heating and electrical equipment	11963
Hardware	12276
Building and construction material	15827
Paper and wood products	18236
Chemicals	220304
Rubber	2561
Leather	2725
Textiles	217164
Foodstuffs	31938
Beverages	65275
Tobacco	18764
Other manufactures	12500
Total	728669

Source: see Table 1-7.

Table 1-9

THE INTERNATIONAL INVESTMENT POSITION OF THE UNITED STATES, 1914, 1919, AND 1939
(in millions of dollars)

United States Investments in Foreign Countries

	1914	1919	1939
Direct Investments	2700	3900	7000
Long-Term Portfolio Investments	800	2600	3800
Short-Term Investments	*	550	595
Total	3500	7000	11395

Foreign Investments in the United States

	1914	1919	1939
Direct Investments	1292	900	1935
Long-Term Portfolio Investments	5400	1600	4312
Short-Term Investments	500	800	3215
Total	7192	3300	9462

	1914	1919	1939
Net Creditor Position of the United States	-3692	+3700	+1933

Sources: Same as Table 1-7, Historical Statistics of the United States and Hal. B. Lary, The United States in the World Economy, #23 in the Economics Series of the U.S. Bureau of Foreign and Domestic Commerce (Washington: U.S. Government Printing Office, 1943).

account, the difference in portfolio preferences between the U.S. and foreign countries (mostly European) is evident, with direct investments abroad representing 60% of U.S. long-term credits and such investments by foreigners in the United States accounting for only 31% of U.S. long-term liabilities in 1939.

The Second World War and Afterward

The outbreak of war in Europe in 1939 caused the British, French, and Canadian governments to adopt measures to prevent capital exports, current account outflows, and to acquire control over assets denominated in foreign exchange. They attempted to conserve their dollar resources, selling gold to build up balances to pay for materials purchased in the U.S.

Such resources were not, of course, sufficient for the prosecution of the war, and in 1941 the Allies requested aid from the U.S. The Lend-Lease Act was passed, but to convince the isolationist American public of the seriousness of the British intent in prosecuting the war, and their immediate need for cash, the British government was required by the U.S. Treasury to acquire the American Viscose Company and sell it to American interests at depressed prices. This company, a subsidiary of Courtaulds, Ltd. was the world's largest producer of rayon, and its forced disposal was a shabby deed perpetrated on an already-beleaguered Britain. A similar requirement was the retirement of certain Brown & Williamson long-term securities as a condition for the granting of a Reconstruction Finance Corporation loan of $425 million to the United Kingdom.[54]

[54]For a good history of the events leading up to the passage of Lend-Lease, see Warren F. Kimball, The Most Unsordid Act: Lend-Lease, 1939-1941 (Baltimore: The Johns Hopkins Press, 1969).

In 1941 also, the U.S. Treasury was instructed by executive order to conduct a census of all foreign-owned assets in the United States, as of June 14, 1941. Initially, only the assets of Denmark and Norway were frozen after Germany invaded those countries on April 10, 1941. As more countries were invaded, their assets in the U.S. were also frozen. On June 14, the freeze was extended to Germany, Italy, and all of Continental Europe. A detailed summary of the assets represented by foreign-controlled enterprises is given in Tables 1-10 and 1-11.

The total of foreign direct investments in the United States in 1941 was $2313 million, an increase of 20% over the estimated 1939 figure. No doubt part of this increase was owing to the broad coverage of the 1941 census, which encompassed 2816 enterprises, more than 2½ times as many as the 1937 census, on which the 1939 estimate was based. Further, the 1941 census was based on market values, which at the time were estimated to be 10-12% below book values, on which the 1937 census was based. The earlier total also included the American Viscose Co. assets, which had been sold by June 14, 1941. When all these adjustments are made, the 1941 figure is approximately 30-35% higher than the 1939 figure, giving an indication of the uncertainty of estimates based on tax records. The British had the most firms, 623, but Japan was second with 360, almost all in distribution.

Again manufacturing was the largest major industrial sector, with 31% of the total ($714 million) and again within manufacturing chemicals, textiles and food products were the leading sub-industries, in that order.

Table 1-10

VALUE OF FOREIGN INTERESTS IN UNITED STATES ENTERPRISES
CONTROLLED BY FOREIGNERS, JUNE 14, 1941
(millions of dollars)

	Manu-facturing	Ex-traction	Public Utilities & Transportation	Finance	Trade	Miscellaneous	Total
Canada	145.8	10.4	282.3	40.1	20.3	30.9	529.8
Belgium	58.2	1.9	0.2	18.0	3.5	1.1	82.9
France	16.1	0.9	32.5	34.2	8.5	7.5	99.7
Germany	56.8	0.8	0.3	22.2	15.0	10.0	105.1
The Netherlands	98.7	195.0	5.0	18.3	12.7	6.2	335.9
Sweden	19.8	0.0	0.0	5.4	4.4	0.0	29.6
Switzerland	33.5	7.5	0.1	79.8	7.0	10.0	137.9
United Kingdom	243.5	51.7	68.1	247.5	32.8	68.0	711.6
Other	41.6	4.0	50.1	56.1	102.0	26.3	280.1
	714.0	272.2	438.6	521.6	206.2	160.0	2,312.6

Source: U.S. Treasury, Census of Foreign Owned Assets in the United States (Washington, U.S. Government Printing Office, 1945).

Table 1-11

NUMBER OF UNITED STATES ENTERPRISES CONTROLLED BY FOREIGN INTERESTS AND FOREIGN INVESTMENT THEREIN, BY INDUSTRY, JUNE 14, 1941
(millions of dollars)

	Number	Value
Agriculture	32	17.3
Mining	30	32.7
Petroleum, coal and natural gas	55	222.1
Manufacturing		
Edible products	114	150.2
Textiles and apparel	99	151.5
Wood products	43	33.5
Chemicals	156	229.0
Metal products and machinery	171	84.7
Other manufacturing	91	65.1
Total, manufacturing	674	714.0
Finance		
Banking and brokerage	115	90.0
Insurance	163	309.3
Other finance	143	122.3
Total, finance	421	521.6
Trade	789	206.2
Rail transportation	27	318.9
Public utilities	131	119.7
Miscellaneous	657	160.0
Total	2816	2312.6

Source: See Table 1-10.

Finance maintained its position as the second leading major sector, with transportation third and petroleum fourth.

The country rankings were also unchanged, with Britain leading with $712 million, followed by Canada, The Netherlands, and Switzerland. German investments totaled $105 million, less than 5% of the total.

The industrial base of these countries was also similar to that of previous years, with the British strong in textile and food products, the Canadians in transportation, and the Dutch in petroleum. The Swiss strength was in finance and in chemicals.

The German holdings documented in the census included those firms with headquarters outside of Germany beneficially owned by German citizens. Of the 171 German-controlled subsidiaries and branches valued at $105 million, 43 with a value of $88 million were held nominally by corporations in Switzerland, The Netherlands, and other non-enemy countries.[55] Switzerland, of course, is a well-known haven for obscuring asset ownership. The French Marxist Pierre Francette estimated that in 1940, 2/3 of the capital invested in America attributed to the "large enterprise in fiscal evasion called Switzerland" was in fact French.[56]

On March 11, 1942, the President, in line with the War Powers Act of December 18, 1941, revived the Office of Alien Property Custodian, and empowered the custodian to vest in himself any property or interest of any foreign government or national, including the frozen assets subject to control by the U.S. Treasury. Whereas the Treasury had no title to

---

[55]U.S. Treasury, Census of Foreign-Owned Assets in the United States (Washington: U.S. Government Printing Office, 1945), 30.

[56]Quoted by Jacques Bojin, op. cit., p. 59.

the assets under its control, the Alien Property Custodian was empowered to administer, liquidate, or sell this property in the interest of the U.S. A working line of demarcation of authority between the two offices was established, with the Treasury continuing to supervise frozen funds and financial transactions and the Alien Property Custodian handling real property and patents, trademarks and copyrights.

Leo T. Crowley, appointed to the post, was selective in his vestment orders during the first three months of his tenure. He acquired patents and copyrights from I.G. Farben, Robert Bosch, and other German, Italian, and Japanese nationals. He acquired title to Farben's subsidiary, General Aniline and Film, from the U.S. Treasury; GAF was the only instance in which the Treasury's supervision of frozen funds involved installation of new management and assumption of a controlling interest in the enterprise. Other properties acquired included: Farben's stock in Magnesium Development Corporation, jointly owned with Alcoa; stock of the Luscombe Airplane Corporation; stock of the Schering Corporation, a pharmaceutical firm; stock of Steel Union Inc., a sales subsidiary of Vereinigte Stahlwerke; stock of American Bosch Corporation (reasons given were the company's importance in war production, its former German ownership, and its dependence on patents controlled by Robert Bosch Co. of Germany); and capital stock of Rare Chemicals, Inc., and Boehringer Corporation of New York.[57]

---

[57]"U.S. Takes Over from the Enemy," Business Week, June 6, 1942, 15-16.

After World War II, the Allies agreed not to exact exorbitant reparations from Germany and Japan, profiting from their experience after World War I. However, in the Paris Agreement on German Reparation of January 24, 1946, it was agreed that

> Each Signatory Government shall, under such procedures at it may choose, hold or dispose of Germany enemy assets within its jurisdiction in manners designed to preclude their return to German ownership or control...[58]

In the Bonn Convention, signed on May 26, 1952, and approved by the U.S. Senate, it was agreed that the Allies would waive all claims for reparations from Germany; Germany would never contest the retention of vested assets by the Allies; and Germany would compensate the former owners of vested property. A similar agreement was contained in the treaty negotiated with Japan and signed on September 8, 1951.[59]

The U.S. policy toward the foreign assets seized in 1942 was delineated in the War Claims Act of 1948, which amended the Trading with the Enemy Act of 1917 to provide that the net proceeds after administration, liquidation and disposition of enemy property held by the Alien Property Custodian was to be conveyed to the U.S. Treasury.[60]

The Alien Property Custodian placed the foreign-owned enterprises under his control under American management, and in this situation some prospered. North American Rayon, worth $8 million in 1942, was sold for $12.7 million; the Schering Corporation, originally worth $1.3 million,

---

[58]Quoted in Oscar Schisgall, The Enemy Property Issue, Public Affairs Pamphlet #246 (New York: The Public Affairs Committee, Inc., 1957), 4.

[59]Ibid.

[60]U.S. Congress. War Claims Act of 1948, as Amended. Public Law 896, 80th Congress (Washington: U.S. Government Printing Office, 1954).

was sold for $30 million. By July, 1956, 382 of the 435 foreign-owned enterprises had been sold, the physial assets of 35 had been disposed of, and 18 remained under the supervision of the Alien Property Custodian. In this last group was General Aniline and Film, worth $69 million when seized. In 1948, the Swiss holding company, Interhandel, filed suit in the United States, claiming title to 89% of GAF's assets on the grounds that it was a Swiss company and hence not subject to U.S. alien property laws. The U.S. government, of course, maintained that GAF was beneficially owned by I.G. Farbenindustrie.[61]

In 1956, a federal court disallowed the Swiss claim; the Supreme Court upheld the ruling in 1957. The U.S. government made preparations to sell GAF, going so far as to print a prospectus. However, Interhandel appealed the case to the International Court at The Hague, even though the United States was not bound to accept their judgment. The publicity generated by this legal maneuver had a salutary effect on the Swiss cause, for an Interhandel official announced in Zurich in November, 1958 that settlement was imminent.

However, at this point holders of I.G. Farben liquidation certificates moved to block any settlement until the ownership of GAF was determined.[62] The case dragged on into 1962, when sentiment grew in Congress for passage of a bill which would allow the sale of GAF, with the proceeds to be placed in escrow until all litigation was concluded. GAF had never reached the rate of return it achieved in 1948,

---

[61]"Clearing a Way to Sell General Aniline," Business Week, December 16, 1964, 16.

[62]"Ghost Story (Interhandel-GAF)", Forbes, December 1, 1958.

and Congressional opinion was that the restrictions put on GAF by government operation (e.g. the prohibition of giving stock options to managers which Interhandel had requested to prevent dilution of its stock) had inhibited its development. A staunch opponent of this measure and of all efforts to dispose of enemy property was Senator Olin Johnston (D-S.C.), chairman of the Trading with the Enemy Subcommittee of the Senate Judiciary Committee, who took the position that all enemy property had been seized without due process in 1942, and hence could not be sold.[63]

Nevertheless, such a bill was passed in 1962, immensely enhancing the government's bargaining position. In October, 1963, Attorney General Robert Kennedy reached a settlement with Interhandel's lawyers, subject to a number of conditions stipulated by the federal court.[64] By December, 1964, these conditions had been satisfied. It was determined to sell GAF after the model provided by the sale of Universal Oil Products in 1959, when an underwriting syndicate bought all the sequestered GAF stock, then resold it to the public under rules insuring a wide distribution of shares. Of GAF's 11.2 million shares, no more than 1,000 were to go to any individual or corporation, and no more than 50,000 to any institutional investor. 15% could be sold abroad, with a maximum of 3% going to any foreign country.[65,66]

---

[63]"General Aniline Builds Up Hopes," Business Week, August 11, 1962, 112.

[64]"General Aniline's Fate," Business Week, October 19, 1963, 38.

[65]"Deal Cuts General Aniline Knot," Business Week, March 9, 1963, 29.

[66]"Clearing Way to Sell General Aniline," Business Week, December 26, 1964, 16.

GAF was finally sold in March, 1965, for $329 million, with the U.S. government receiving the first 11%, then half the remainder plus $24 million of the Swiss share to cover back taxes and a repurchase of Interhandel shares owned by GAF at its seizure.[67] Nevertheless, this sale of the largest single item in the Alien Property Custodian's inventory did not exhaust the office's assets. Reorganized as a subdivision of the Claims Division in the Department of Justice on July 1, 1966, the Office of Alien Property as of June 30, 1970 still had under its supervision approximately $1 million in miscellaneous property. Nine suits were still in litigation, one of which involved holders of General Dyestuff stock seized in 1942 which had been exchanged for GAF stock in 1954; they were claiming their right to $22 million from the GAF sale. In over 28 years of existence, the Office of Alien Property had taken in $866 million from the sale of property, patents, and copyrights, and had returned $33 million to claimants and residents of neutral countries (since its policy was to sell only German and Japanese property).[68]

The disposal of German assets seized abroad as the war ended also influenced the course of foreign direct investment in the United States. Owners of major industries located in the zones of Allied occupation were tried for conspiring with Hitler; while the trials were in progress, their property was held in trust and was returned to them upon acquittal. It was the decision of the Allied Liquidation Commission, however, to

---

[67] "GAF Stock Sells Like Hot Cakes," Business Week, March 13, 1965, 142.

[68] U.S. Department of Justice, Office of Alien Property, Annual Report, Fiscal Year 1970 (Washington: U.S. Government Printing Office, 1970).

"deconcentrate" I.G. Farben Industries, the coal and steel concerns (including Vereinigte Stahlwerke and the three large banks--the Commerzbank, Deutsche Bank, and the Dresdener Bank. The leading case, of course, was the breakup of I.G. Farben. Leunawerk, owned by Farben and the largest chemical plant in Europe, had been seized by the Soviets in June, 1946. Farben assets in the western zone were divided among four major companies--Badische Anilin- und Sodafabrik, Cassella Farbwerke, Farbenfabrik Bayer and Höchster Farbwerke, with a small amount of residual property held by the I.G. Liquidationsmasse.[69] Three of these firms--BASF, Bayer, and Hoechst--were quickly back in the U.S. by 1960.

Summary

The history of foreign investment in the United States from colonial times to the post-World War II era has been, then, a tumultous one. Originally foreign capital participated heavily in the development of America's natural resources, and a strong foreign presence in the financial sector was built up partly as a consequence. Then foreign interests increasingly gained control of U.S. manufacturing enterprise, especially in textiles, where British strength lay, and in chemicals, the strong suit of the Germans. Throughout this long history, the fortunes of war wrought a sharp influence on the course of of foreign investment in the U.S. as allies were forced to sell off

---

[69]Gustav Stolper et al., The German Economy, 1870 to the Present (New York: Harcourt, Brace and World, 1967), pp. 188, 195.

some investments to pay for material and enemies had their property confiscated. The postwar years have been a period of relatively uninterrupted prosperity, yet the heritage of 20th century war still has continued to influence the course of foreign investment in the U.S.

Appendix to Chapter 1

FOREIGN INVESTMENTS IN THE UNITED STATES DURING THE COLONIAL ERA

It is easily recognized that the first foreign claims on assets in what later became United States territory were claims on the country's most abundant resource, land, whether one chooses to consider the efforts of Columbus, the Spanish settlements in Florida in the 16th century, or Sir Francis Drake's claim over the west coast of North America ("New Albion") in the name of Queen Elizabeth I in 1578.[1]

The first quasi-corporate body to be given control over assets in the United States was the English "Gouvernour and Assistants of the Citie of Ralegh in Virginia,"[2] recipients of an indenture of grant from Sir Walter Ralegh, then "chiefe gouvernour of Virginia,"[3] in 1587. Unfortunately, the colonists recruited by the governor and his assistants quickly disappeared into the Virginia wilderness.

Nineteen years later, James I gave a charter to "The Treasurer and Company of Adventurers and Planters of the City of London, for the first Colony in Virginia"[4] (the "London Company"). This initiative was, of course, a success, and the story of the colony's leader, Captain John Smith, and the Indian princess, Pochohontas, is well-known to American

---

[1]C.E. Carrington, The British Overseas (Cambridge, Cambridge University Press, revised edition, 1968), p. 17.

[2]J.S. Davis, Essays in the Earlier History of American Corporations, Volume I (Cambridge: Harvard University Press, 1917), p. 30.

[3]Ibid.

[4]Ibid., p. 32.

school children. However, by 1624 the London Company was insolvent, though it did not officially pass out of existence until 1632.[5] Insolvency was also the fate of "The Councill established at Plymouth, in the County of Devon, for the planting, ruling, and gouverning of New England in America."[6] (the Plymouth colony) established in 1620, from whose hardship the American heritage of Thanksgiving is derived. Moribund in 1623, it surrendered its charter in 1635.

Indeed, in a study of twelve investments made in the United States before the Revolutionary War by organizational entities that could be called corporations, Joseph Davis concluded, "...none of the business corporations had a continuous, active existence of more than a score of years and all ended in discouragement...."[7] Davis also found that in addition to business companies, of which the Water Company of Boston (1652) and William Penn's The Free Society of Traders in Pennsylvania (1682) are prime early examples, one educational corporation and several missionary societies were established. The former served to secure for Virginia a charter for the establishment and funding of William and Mary College in 1693 (charters which, incidentally, Harvard, Princeton and Dartmouth all applied for and failed to receive). The societies, formed to evangelize the Indians, were the only corporate-like entities which maintained their headquarters in England, for fund-raising purposes. The rest of the pre-Revolutionary War corporations organized abroad gradually became American in ownership, often as a

---

[5]Carrington, op. cit., p. 22.

[6]Davis, op. cit., p. 34.

[7]Ibid., p. 48.

result of the emigration of their stockholders to America (as with the Massachusetts Bay Company in 1623). This "Americanization" was a natural hallmark of foreign direct investment in the U.S. well into the 20th century, and has complicated efforts to distinguish foreign investments from the domestic variety.[8]

The original title to most initial foreign investments was secured by charter from the appropriate sovereign entity, who controlled the assets by fiat based on the explorations of some earlier adventurer. However, in one rather famous case, a capital movement took place. Henry Hudson initiated the Dutch presence in America when he discovered the area later known as New York while sailing for the Dutch East India Company in 1609. By 1626, the Dutch West India Company had founded Manhattan as a trading post on that location. In that year Peter Minuet, the first director-general of New Netherland province, purchased the island from the Brooklyn Indians (Canarsees) with trinkets and cloth valued at 60 guilders, or about $39.[9]

Quasi-corporate and government foreign direct investments during the colonial period were not large compared to similar domestic activity. Davis notes, "Most of the corporations active in America during the

---

[8] C.P. Kindleberger notes the same phenomenon in "Origins of United States Direct Investment in France" (M.I.T. Department of Economics Working Paper #105, March 1973); Welles and Co., a private bank, and Haviland, manufacturers of fine china, had both been established by Americans in France in the 19th century but over time became increasingly French in ownership and outlook. This phenomenon has implications for the calculation of stocks and flows of direct investment. When the center of decision-making changes from home to host country, the stock of liabilities to foreigners declines and a capital "outflow" occurs.

[9] <u>Encyclopedia Americana</u>, Volume 20, 1972, pp. 231-232.

colonial period originated and were chartered in America by the authorities here."[10] (Of course, such corporations as were controlled by foreigners are formally equivalent to today's subsidiaries, but little is known of the extent of this practice.) Further, corporate activity as a whole in the colonies was not intense until just prior to the Revolutionary War, as Davis comments, "All but one or two of the colonial business corporations were chartered after 1760."[11]

During the colonial era, political and physical constraints inhibited the operation of a business any way but locally. The latter restrictions are obvious, and it was not until the striking developments in transportation and communication of the 20th century overcame them that the international corporation came into its own. The former relate particularly to restrictions by the English crown on the operation of corporate-like entities, including the extension of the jurisdiction of the Bubble Act of 1720 to America by Parliament in 1741.

After the Revolution, there was a much different climate and set of initial conditions for corporate investment in the international economy. The need of the United States for war financing forced the country to become known in the world financial community. When the peace treaty of 1783 was signed, the United States was in debt to France for loans of $4.5 million and to Holland, still the pre-eminent world financial power, for $1.8 million.[12] The French banker, Etienne Claviere

---

[10]Davis, op. cit., p. 104.

[11]Ibid., p. 107.

[12]Cleona Lewis, America's Stake in International Investments (Washington: The Brookings Institution, 1938), p. 513.

sent Jean Pierre Brissot de Warville and the Dutch banker Theophile Cazenove came to the U.S. to select securities and lands for investment.[13]

British investors, of course, were more reticent to return to their former colonies, as their properties and estates had been confiscated causing a loss estimated at $40 million.[14] Such wartime confiscation are, as we will see, a leitmotiv in the chronicle of foreign direct investment in the United States. However, England quickly regained her monopoly in the financing of American trade and soon joined the French and Dutch in acquiring American securities and lands.

The availability of securities to be purchased was much greater in post-Revolutionary War times, as more business corporations were formed and unincorporated joint-stock companies issued transferable shares. Davis comments that, "Prior to 1801 over 300 charters were granted for business corporations, 90% of them after 1789."[15]

The marketing of land was intensively conducted. The aforementioned Dutch banker and others bought 315 million acres, one-seventh of the state of New York, from the patriot Robert Morris. This syndicate then formed the Holland Land Company to resell the land to settlers. This prosperous venture consistently earned a 6% rate of return before folding in 1836. At the same time, Americans traveled to Europe selling land. During the Revolutionary War the American Commission to France sold shares in a company that claimed to have title from the Indians to lands in the territories of Ohio, Indiana and Illinois. Robert Morris

---

[13] Davis, op. cit., p. 152.

[14] Lewis, op. cit., p. 1.

[15] Davis, op. cit., Volume II, p. 8.

had sent his son to Europe to solicit buyers for his land in New York. There is record of an American land-agency office in Threadneedle Street as early as 1795. French and Belgian land companies bought in the United States in the 1790's, and Alexander Baring invested $250,000 in land in Maine in the 1790's.[16] Davis notes that "Foreign investors--Dutch, French, and English especially--held considerable stock in the Bank of North America and the United States, and by the end of the century were very likely in other large institutions." He continues by quoting Robert Morris' assertion that 13% of the stock of the Bank of North America was held abroad in 1786, with 90% of foreign holdings in Dutch hands.[17]

Of course, these first investments in the securities and lands of the new republic were rarely what is called direct investments, but were rather of the portfolio variety, long-term in nature but without direct control over the asset involved. It will become evident that the great majority of foreign capital participation in the development of the United States was of this portfolio variety, since while foreign investors had some information about assets titled in the United States, they rarely had the means to provide proper supervisory control over those assets until the 20th century.

Nevertheless, it is an important theme of the history of foreign direct investment in the United States that such portfolio investments often provided the basis for later direct investments, as loans were found in default or as enterprises dissolved. Louis Hacker states that

---

[16]Lewis, op. cit., pp. 79-80.

[17]Davis, op. cit., Volume II, p. 299.

prior to the Revolution, "...the floating obligations of Southern planters to English merchants were converted into long-term debts or capital investments--mortgages on land and on Negro slaves."[18] Such occurrences were common in the nineteenth century as well.

European investors were more than just speculators in land and securities, however. According to Davis, "Dutch capitalists supplied part of the funds for at least the Connecticut River canals at South Hadley (Massachusetts), the Potomac Company, the New Jersey manufacturing society and probably the Western Inland Company of New York."[19] On occasion, however, enterprises purportedly intending to develop local resources were actually established for other purposes.

Such was the case with the Manhattan Company, granted a perpetual charter to provide pure water for the city of New York in 1799 through the strenuous efforts of Aaron Burr, acting on behalf of the Marquis of Caermarthen and the Democratic Party, which wanted a bank more sympathetic to its interests. Once chartered, the company never pumped a drop, but quickly entered into the banking and insurance business, with the Marquis retaining control through a front of American directors.[20]

Early European participation in the American economy was smallest in the manufacturing sector, which was one of the weakest segments of the U.S. economy. Manufacturing had developed little during colonial times, as the colonies engaged in a system of triangular trade, with the North and Middle Atlantic Colonies receiving manufactured articles

---

[18] Louis M. Hacker, The Course of American Economic Growth and Development (New York: John Wiley & Sons, 1970), pp. 37-38.

[19] Davis, op. cit., Volume II, p.299.

[20] Ibid., pp. 100, 232.

from England, sending food to the South, which exported tobacco and later rice and cotton to England. Carrington asserts that "The Acts of Trade (which prohibited ships of foreign origin from trading with the colonies) prevented New England from developing manufactures...."[21] It must be remembered, however, that manufacturing was not well developed anywhere at this time, save in England. It is likely that English restrictions on the export of machines and plans for machines in tandem with the underdeveloped nature of corporate forms of organization were more important that the Acts of Trade.

In any event, Alexander Hamilton, the first Secretary of the Treasury of the United States, sought to solicit more investment in this crucial sector, urged on by Tench Coxe, "the foremost advocate of the development of manufacturing in the United States."[22] In his Report on Manufactures in December, 1791, Hamilton wrote,

> It is not impossible, that there may be persons disposed to look with a jealous eye on the introduction of foreign Capital, as if it were an instrument to deprive our own citizens of the profits of our own industry; But, perhaps, there never could be a more unreasonable jealousey. Instead of being viewed as a rival, it ought to be Considered as a most valuable auxiliary, conducing to put into Motion a greater Quantity of productive labor, and a greater portion of useful enterprise than could exist without it.... every farthing of foreign capital...is a precious acquisition.[23]

The infusion of foreign capital was an important topic of the day, and Hamilton had other supporters besides Coxe. From an anonymous article

---

[21]Carrington, op. cit., p. 101.

[22]Davis, op. cit., p. 355.

[23]Jacob E. Cooke, ed., The Reports of Alexander Hamilton (New York: Harper & Row, 1964), p. 148.

in the American Museum of April, 1791, entitled "A Brief Examination of Lord Sheffield's Observations on the Commerce of the United States of America," Davis quotes, "The first judicious European capitalists, who shall take good situations in the united states and establish manufactories by labor-saving machines, must rapidly and certainly make fortunes."[24]

Early efforts to establish manufacturing establishments in the U.S. grew out of the commercial contacts which English and other foreign merchants had with the United States. Davis notes that almost all manufacturing enterprise in the United States before 1800 was of the cottage industry type or conducted by partnerships. He found evidence of only eight quasi-corporate entities in manufacturing in all of the U.S. prior to 1800, in the textile, cloth and glass industries. Stating that more failed, Davis cites the scarcity of skilled labor in the U.S. and the technological virtuosity of foreign competition as the reasons for failure. Among the eight was one foreign firm, a German glass works established in Fredericktown, Maryland in 1789 and abandoned a few years later.[25] Of course, foreign capital participated in the establishment in 1791 of the New Jersey Society for Useful Manufactures (S.U.M.), whose estimated capital was thought to be as large as that engaged in all manufacturing in the U.S. at the time. But the S.U.M. was also crippled by the Panic of 1793, and though it did not fail, it did not prosper as it limped through the next century as a holding company.[26]

---

[24]Davis, op. cit., p. 351.

[25]Davis, op. cit., Volume II, pp. 264, 280.

[26]Davis, op. cit., p. 391.

Despite the poor start in manufacturing,

> Hamilton's expectations that foreign investments would take place in the United States were fully realized. As of June 30, 1803 (the estimates are those of Samuel Blodgett's <u>Economica</u>, published in 1806), the American capital balance sheet was, in part, as follows; federal debt stood at $81.3 million of which $43.7 million, or 53%, was held abroad; the stocks of American corporations (Banks, insurance companies, and turnpike and canal companies) were worth $48.4 million, of which $15.9 million or 33%, was owned by foreigners; the Bank of the United States was capitalized at $10 million of which $6.2 million or 62% was in foreign portfolios."[27]

Finally, foreign participation in the Louisiana Purchase of 1803 was also extensive. $3.7 million of the purchase price of $15 million was written off against U.S. claims against France for the shipping war of 1796-1800 between the two. Of the remaining $11.3 million financed by 6% bonds, $9.2 million was owed to England, $1.3 million to France and $0.5 million to Holland.[28]

---

[27] Hacker, op. cit., p. 67.

[28] Ibid.

Chapter 2

FOREIGN DIRECT INVESTMENT IN THE UNITED STATES SINCE 1950

The events of the second world war left the United States alone of the major industrialized countries with its economi intact. After the war all the belligerents were occupied in the extensive reconstruction of their own economies and imposed controls to insure that sufficient capital would remain at home to accomplish the task. In the second half of the 1950's, the rebuilding job had been substantially completed, convertibility of currencies was restored and the Treaty of Rome was signed creating the European Economic Community. European and Japanese capital remained largely at home, however, drawn by the stimulus of rapid domestic and regional growth and in some cases retarded from moving by government regulation. In the 1960's the Kennedy Administration in the United States adopted several measures to improve the balance of payments, including the adoption of an "Invest in U.S.A." program. As growth in their own regions slowed and their companies matured, European and Japanese corporations migrated to the United States in increasing numbers. The currency realignments of 1971-74 validated the structural change in the competitive position of foreign companies vis-à-vis their U.S. counterparts, and were followed by a near-torrent (in comparison with previous flows) of foreign investors into the U.S., occasioning a review of government policies toward foreign investment by both the executive and legislative branches of government.

The Value of Foreign Direct Investment Since 1950

1950 is the first year of a consistent series of data about foreign direct investment in the United States, and consequently was chosen as the breakpoint in the narrative beginning in Chapter 1. This series is the result of a benchmark survey of foreign direct investment in the United States taken by the Department of Commerce in 1959;[1] prior to this time up-to-date estimates of the volume of foreign direct investment in the United States depended on quarterly reports by corporations identified as foreign-owned in the U.S. Treasury Department's census of foreign-owned assets conducted in 1941.[2] The 1959 survey has been updated quarterly to provide an annual series through 1972.

For the purposes of the 1959 survey, direct foreign investments were U.S. business enterprises incorporated in the U.S. in which foreign persons or organizations held 25% or more of the voting stock or other controlling interest, and U.S. branches of foreign corporations. The value of such investments was taken to be the book value of liabilities due to and net worth owned by the foreign person or organization involved. Special adjustments were made in the financial sector to net out short-term interbank deposits and to allow for insurance sector accounting practices. The change in the value of direct investment in a given year is the sum of net capital inflows, asset valuation adjustments, and reinvested earnings of incorporated affiliates (reinvested

[1]U.S. Department of Commerce, Office of Business Economics, Foreign Business Investments in the United States (Washington: U.S. Government Printing Office, 1962).

[2]U.S. Treasury Department, Census of Foreign-Owned Assets in the United States (Washington: U.S. Government Printing Office, 1945).

earnings of branches are treated as an outflow to the parent and an inflow to the branch). The evolution of these concepts since 1950 is represented in Tables 2-1 through 2-5.

Table 2-1 shows the value of foreign direct investment in the United States by major industry aggregate from 1950-1972. The rapid increase in the total since 1966 is evident, since the average annual rate of growth from 1966-1972 was 9.5%, as compared to only 5.7% for 1950-66. Of course, with the currency uncertainties of 1971-72, this rate of growth fell off to near the old trend. However, projections for the 1973 inflow at $3 billion give a growth rate for 1973 of 20%.[3] Within the total, the increasing importance of manufacturing is also striking as its share of the total increased from 33% in 1950 to 50% in 1972.

The distribution of the value of foreign direct investment by subindustry within manufacturing is not published by the Department of Commerce, in all probability because of the small number of foreign firms in several subindustries. Publication of the book value of foreign direct investment in these subindustries would disclose information which Commerce has agreed to keep confidential under the Bretton Woods agreement. The 1959 benchmark survey, as published, does provide a breakdown of sales of foreign-controlled subsidiaries and branches by subindustry in 1959. Food and beverage products had 45% of the total of $5131 million. Chemicals was next with 17% followed by non-electrical

[3]Such projections are based on a private survey done by David Bauer and reported in "Foreign Direct Investment in the United States," The Conference Board Record (February, 1974), pp. 23-26.

Table 2-1

FOREIGN DIRECT INVESTMENTS IN THE UNITED STATES;
STOCKS BY MAJOR INDUSTRY, 1950-72
(millions of dollars)

Year	Petroleum	Manufacturing	Finance	Trade	Other	Total
1950	405	1138	1065	784		3391
1951	466	1274	1105	814		3658
1952	552	1377	1170	846		3945
1953	706	1451	1219	875		4251
1954	776	1582	1371	904		4633
1955	853	1759	1499	965		5076
1956	937	1940	1534	1048		5459
1957	1043	2083	1496	1088		5710
1958	1099	2232	1660	1124		6115
1959	1184	2471	1734	1215		6604
1960	1238	2611	1810	1251		6910
1961	1325	2754	2025	1286		7392
1962	1419	2885	1943	750	615	7612
1963	1513	3018	2045	706	662	7944
1964	1612	3213	2181	675	682	8363
1965	1710	3478	2169	748	692	8797
1966	1740	3789	2072	739	714	9054
1967	1885	4181	2193	848	816	9923
1968	2261	4475	2305	938	836	10815
1969	2493	5344	2189	959	833	11818
1970	2992	6140	2256	994	888	13270
1971	3113	6755	2352	512	923	13655
1972	3243	7228	2411	523	958	14363

Sources: 1950-61, U.S. Department of Commerce, Office of Business Economics, Foreign Business Investments in the United States (Washington: U.S. Government Printing Office, 1962).

1962-71, Robert B. Leftwich, "Foreign Direct Investments in the United States, 1962-71," Survey of Current Business (February, 1973), 29-40.

1972, Robert B. Leftwich and Robert Boyke, "Foreign Direct Investments in the United States in 1972," Survey of Current Business (August, 1973), 50-51.

machinery with 8%. Table 2-2 provides an indication of the distribution of the number of foreign-controlled firms in manufacturing. Non-electrical machinery accounts for 20% of the total number of firms, while chemicals represents 18% and 11% are in electrical machinery.

Table 2-3 breaks the total down by area. British and Canadian investment flows predominate over the sample period, representing respectively 34% and 30% of the total in 1950 and 31% and 25% in 1972. Much of the 8% decline of the two has been picked up by The Netherlands, whose share has increased from 9% to 16%. Switzerland has remained the fourth largest source, while within the Other Europe category, Germany has increased her investments from $152 million in 1962 to $807 million ten years later. Over the period 1962-70 Japan's investment approximately doubled from $112 to $229 million. Changes in intercompany accounts owing to expectations of a further deterioration in the position of the dollar during 1971-72 caused the Japanese to have a negative position in these years; however, their 1973 total is expected to be strongly positive.

Table 2-4 compares the magnitudes of domestic investment and foreign direct investment in the United States with U.S. direct investment abroad and presents the sources of the changes in the values of both international series for the last ten years. The small size of foreign direct investment in the U.S. is evident. Only once, in 1970, was it more than 1% of U.S. domestic investment--and the former includes current plus fixed assets while the latter only refers to fixed assets. Only in 1970 was foreign direct investment in the U.S. more than 20% of

Table 2-2

DISTRIBUTION OF FOREIGN DIRECT INVESTMENTS
IN UNITED STATES MANUFACTURING, 1972

Sub-industry	Number of Investments
Machinery, except electrical	68
Chemicals and allied products	60
Electrical and electronic machinery	37
Instruments	25
Fabricated metal products	23
Food and kindred products	23
Printing and publishing	19
Textile mill products	15
Paper and allied products	13
Primary metal industries	13
Transportation equipment	9
Stone, clay, glass and concrete products	9
Miscellaneous	6
Lumber and wood products	4
Furniture and fixings	4
Tobacco manufacturers	3
Apparel and other finished products	3
Petroleum refining	3
Rubber products	3
Leather products	1
Total	341

Source: U.S. Senate, Committee on Banking, Housing and Urban Affairs, Subcommittee on International Finance, 93rd Congress, 2nd session, _Foreign Investment in the United States_ (Washington: U.S. Government Printing Office, 1974).

Table 2-2

DISTRIBUTION OF FOREIGN DIRECT INVESTMENTS
IN UNITED STATES MANUFACTURING, 1972

Sub-industry	Number of Investments
Machinery, except electrical	68
Chemicals and allied products	60
Electrical and electronic machinery	37
Instruments	25
Fabricated metal products	23
Food and kindred products	23
Printing and publishing	19
Textile mill products	15
Paper and allied products	13
Primary metal industries	13
Transportation equipment	9
Stone, clay, glass and concrete products	9
Miscellaneous	6
Lumber and wood products	4
Furniture and fixings	4
Tobacco manufacturers	3
Apparel and other finished products	3
Petroleum refining	3
Rubber products	3
Leather products	1
Total	341

Source: U.S. Senate, Committee on Banking, Housing and Urban Affairs, Subcommittee on International Finance, 93rd Congress, 2nd session, Foreign Investment in the United States (Washington: U.S. Government Printing Office, 1974).

Table 2-3

FOREIGN DIRECT INVESTMENTS IN THE UNITED STATES;
STOCKS BY MAJOR COUNTRIES OR REGIONS, 1950-72

(millions of dollars)

Year	Canada	United Kingdom	The Netherlands	Switzerland	Other Europe	Rest of World	Total
1950	1029	1168	334	348	377	134	3391
1951	1109	1273	376	369	392	139	3658
1952	1218	1345	423	390	417	152	3945
1953	1350	1422	480	415	434	150	4251
1954	1427	1590	533	466	460	157	4663
1955	1542	1749	613	522	485	165	5076
1956	1690	1833	681	557	527	171	5459
1957	1773	1881	747	576	549	184	5710
1958	1835	2024	816	636	594	210	6115
1959	1896	2167	892	716	677	256	6604
1960	1934	2248	947	773	739	269	6910
1961	1989	2484	1023	830	791	274	7392
1962	2064	2474	1082	836	855	301	7612
1963	2183	2665	1134	825	868	269	7944
1964	2284	2796	1231	896	897	259	8363
1965	2388	2852	1304	940	980	333	8797
1966	2439	2864	1402	949	1059	341	9054
1967	2575	3156	1508	1096	1245	343	9923
1968	2659	3409	1750	1238	1353	406	10815
1969	2834	3496	1966	1395	1653	474	11818
1970	3117	4127	2151	1545	1731	598	13270
1971	3339	4438	2225	1537	1886	231	13655
1972	3612	4581	2331	1595	1934	311	14363

Source: see Table 2-1.

Table 2-4

U.S. DOMESTIC INVESTMENT, U.S. FOREIGN DIRECT INVESTMENT, AND FOREIGN DIRECT INVESTMENT IN THE U.S., 1963-72

(millions of dollars)

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
U.S. Domestic Investment (excluding residential structures)	60100	66900	80900	96400	91500	95900	106400	105900	109400	126300
U.S. Foreign Direct Investment	3460	3744	4994	5325	4692	5492	6050	7145	8020	7833
Net Capital Flows	1976	2328	3468	3661	3137	3209	3271	4410	4943	3404
Reinvested Earnings	1507	1431	1542	1739	1598	2175	2604	2948	3157	4521
Other Adjustments	-23	-15	-16	-75	-43	108	175	-213	-80	-92
Foreign Direct Investment in the United States	332	419	434	257	869	892	1003	1452	385	708
Net Capital Flow	-5	-5	57	86	251	319	832	1032	-115	160
Reinvested Earnings	236	327	358	339	440	488	431	434	498	548
Other Adjustments	101	97	19	-168	178	85	-260	-12	2	---

Source: Survey of Current Business, various issues.

U.S. direct investment abroad. And, with the exception of 1969-70, foreign investors in the U.S. have increased the value of their holdings principally through retained earnings rather than via capital inflows. In contrast, until 1972, U.S. direct investment was always financed in the main by capital outflows (despite the array of capital controls programs).

These direct investment statistics suggest that the foreign long-term capital account with the U.S. is imbalanced. However, Table 2-5 shows that while the U.S. is a net creditor, its creditor position in direct investments is offset by a debtor position in long-term portfolio investment. In 1972, flows in both directions were nearly equal.

Despite the full and complete coverage obtained in the census of foreign-owned assets in 1941, estimates for the 1959 survey year based on the 1941 benchmark were off by 20%. The value of foreign direct investment in the U.S. in 1959 was $6604 million according to the survey, but only $5220 million according to the 1941 benchmark. Similarly, the data just reported are based on the 1959 benchmark, and must also be subject to error, especially in recent years. In a questionnaire survey of foreign direct investors in the U.S. made in 1973, it was estimated that the Department of Commerce figures understate the book value of foreign direct investments in the United States by some $28 billion![4] Since only 4% of the sample responded to the

[4]Jeffrey S. Arpan and David A. Ricks, "Foreign Direct Investments in the United States in Manufacturing, Mining, and Petroleum," paper presented at the Annual Meeting of the Academy of International Business, New York City, December 28, 1973.

Table 2-5

U.S. LONG-TERM CAPITAL ACCOUNT, 1972
(millions of dollars)

	1972	Change, 1971-72
U.S. Direct Investment Abroad	94031	7833
U.S. Portfolio Investment Abroad	24889	3139
Total	118916	11022
Foreign Direct Investment in the U.S.	14363	708
Foreign Portfolio Investment in the U.S.	38200	8505
Total	52563	9213

Source: U.S. President, _International Economic Report of the President_ (Washington: U.S. Government Printing Office, 1974).

(voluntary) questionnaire, this result is subject to a great deal of qualification. However, it illustrates one of the motivations for the introduction of the bill to study foreign investment in the U.S. mentioned earlier.

Public Policy and Foreign Investment Since 1950

U.S. Government handling of foreign-owned assets seized during the second world war was discussed at the end of Chapter 1. American attitudes toward foreign investment in the cold-war era were lukewarm at best. Some Americans "showed themselves rather alarmed about what they considered a foreign invasion of capital. There were rumors that unidentified foreign interests were buying the shares of American corporations and there was the feeling that some dark plot of taking over control was being hatched."[5] Articles were published with titles such as "A Timely Example of How Foreigners Hide Interests in American Corporations"[6] and "U.S. Acts to Identify Secret Sources of Foreign Capital Invested Here."[7] During this time, of the larger U.S. firms only the Waterman and Underwood firms were taken over (by Bic and Olivetti, respectively).

With the election of John F. Kennedy, the policy of the United States toward foreign investment took a distinct positive turn. In his

[5]Thomas S. Gates, President, Morgan Guaranty Company of New York, Speech in Brussels, June 24, 1965. Quoted by Rainer Hellman in his The Challenge to U.S. Dominance of the International Corporation, translated by Peter Ruof (New York: Dunellen, 1970), p. 169.

[6]Financial World, May 14, 1958, 28-29.

[7]James J. Butler in the Magazine of Wall Street, April 27, 1957, 140-142.

February 1961 balance-of-payments message to Congress President Kennedy launched the "Invest in U.S.A." program to promote direct investments, partnerships and licensing agreements in the U.S. Administered by the Department of Commerce, the program was explicitly designed to benefit the U.S. balance of payments and implicitly to provide some insurance against foreign governmental actions inimical to U.S. multinationals. The Commerce Secretary under Kennedy was Luther Hodges, who sent the first industrial mission to Europe to attract investment while Governor of North Carolina in 1959.[8]

During the 1960's the approach taken in this program was a low-profile operation featuring institutional promotion in Europe via speeches, interviews, and assistance to state-organized investment missions, including such permanent establishments as the New York office opened in Brussels in 1963 to solicit investment in that state. In 1966, the Commerce Department followed the New York example and opened an industrial development office in Paris.

Since it is easier to pull on a string than to push, from 1963 onward U.S. concern with its balance of payments led it to adopt a series of measures designed to restrict the outflow of capital. The Interest Equalization Tax, Voluntary Foreign Credit Restraint Program and the Foreign Direct Investment Program each had somewhat of an initial effect, but as time wore on, each was increasingly ineffective.[9] They were officialy discontinued in January, 1974, but during their

---

[8]Nicholas Faith, The Infiltrators (London: Hamish Hamilton, 1971), p. 125.

[9]At least such was my conclusion in a paper written for Professor Kindleberger's international economics course at M.I.T. in May, 1973, in which I surveyed the econometric literature on the effects of these programs.

operation exercised some indirect restrictions on foreign direct investment in the U.S. These restrictions will be discussed in a later context.

Another balance-of-payments related event of 1963 was President Kennedy's appointment of a task force headed by Undersecretary of the Treasury Henry Fowler to make recommendations about revisions of the tax laws to provide incentives for foreign investment in the U.S. stock market. The "Fowler Report" of 1964 made three major recommendations: 1) that the Federal Reserve Board's power to set interest rate ceilings on time deposits should be curtailed; 2) that income tax and estate tax treatment of foreign investors be eased; and 3) that American securities should be enthusiastically merchandized abroad. The provisions of this report were reflected in the Foreign Investors Tax Act, passed by Congress and signed into law by the President in 1966.

However, while easing the way for portfolio investment, the 1966 law does contain provisions which are designed to remedy abuses by foreign corporations doing business in the United States. Income taxable at the same rates for U.S. corporations is defined as "income effectively connected with the conduct of a trade or business in the United States." This includes profits derived from the sale of merchandise abroad, if the transaction is arranged by the U.S. office. However, only such income is taxable at corporate rates; on income not so connected, the tax rate is 30% (or lower if arranged by treaty). The taxation of non-resident foreign corporations remains essentially the same: 30% on their income from U.S. sources, with capital gains generally exempt.

Finally, the Act specified that in 1973 (since extended to 1975) foreigners must start paying taxes on income from their money on deposit in U.S. banks, and foreign insurance companies with U.S. branches must begin paying income tax on income from their investments in the U.S.[10]

In 1969 the "Invest in U.S.A." program was turned into much more of an activist vehicle by the Nixon Administration. A brochure was published entitled _Invest in the U.S.A., an Invitation from the President of the United States_ in which the advantages of producing in America were extolled and an attempt was made to put certain foreign fears to rest. Large and small-scale "Invest in USA" conferences have since been held in the major cities of Europe and Japan, often in collaboration with the National Association of State Development Agencies and often with sponsorship of foreign business associations. In June of 1973, 34 state agencies made presentations to 800 Japanese businessmen at conferences in Tokyo and Osaka. The President's message to these gatherings spoke of "how keenly interested we are to attract additional investment from abroad".[11] In May, 1974, a similar seminar was held in Düsseldorf, West Germany. And in the Fall of 1974 the French Chamber of Commerce in the U.S. is scheduling a seminar in New York for 100 French industrialists interested in investing in the U.S.

---

[10] Franz M. Joseph and Richard U. Koppel, "Foreign Investors Tax Act," _Taxes_ 45 (February, 1967), 113-134, and "Congress Opens Door for Foreign Investors," _Business Week_, October 29, 1966.

[11] As quoted in "Incentives and Promotional Efforts to Attract Foreign Investment," Council on International Economic Policy, memo, October 25, 1973, 4.

Promotional Efforts

The "Invest in USA" program is currently administered by the Investment Services Division of the Office of International Finance and Investment of the Bureau of International Commerce. Besides the Washington office, the Division has representatives in Brussels and Paris. In addition to administering conferences abroad and answering requests from potential foreign investors for information on investing in the U.S., the division also matches foreign investors with potential U.S. business partners via the U.S. embassy network.

In its efforts to attract foreign investment, the federal government has received a good share of assistance from the private sector. In May, 1969, the Atlantic Council of the United States, the Committee for Atlantic Economic Cooperation and the Atlantic Institute sponsored a conference entitled "The Multinational Corporation in the World Economy" which was devoted in large part to "ways to increase direct investment by European and Japanese corporations into the United States."[12] The Institute for International and Foreign Trade Law of the Georgetown University Law Center in Washington, D.C. sponsored a conference on foreign direct investment in the U.S. in October, 1970,[13] and followed it up in July, 1972, with the publication of _Legal Environment for Foreign Direct Investment in the United States_, a detailed compendium of U.S. laws and their implications for foreign investors in

---

[12] Sidney E. Rolfe and Walter Damm, eds., _The Multinational Corporation in the World Economy: Direct Investment in Perspective_ (New York, Praeger, 1970), p. xvii.

[13] Institute for International and Foreign Trade Law, _Proceedings of the Conference on Foreign Direct Investment in the United States_ (Washington: Georgetown University, 1970).

the U.S.[14] The International and Comparative Law Center of the Southwestern Legal Foundation in Dallas, Texas devoted one session of its 1971 Symposium on International Business to the "Legal Problems of Foreign Enterprise Investing in the United States."[15] In October, 1973, a foreign underwriting and brokerage firm, Yamaichi International (America) Inc. conducted a seminar "Investing in America."[16]

Undoubtedly the most enthusiastic suitors of foreign enterprise, however, are the state development agencies. In 1968, only three state development agencies had offices overseas--New York, Illinois, and Virginia, all in Brussels. By mid-1974, twelve states were represented as Table 2-6 indicates. Other states with plans in the works include Alaska and Pennsylvania. Some states do not consider such offices useful enough to justify their expense, however; both Ohio and California have closed their overseas offices in the period since the "Invest in U.S.A." program has been revived. State attendance at these gatherings is improving. Seventeen states were represented at the large "Invest in U.S.A." conference at Munich in 1971; 27 attended the 1972 events in Dusseldorf/Stockholm; and, as noted, 34 were in Tokyo/Osaka. Over 30 states have created international divisions within their state development offices.

---

[14]Institute for International and Foreign Trade Law, Legal Environment for Foreign Direct Investment in the United States (Washington: Georgetown University, 1972).

[15]David R. Tillinghast, "Legal Problems of Foreign Enterprises Investing in the United States," in V.S. Cameron, ed., Private Investors Abroad-Problems and Solutions in International Business in 1971, Symposium conducted by the International and Comparative Law Center, Southwestern Legal Foundation, Dallas, Texas (New York: Matthew Bender, 1971), pp. 91-126.

[16]Yamaichi International (America), Inc., Investing in America (New York: de Hellerman, 1973).

Table 2-6

STATE DEVELOPMENT AGENCIES WITH OFFICES ABROAD

State	Foreign Office
Alabama	Bern
Georgia	Brussels
	Tokyo
Illinois	Brussels
	Hong Kong
Maine	Bonn
Maryland	Brussels
Michigan	Brussels
	Tokyo
New York	Brussels
	Tokyo
North Carolina	Zurich
South Carolina	Tokyo
Texas	Mexico City
Virginia	Brussels
Wisconsin	Frankfurt

Sources: "U.S. States Offer Foreign Firms Variety of Incentives," Business International, May 24, 1974, 164-165; Frank V. Fowlkes, "Direct Foreign Investments Increase/Administration and Industry Endorse Trend," National Journal Reports, November 24, 1973, 1756.

Coordination among all three groups is good. In the case of the state-federal relationship, the key has been the National Association of State Development Agencies (NASDA). States would prefer, however, that more of the federal agencies which have a direct impact on foreign decisions to invest would take an active part in the solicitation of foreign investments. The Department of State has taken a step in this direction by appointing a state coordinator from its Office of Commercial Affairs to provide liaison between the department and the states on matters of trade promotion and inward investment.[17] The Yamaichi seminar is a good example of private-government cooperation; the seminar was held "with the cooperation of the State of New York" and featured New York Governor Wilson as a principal speaker.

Substantive Incentives

The federal government has continually taken the position that its intention is to treat foreign-controlled subsidiaries and domestic corporations in exactly the same fashion. The only positive exception to this policy on a federal level derives from the offset agreement with West Germany which covers American military expenditures in that country. Under this agreement, loans are available to German companies that invest in the U.S., with the stipulation that no such loan may exceed one-half of the total investment. For firms which have already invested in the U.S. and are expanding their plant, the limit is DM 32 million. Foreigners are equally eligible with domestic corporations and individuals

[17]"Incentives...," op. cit.

for Economic Development Administration-guaranteed and -subsidized loans, as well as similar loans from the Small Business Administration.

The situation at the state level is infinitely more complex.[18] Almost all states provide data basic to plant location, while only two (Minnesota and New Hampshire) will own or share ownership in industrial sites. Over 40 states feature industrial revenue bond financing, though few offer loan guarantees or special tax incentives. Nineteen have right to work laws, and nearly all have training programs. These last two features, aggressively marketed by Virginia, North Carolina, and South Carolina, are often cited as the major reasons for their success in attracting foreign investment, as indicated in Table 2-7.

Understandably, the strong agglomeration economies of the New York-New Jersey area coupled with that region's historic leadership in the development of manufacturing enterprise explain the leading positions of those states. But South Carolina, North Carolina and Virginia, which rank 3rd, 7th and 10th in number of manufacturing firms, belong to a region which has been the last to industrialize in the U.S., making their achievement all the more remarkable.

Substantive Disincentives

Federal laws provide a few absolute proscriptions on the operation of foreign firms in the U.S., while differences in state laws provide

---

[18] See pp. 73-76 of the source cited in footnote 14 for an excellent summary of state laws and practices.

Table 2-7

FOREIGN-OWNED MANUFACTURING FACILITIES,
BY STATE, JUNE 1973

Alabama	4	Nebraska	3
Alaska	12	Nevada	1
Arizona	3	New Hampshire	7
Arkansas	1	New Jersey	112
California	44	New Mexico	0
Colorado	4	New York	200
Connecticut	21	North Carolina	28
Delaware	5	North Dakota	2
Florida	8	Ohio	19
Georgia	15	Oklahoma	3
Hawaii	1	Oregon	5
Idaho	1	Pennsylvania	50
Illinois	43	Puerto Rico	8
Indiana	4	Rhode Island	10
Iowa	2	South Carolina	50
Kansas	1	South Dakota	0
Kentucky	3	Tennessee	14
Louisiana	17	Texas	20
Maine	6	Utah	3
Maryland	14	Vermont	0
Massachusetts	27	Virginia	23
Michigan	25	Washington	10
Minnesota	3	West Virginia	6
Mississippi	5	Wisconsin	9
Missouri	12	Wyoming	2
Montana	0	Total	866

Source: Frank W. Fowlkes, op. cit., in Table 2-6.

relative incentives and restrictions. Some of the state laws provide relative disincentives in all sectors; examples are water pollution control laws, tax bases and tax rates. In general, other state restrictions are sector-specific, in banking, insurance, and land ownership.

With the exception of New York, California, Oregon, Illinois, and Massachusetts, all states prohibit branches of foreign banks from conducting a full-scale lending and deposit operation. New York and California authorize agencies, which conduct only wholesale banking operations. Several states allow subsidiaries of foreign banks to be chartered under their laws; three of these have actually issued such charters.[19]

Only Connecticut, California and Oregon allow foreign-owned insurance companies to operate within their jurisdictions.

Several states restrict the quantity of land that may be under foreign ownership or prohibit foreign ownership of land except for industrial use. Iowa prohibits non-resident aliens from holding more than 640 acres outside cities and towns. Since 1899, Nebraska has prohibited aliens and corporations not organized under Nebraska law from owning land.[20]

---

[19]Testimony of George W. Mitchell, Vice-Chairman, Board of Governors of the Federal Reserve System in U.S. Senate, Committee on Banking, Housing and Urban Affairs, Subcommittee on International Finance, 93rd Congress, 2nd session, Foreign Investment in the United States (Washington: U.S. Government Printing Office, 1974), pp. 47-59.

[20]Testimony of Roger Blobaum, agricultural consultant, in U.S. House of Representatives, Committee on Foreign Affairs, Subcommittee on Foreign Economic Policy, 93rd Congress, 2nd session, Foreign Investment in the United States (Washington: U.S. Government Printing Office, 1974), p. 48.

Texas law prohibits foreign corporations altogether, an embarrassing fact that came to light during the takeover of Texasgulf by the Canadian Development Corporation in 1973.

Finally, several state "blue sky" registration laws for public offerings of securities are more stringent than U.S. requirements (discussed below) and provide an added disincentive to inward investment.

Sector-specific federal prohibitions on foreign activity exist in communications, transportation, natural resources, and banking.[21] In communications, a 1927 act amended in 1934 prohibits a foreign-owned or -controlled corporation from receiving a license to operate an instrument for the transmission of communications. A corporation is foreign-owned if any director or officer is an alien, or if more than one fifth of its stock is owned by alien individuals, corporations, or governments. It is foreign-controlled if it is directly or indirectly controlled by a corporation one-fourth of whose stock is held by foreign interests.

In transportation, aviation and shipping have restrictions on foreign involvement. The only permitted registrants of aircraft in the U.S. are individual American citizens, partnerships in which all partners are American, or corporations formed in the U.S. with at least 75% of the stock owned by American citizens and at least 2/3 of the directors American citizens. Only domestically registered aircraft may engage in trade or transport between two points within the U.S., though foreign aircraft may be licensed to engage in such activities between the U.S.

[21]The description of these restraints comes in large measure from the Chamber of Commerce of the United States, Report of the Task Force on Foreign Investment, reprinted in U.S. Senate, Committee on Banking, Housing and Urban Affairs, op. cit., pp. 137-150.

and foreign countries, if reciprocal privileges are granted U.S. aircraft.

Under the Jones Act of 1920 any shipping of freight or passengers between points in the United States or its territories must be done in vessels which were built and are registered in the U.S. and which are owned by U.S. citizens. Intercoastal transportation of empty items (cargovans, barges, etc.) is permitted for vessels of foreign countries which grant reciprocal privileges to American vessels. To register a ship in the U.S., the corporation's principal officers must be American citizens and 75% of the stock must be owned by citizens of the U.S.

An 1887 law is the source of the restriction of foreign ownership of public land in the U.S. It requires that public land be transferred or leased only to U.S. citizens or partnerships of U.S. citizens (or persons intending to become U.S. citizens), or to corporations organized under the laws of the United States. Such firms may have any percentage of foreign ownership, as long as the foreign country in question grants reciprocal land ownership privileges to U.S. citizens. If it does not, the U.S. corporation must be majority owned by U.S. citizens. The Promotion of Mining Act of 1920 contains similar provisions relating to the exploration and leasing of mineral deposits on public lands. The Outer Continental Shelf Act of 1953 and the new Geothermal Steam Act contain no such citizenship or reciprocity provisions.

Ownership (as opposed to leasing) of public lands can be acquired by anyone who files for a patent and proves the discovery of valuable mineral deposits on that land. The Mineral Leasing bill of 1973, under deliberation in Congress, proposes to eliminate acquisition of ownership for everyone and make all such lands only leasable.

A 1920 law provides that hydroelectric power sites on navigable streams may be developed only by U.S. citizens or domestically organized corporations, though there is no restriction on the foreign ownership of those corporations.

No licenses for the operation of atomic energy utilization or production facilities may be issued to aliens or foreign-owned or foreign-controlled corporations. Foreign ownership or control of auxiliary industries (such as fabrication of fuel elements, uranium milling and mining, etc.) is permitted unless it is found "inimical to the nation's welfare." No general rules exist defining foreign ownership or control. Recently the AEC approved the transfer of the license for operation of a reactor from Gulf Corp. to General Atomic Corp., a 50%-50% joint venture of Gulf and Royal Dutch-Shell, because it concluded that this would not result in foreign control or domination inimical to the welfare of the United States.

Only banks incorporated in the United States may join the Federal Reserve System or the Federal Deposit Insurance Corporation. There is no limitation on the percentage of a bank which may be foreign-owned. Foreign banks actually have two advantages over their domestic counterparts, in that they may have branches in more than one state and may engage in non-governmental securities transactions, since they are exempt from the provisions of the Glass-Steagall Act.

Regulations of the securities industry impose both minor sector-specific and economy-wide restraints on the operation of foreign firms. Foreigners are not currently permitted to become members of the New York and American Stock Exchange, though they can join regional exchanges; however, foreigners can establish a brokerage business which can become a member of the National Association of Security Dealers and participate in underwritings and brokerages off the exchange. The Securities and Exchange Commission (SEC) is currently reviewing this policy. Not surprisingly, the governors of the New York Stock Exchange have filed an opinion with the SEC which would delay resolution of the issue of foreign membership until uniform national guidelines on exchange membership have been established.

Economy-wide restraints, by the SEC and other agencies, are only impediments to investment insofar as they require more of a potential investor than does the investor's home country or other investment sites under consideration. The Securities Act of 1933 prescribes that if an investor wishes to raise funds from an offering of securities to the public, in most cases the issue must be registered with the SEC. After the offering is completed, the issuer is subject to reporting requirements of the Securities Exchange Act of 1934.

Section 13(d) requires an investor acquiring more than 5% of the beneficial ownership of a class of securities registered under Section 12 (which covers most public companies) to file with the SEC certain information regarding the transaction. Section 14(d) requires an investor intending to make a tend offer or take-over bid for more than 5% of the shares of a company to file the same information prior to the tender offer. Section 16 requires investors owning beneficially more than 10% of a public company and "insiders" (e.g. directors or officers) to file with the SEC a statement of the amount of securities owned and to file an updated statement each time this amount changes.[22]

These provisions require more disclosure than foreigners are used to providing. In addition the form and content of financial statements and the requirement of independent audits also can cause difficulties. The SEC has proved willing to modify its requirements for disclosure and to permit reconciliation, rather than reconstruction, of accounting data. However, Ray Garrett, Jr., SEC chairman, has commented that his agency would be "flexible" but would not allow a "lowering of U.S. disclosure standards for foreign issues."[23]

U.S. tax provisions concerning foreign corporations have been substantially discussed in the context of the Foreign Investors Tax Act of 1966. The U.S. has tax treaties with all the industrialized countries which reduce withholding rates on interest and dividends to 10-15%, rather than the statutory 30%. Section 482 of the Internal Revenue Code, which requires parent-subsidiary transactions to take place at arm's length, is a potential source of difficulty in apportioning U.S.- and foreign-source income.

---

[22]"Securities and Exchange Commission Regulations," Council on International Economic Policy memo, October 25, 1973.

[23]"SEC Chief Pledges Flexibility in Handling Foreign Offers in U.S.," <u>Wall Street Journal</u>, April 3, 1974.

When it was in force, the Interest Equalization Tax was intended to inhibit the ability of foreign investors to raise funds in the U.S. It was more likely to be a constraint because foreign governments have, in general, imposed some controls on capital outflows, just as the U.S. did. The high proportion of foreign direct investment in the U.S. financed by retained earnings is an indication of the extent to which foreign subsidiaries are "on their own." In 1973, the IET authorization law was amended to provide an Inward Direct Investment Exemption, providing that if more than 50% of a direct investment by a foreign entity comes from abroad, the foreign entity's securities are exempt from the tax. Of course, the termination of the IET on January 30, 1974 means that this impediment to local borrowing no longer exists. Interestingly, at the time of SEC Chairman Garrett's comments two months later, no foreign corporation had tried to finance any U.S. operations via the U.S. capital market.

The administration of U.S. antitrust law is undoubtedly considered as a major impediment by foreigners considering investing in the U.S. The key statutes are Sections 1 and 2 of the Sherman Anti-Trust Act (1890) which concern price fixing, group boycotts, market allocation and monopolizing practices, and Section 7 of the Clayton Act (1914), which prohibits any merger or acquisition which may tend substantially to lessen competition or to create a monopoly in any line of commerce in any section of the United States. The basic issues in the administration of these laws is their inconsistent enforcement, the breadth of their extra-territorial application, and the interpretation of potential competition.

On the first point, one leading U.S. legal expert commented, "Unfortunately there is...no coherent enforcement policy at the Antitrust Division which can be discerned by the outside observer."[24] Since his comments the situation has improved somewhat; the Justice Department has become much more active in its urging of potential merger partners to ask for an informal review of the likelihood of antitrust action. However, a recent proposal to make public these reviews (with information supplied by the companies to support their positions) will undoubtedly restrain foreign corporations, unused to extensive public disclosure, from using this procedure.[25,26] Whether or not it is used, corporations still face the dynamic uncertainties arising from changing administrations every four or eight years.

The second and third issues arise because "the extraterritorial application of the U.S. laws is governed by the 'effects' theory (i.e. the effects of acts performed abroad upon U.S. domestic or foreign trade) and does not depend on the nationality of the enterprise involved,"[27]

---

[24]Gerhard A. Gesell, "Joint Ventures in the Light of Recent Antitrust Developments: Joint Ventures and the Prosecutor," The Antitrust Bulletin, 10 (January-April, 1965), 34-35.

[25]"Justice Agency Will Make Public the Advice It Gives Firms on Potential Antitrust Actions," Wall Street Journal, December 13, 1973.

[26]One example of this are Burmah Oil Co., Ltd.'s and Signal Oil and Gas Co.'s refusal to delay Burmah's acquisition of Signal for sixty days pending a Justice Department review, as reported in "Multinational Oil Concerns Said to Peril Independents," New York Times, January 30, 1974.

[27]J.J.A. Ellis, "The Legal Aspects of European Direct Investment in the United States," in Rolfe and Damm, op. cit., p. 53.

and because potential competition is broadly defined to include possible developments in foreign countries and in the tariffs and exchange rates between countries. The implication of the "effects" approach in conjunction with potential competition is that foreign parent corporations with subsidiaries in the United States may be prohibited from some business transactions in their own market because such events could possibly alter the competitive structure of the U.S. market. U.S. practice in this area is not widely emulated; in 1964, a conference of the International Law Association passed a resolution (over U.S. objections) stating that international law does set limits to the jurisdiction of individual states.[28]

A leading example of the dynamic uncertainty faced by foreign corporations engaged in joint ventures in the U.S. is the case United States v. Monsanto Co., Farbenfabriken Bayer AG, and Mobay Chemical Company (1967). The complaint charged violation of Section 1 of the Sherman Act. The consent decree in that case required Monsanto to sell all of its interests in the U.S. joint venture, Mobay, to Bayer, the other shareholder. The joint venture had been established in 1954 to produce and sell isocyanates and other materials used in the manufacture of polyurethane foam. By 1962, when the suit was brought, Mobay had 50% of the market. The suit charged that Monsanto and Bayer were actual as well as potential competitors, and gave as evidence the facts that Monsanto had stopped producing isocyanates and Bayer only exported them

---

[28]Ibid.

to Mobay. The difficulty here was characterized by Jules Backman: "Who is a potential competitor?...they cannot always be identified in advance....the number of potential competitors change as economic conditions change."[29]

Implications of the "effects" doctrine are well-illustrated in the efforts of the Swiss chemical firms, CIBA and Geigy, to merge in 1969-70. Both firms had successful American subsidiaries in similar product lines in addition to a joint venture, the Toms River Company. They delayed their merger, however, until an accommodation could be reached with the Justice Department. The merged CIBA-Geigy was forced to form a new company which would receive facilities to manufacture some of the products made by the weaker partner in each field, and then sell that company to an eligible purchaser.

Defenders of the Justice Department often cite British Petroleum's merger with Sohio in 1969. Earlier that year BP discovered oil in Alaska; then it borrowed $400 million in the U.S. to take over 8500 service stations formerly belonging to Sinclair Oil (this divestment was directed by the Justice Department as a consequence of the Atlantic Richfield-Sinclair merger). To augment the Sinclair outlets, to market the Alaskan oil and to secure a competent management team, BP purchased a 25% stake in Sohio. The Justice Department originally intended to bar the merger completely, but after consultations between BP's President, Sir Eric Drake, and the U.S. Attorney General, John Mitchell, a consent

---

[29]Jules Backman, "Joint Ventures in the Light of Recent Anti-Trust Developments: Joint Ventures in the Chemical Industry," <u>The Antitrust Bulletin</u>, 10 (January-April, 1965), 12.

decree was allowed. Sohio was forced to sell off stations selling 400 million gallons of fuel a year, thus reducing its share of the Ohio market to 20% from 30%. Justice Department officials have cited their handling of this case and the Sinclair sell-offs as evidence that they don't oppose foreign investment per se.[30]

Antitrust measures may also be taken by the Justice Department in bank merger cases under the Bank Merger Act of 1960 as amended in 1966 and in cases of "market-extension" bank takeovers under the Bank Holding Company Act of 1956, as amended in 1970. The Justice Department has lost all five of the suits brought to date under these laws.[31]

Foreign firms do not usually have a surplus of managerial personnel, and U.S. visa requirements pose an impediment for the transfer of aliens to U.S. corporate jobs. For nonimmigrants (those intending to leave after a fixed interval of time) there are four classifications authorizing work in the U.S. for remuneration; treaty trader, treaty investor, temporary worker, and intercompany transferee. As long as aliens in these categories maintain their status with the approval of the Immigration and Naturalization Service, they may remain in the U.S. indefinitely.

---

[30]Many foreign investors remain unconvinced, as noted in "Invest-in-U.S. Craze Loses Some Allure For Foreign Firms," Wall Street Journal, June 14, 1974. Nestle ("Nestle Says Antitrust Difficulties Deter Swiss Firm From New U.S. Acquisitions," Wall Street Journal, March 19, 1974) and the German chemical manufacturer BASF ("BASF Seeks to Boost U.S. Volume Without Major Acquisitions," Wall Street Journal, May 21, 1974) have both decided that the hassle involved, including difficulties with the Federal Trade Commission, doesn't justify the potential return.

[31]Takeshi Yano and Dominique Hardy, "The Acquisition as a Form of Foreign Direct Investment in the USA," (Master's thesis, Alfred P. Sloan School of Management, M.I.T., 1974), 58-59. This study is excellent on the institutions promoting and laws governing acquisitions of U.S. companies by foreigners.

Foreigners who intend to reside in the U.S. for an indefinite period or permanently in connection with business must obtain an immigrant visa. Only 170,000 of such visas each year are issued to persons born in the Eastern Hemisphere, with another 120,000 going to persons born in independent countries in the Western Hemisphere; consequently, alien individuals often have to wait for such visas. A recent article in the Wall Street Journal[32] underscores this difficulty, citing bureaucratic difficulties in processing non-immigrant visas and two-year waits for immigrant visas.

One final set of restrictions facing foreign investors (which also have been cited as a motive for such investment) are regulations concerning contractors with the Federal government. Facility and individual security clearances on jobs involving classified information are necessary for key management personnel. However, voting trusts may be established by which foreign interests relinquish their right to all participation in the management of the enterprise but retain rights to all profits.

The Buy American Act of 1933 espouses the general policy that only items produced in the United States can be acquired by the government for public use. However, this Act does not apply if a foreign company produces the product sold to the U.S. government in the United States, or if the product contains more than 50% of U.S. products by value.

---

[32]"Immigration Red Tape Complicates Transfer by Aliens to U.S. Corporate Jobs," Wall Street Journal, February 1[illegible], 1974.

Foreign Restrictions

All of the countries which are major sources of foreign investment in the United States are members of the OECD, and as such all save Canada are signatories to the Code of Liberalization of Capital Movements. Among members of the OECD the following countries have reservations or derogations in effect that gave rise to the indicated severity of restrictions on outward direct investment:

1) Full formal restrictions requiring elaborate procedures to export capital at all--Australia, Finland, France, Norway, Spain, Sweden;

2) Limited but effective restriction--Italy, Japan, Portugal, United Kingdom;

3) The maintenance of different payments channels which result in premium rates of exchange for capital exports--Belgium, France, The Netherlands, United Kingdom.[33]

Practices of the two countries which are the major sources of foreign direct investment in the United States are very different. Canada, while extremely concerned about capital imports, has no formal exchange controls and relies only on non-mandatory guidelines issued by ministers in the government. Britain reviews all requests for foreign exchange to be used in different investment, generally approving the sale of official exchange for approving projects in the Overseas Sterling Area and the EEC up to a limit of $2.4 million per project per year. For direct investments elsewhere, approval is contingent upon satisfying the normal criterion--balance of payments benefits in three years or the "super-criterion"--i.e. "those investments which directly promote exports

[33] Simon Webley, "Foreign Direct Investment in the United States--Trends and Impediments," paper submitted to the British-North American Committee in Washington, December 7-9, 1973, 17.

of United Kingdom goods and services and promise benefits to the balance of payments in the form of additional exports; profits and other foreign currency earnings, equal to or exceeding the amount invested, within eighteen months and continuing thereafter."[34] Approved investments may only obtain $600,000 or 50% of the total cost of investment, whichever is greater, at the official exchange rate; the remainder must be purchased in the investment currency market.

Foreign tax laws also may discriminate against direct investment. However, as with capital export controls, such discrimination is at most region-specific and rarely country-specific.[35]

Japanese Investment, the Energy Crisis and Arab Intentions

Any description of the current climate for foreign direct investment would be remiss if it ignored what for a time looked to be a major future source of inward investment--Japan. Throughout the post-war era, Japan's presence on the international investment scene has been minimal. Her overseas properties were confiscated as a consequence of World War II, and under the Foreign Exchange and Foreign Trade Control Law of 1949, Japanese enterprises required permission to invest abroad, approval which was hard to come by. From 1969-71, this law was successively liberalized, until in July, 1971 permission was no

---

[34]Bank of England, A Guide to United Kingdom Exchange Control (London: Her Majesty's Stationery Office, 1973).

[35]An up-to-date compendium on governmental attitudes toward foreign investment is Jonathan Sanford and John Costa, "International Trends in the Regulation of Foreign Investment," in U.S. House of Representatives, Committee on Foreign Affairs, *op. cit.*, pp. 375-468.

longer required.[36] During the 1950's priority in foreign investment ventures was given to the re-establishment of trading companies to support the export initiative and to raw materials sourcing ventures. As the Japanese economy matured, manufacturing assumed a more important role in foreign investment, a motivations changed to include lower labor costs (for investment in LDC's) and a need to "jump over" tariff barriers (in developed economies).

In March 1971, total Japanese direct investment abroad was estimated by Japanese authorities at $3.6 billion, of which manufacturing represented 26.8% and extractive industries represented 31.3%. Investment in North America was 25.4% of the total, though manufacturing investment in the same location was only 6.7% of the aggregate amount.[37] The currency realignments of 1971-73 coming on the heels of the relaxation of exchange controls dramatically increased the outflow of Japanese capital, though faster to other regions than to North America. According to the Japan External Trade Organization (JETRO), of the worldwide total of $6.8 billion as of March 1973 (a two-year increase of 90%!), Japanese investment in North America totaled $1.5 billion, 23% of the aggregate. Since that time JETRO estimates that the total has been increasing at the phenomenal rate of $300 m. per month![38]

---

[36]Lawrence B. Krause, "Evolution of Foreign Direct Investment: The United States and Japan," in Jerome B. Cohen, ed., Pacific Partnership: United States-Japan Trade--Prospects and Recommendations for the Seventies (Lexington, Mass.: D.C. Heath and Company, 1972), p. 164.

[37]M. Tamura, "Japanese Direct Investment in the United States: Opportunities for Future Growth" (Master's thesis, Alfred P. Sloan School of Management, M.I.T., 1973).

[38]"$1.5 Billion Invested in U.S., Canada," Washington Post, December 31, 1973.

In the United States, Department of Commerce data on the recent book value of Japanese direct investments have shown the cumulative total to be negative in both 1971 and 1972, owing to intercompany transfers of dollars of trading subsidiaries into yen on the parent company's accounts prior to the February 1973 devaluation. The United States-Japan Trade Council has estimated that the Japanese presence here at end-1972 was $350-500 million when such transfers are disregarded. Its estimate for end-1973 is $1 billion with manufacturing and real estate representing an increasing proportion.[39]

One investment in this increase was the largest Japanese investment to date, Mitsui's purchase of half-interest in American Metal Climax's aluminum refining operations for $125 million. Manufacturing investments announced in 1974 include Matsushita's purchase of Motorola's home television line (challenged for a time by the Justice Department), Kawasaki's construction of a motorcycle factory to be built in Nebraska and Canon's intention to produce desk-top calculators in California. Increased Japanese expansion in the financial sector (eight of the largest 20 foreign banks are Japanese), especially in California, has resulted in legislation, narrowly defeated, in that state to prohibit further expansion. Japanese investment in American natural resources (including West Coast forests, Mid-West farmland, West Virginia coal mines and Hawaiian real estate) has also generated an initial negative reaction by local citizen groups. However,

[39]Testimony of Nelson Stitt, director, U.S.-Japan Trade Council in U.S. House of Representatives, Committee on Foreign Affairs, op. cit., 37.

congressional hearings held in Hawaii on the subject by Senator Daniel Inouye (D.-Hawaii) in December, 1973 indicated no strong local sentiment for government controls.[40]

The world energy shortage may remove some of the above objections by eliminating Japanese investment in real estate. In the wake of the Arab oil embargo and price increase, Japan's Finance Ministry has re-imposed restrictions on investments in foreign securities and loans for foreign investment in real estate. However, it is still encouraging Japanese companies to accept loans for raw-materials sourcing ventures, and in an increasingly energy-short world, it is likely that further conflicts will occur between the Japanese and their U.S. hosts.

The impact of the energy difficulties on Japanese direct investment in the U.S. is uncertain. The exchange-rate advantage and the days of "luxury" investments are over; raw materials ventures will predominate. But manufacturing investments also could increase because of rising anti-Japanese sentiment in Asia and more stable raw-material supply situations in the U.S. The volume of Japanese direct investment in 1980 was projected to be $27 billion before the Mideast War, with the proportion in North America forecast to be 16% of that, or $4.2 billion. Even presuming a 25% reduction in that figure owing to the need to conserve foreign exchange, one can expect over $3 billion of U.S. assets to be controlled by the Japanese in 1980. At a minimum, then Japanese investment must grow at an annual rate of 25%.

---

[40]"Foreign Investors Stir Hawaii," Washington Post, December 31, 1973.

There is no ambiguity about the sign of net Arab direct investment flows into the U.S.; it will be positive. The uncertain parameter is the magnitude. To date, Arab investors have shown a definitie preference for liquid assets and are chary of placing their wealth where there is risk of expropriation.[41] Still, they have already bought significant quantities of real estate, including half interest in the Atlanta Hilton center, an entire island off the coast of South Carolina, and an office building on Fifth Avenue. Union de Banques Arabes et Françaises will soon establish a New York Office. The National Iranian Oil Company is still dickering with Ashland Oil over a tentative agreement to guarantee Ashland long-term supplies of crude oil in exchange for a 50% interest in Ashland's New York refining and marketing facilities.[42]

The U.S. government position has been stated in congressional hearings by Peter Flanigan, executive director of the Coucnil on International Economic Policy. Pointing out that the vast diversified economy of the U.S. is a natural home for direct investment, Flanigan stated that the U.S. welcomes investment by oil-producing nations. Despite the official welcome, it is likely that the Arab investors in real estate will encounter much the same hostility that faces the Japanese--unless, of course, some of the Arab investments involve assured oil supplies until alternative energy sources come on line.

---

[41]The U.S. Treasury has tried to meet this interest in short-to-medium term portfolio investments by discussing with Saudi Arabia the possibility of investing in special, non-marketable variable rate Treasury issues of the kind usually available to foreign central banks ("Treasury Weighs Saudi Investing," New York Times, June 19, 1974).

[42]Iran recently made the largest direct investment in Western industry, buying a 25% interest in Friedrich Krupp Hüttenwerke, one of West Germany's largest steel producers ("Iran to Acquire a 25% Interest in Krupp Steel," Wall Street Journal, July 18, 1974).

Official Concern About Foreign Direct Investment

Xenophobia has always found champions in the American political spectrum ready to restrict the activities of foreign individuals and corporations. After the Justice Department refused to review the acquisition of Signal Oil Co. by Burmah Oil Co., Ltd., Senator Floyd K. Haskell (D.-Colo.) remarked that such an acquisition "makes you wonder who the hell runs this country."[43] The energy crisis, however, has caused many more moderate citizens and their representatives to question and examine the nature of America's international economic relationships, and of course foreign direct investment has been an obvious candidate for close scrutiny.

Current Congressional activity includes:

-H.R. 8951, The Foreign Investors Limitation Act, sponsored by Representative Dent (D.-Pa.) introduced June 25, 1974 and reintroduced with 13 co-sponsors as H.R. 11265 would restrict non-U.S. citizens from acquiring more than 5% of the voting of more than 35% of the non-voting securities of any issuer whose securities are registered under the Securities and Exchange Act of 1934. It has been referred to the Subcommittee on Commerce and Finance of the House Committee on Interstate and Foreign Commerce, where hearing will be held in the summer of 1974. An identical bill has been introduced by Rep. Lujen (R.-N.Mex.) as H.R. 11335.

---

[43]Quoted in Congressional Quarterly, February 2, 1974, 227.

-H.R. 11597, the Foreign Bank Control Act and H.R. 11440, sponsored by Rep. Patman (D.-Texas) and Rep. Rees (D.-Calif.), both introduced in the Fall of 1973, would prohibit future foreign branch and agency banks, would limit foreign banking activities to representative offices or subsidiary operations in one state only, and would require foreign banks to give up their brokerage activities. No foreign banks with more than a 5% interest in companies operating in or exporting to the U.S. would be permitted. The bills have been referred to the House Committee on Banking and Currency.

-H.R. 12040, sponsored by Rep. Moss (D.-Calif.) introduced December 19, 1973 would limit foreign investment in energy- and defense-related industries. It has been referred to the same committee to which the Dent bill was sent, which Rep. Moss chairs; hearings will be held in the summer of 1974.

-Rep. Culver (D.-Iowa) introduced a bill similar to S.2840 described below. Rep. Culver initiated the bill after the Subcommittee of Foreign Economic Policy of the House Committee of Foreign Affairs, of which he is chairman, held hearings on foreign investment in the United States in January 1974.

-Rep. Roe (D.-N.J.) has introduced bills (H.R. 13897 and 13898) which would require the registration of all foreign holdings and the establishment of a commission to divest foreign companies found to be a threat to strategic industries and resources, and which would ban foreign investments that affect U.S. national defense or economic security.

-S.2840, sponsored by Senator Inouye (D.-Ha.) introduced December 20, 1973, requests the executive branch to perform a $2\frac{1}{2}$-year study on foreign investment in the U.S. to be submitted to Congress. The bill passed the Senate June 13, 1974 and was sent to the House. $3 million was budgeted for the study.

-The House Ways and Means Committee has voted to allow the dividend and interest income of foreigners to go untaxed, as part of a general tax reform measure.

-The Subcommittee on International Finance of the Senate Committee on Banking, Housing and Urban Affairs, chaired by Senator Stevenson (D.-Ill.), held the first of a series of hearings on current policy considerations in January and February, 1974. The hearings were designed in part to provide a forum for the viewpoints of the administration and business community.

In other areas, the Federal Reserve Board has been reviewing its policy toward foreign banking since February, 1973. The Fed is concerned about the ability of foreign banks to thwart monetary policy and is attentive to the complaints of domestic banks about the latitude foreigners have in locating branches. The Fed, which was widely criticized in Europe during the collapse of the U.S. National Bank in San Diego in 1973, suggested in January, 1974 that Cedar Holdings, Ltd. hold off on its purchase of a New York bank until its cash position improved. The difficulties of Franklin National Bank, whose principal shareholder is the Italian financier Michel Sindona, and the closing of the German Bankhaus I.D. Herstatt, both due to foreign exchange losses, have served to amplify calls for closer Federal Reserve scrutiny of foreign banks.

The Fed intends to submit a proposal on foreign bank regulation to Congress in September, 1974. It is likely that such a proposal will protect by a "grandfather" clause everything owned by foreign banks, including their brokerage firms, as of the day a bill implementing the Fed's proposals is introduced to Congress. In return, foreign banks would be required to obey the Fed's reserve requirements, join the FDIC, engage in no new brokerage activities, and limit the establishment of new deposit-gathering facilities to one state only. The SEC is predicted to go along with the Fed on the brokerage issue, providing that foreign-controlled brokerage firms currently in existence are incorporated to provide an extra measure of investor protection. Neither the Fed nor the SEC can afford to put too much pressure on foreign banks, for fear of retaliation by banking authorities abroad; though foreign banks in the U.S. have assets totalling more than $35 billion, U.S. banks overseas have assets worth $140 billion.[44]

The Justice Department won a grand jury indictment of nine major chemical firms on July 18, 1974 on criminal antitrust charges of conspiring to fix the price of dyes. Included in the indictment are the U.S. subsidiaries of Ciba-Geigy, BASF, Bayer and Philips.

Finally, the Federal Trade Commission has gone to court to prevent the takeover of Airco, Inc. by British Oxygen in December, 1973. Under

---

[44]"The Fed's Drive to Regulate Foreign Banks," Business Week, July 13, 1974.

authority granted it by Congress in 1973, the FTC asserted that British Oxygen's acquisition of 35% of Airco's stock could have anticompetitive effects. Prior to the Congressional action, the FTC could not go into court to block mergers it opposed. And the FTC continues to scrutinize Nestle's 1970 increase of its share in Libby-McNeill-Libby from a minority to a majority holding.

The Latest Figures

Official Commerce Department estimates of the inward flow of direct investment in a given year are not published until the following August; hence, precise estimates of the 1973 total are not yet available. Unofficial forecasts of the amount range from the Department's estimate of $1.5 billion to more than $3 billion according to a recent Conference Board publication.[45] One third of the projects announced in the latter report were of Japanese origin. Chemicals, textiles and electronics were the leading industries, while the southeast was the leading region. Depending on who one believes, then, the estimated total of foreign direct investment in the U.S. at year-end 1973 then ranges from nearly $16 billion to almost $18 billion.

A similar Conference Board report for the first quarter of 1974 indicates that the flow of direct investment during that period continued at an annual rate of $1.5-$2 billion.[46] The largest proportion of projects announced were in the chemical industry, and the southeast was the principal recipient of investments, continuing past trends. As in their 1973 study, Japan was the leading source country in terms of number of projects announced, with nearly 25%.

W.T. Grimm & Co., merger consultants, report that though total merger announcements are off 20-25% in 1974 from 1973, foreign mergers and acquisitions have not slacked off at all; foreign companies made 93 purchases of U.S. firms in the first half of 1974.[47]

---

[45] David Bauer, op. cit.

[46] The Conference Board, "Announcements of Foreign Investment in U.S. Manufacturing Industry," First Quarter, 1974.

[47] "Mergers Slid 19% in Second Quarter to 794, Study Finds," Wall Street Journal, July 10, 1974.

The Latest Figures

Official Commerce Department estimates of the inward flow of direct investment in a given year are not published until the following August; hence, precise estimates of the 1973 total are not yet available. Unofficial forecasts of the amount range from the Department's estimate of \$1.5 billion to more than \$3 billion according to a recent Conference Board publication.[45] One third of the projects announced in the latter report were of Japanese origin. Chemicals, textiles and electronics were the leading industries, while the southeast was the leading region. Depending on who one believes, then, the estimated total of foreign direct investment in the U.S. at year-end 1973 then ranges from nearly \$16 billion to almost \$18 billion.

A similar Conference Board report for the first quarter of 1974 indicates that the flow of direct investment during that period continued at an annual rate of \$1.5-\$2 billion.[46] The largest proportion of projects announced were in the chemical industry, and the southeast was the principal recipient of investments, continuing past trends. As in their 1973 study, Japan was the leading source country in terms of number of projects announced, with nearly 25%.

W.T. Grimm & Co., merger consultants, report that though total merger announcements are off 20-25% in 1974 from 1973, foreign mergers and acquisitions have not slacked off at all; foreign companies made 93 purchases of U.S. firms in the first half of 1974.[47]

[45] David Bauer, op. cit.

[46] The Conference Board, "Announcements of Foreign Investment in U.S. Manufacturing Industry," First Quarter, 1974.

[47] "Mergers Slid 19% in Second Quarter to 794, Study Finds," Wall Street Journal, July 10, 1974.

Conclusion

In concert with other areas of economic activity, foreign direct investment in the United States seems to have experienced a structural change approximately twenty-five years after the end of the second world war. The volume of the inflow has accelerated, its industrial composition has shifted away from finance and trade toward manufacturing, and the distribution of the total among source countries has been altered more in favor of Germany and Japan. These changes have been accompanied by increased public interest in foreign businesses in the U.S., and despite a favorable administration policy, some Congressmen have introduced legislation to restrict the scope of foreign operations in America.

Yet even with the possibility of the deterioration of the international economic order attendant upon the energy crisis, it is that foreign influence in American life will continue to be consolidated and grow. International investment in real assets possesses a strong tendency toward irreversibility which governments have limited ability to modify.

Chapter 3

TWO "CLOSE CASES"

As will be evident in later chapters, the thrust of this study is empirical. However, as recent critiques of economics as a discipline have emphasized,[1] reality is better understood if economic theory and econometric techniques are embedded in a thorough institutional analysis. In the field of direct investment, where the events that take place are quite unlikely to obey the laws of a model made by analogy to Newtonian physics, it is necessary to be aware of such considerations.

Accordingly, I am concluding the descriptive portion of this work with two short industry case studies. Within each industry, I examine the foreign investment decisions of two firms, one of which has invested in manufacturing facilities in the United States, and one of which has chosen to penetrate the U.S. market via exports. Such "close cases", in which some of the motivations for direct investment are present for both firms, are often useful in illuminating the crucial factors in direct investment decisions. In so doing, they suggest which theories of direct investment may have more explanatory power. Such detailed examinations of foreign investment decisions can suggest considerations which should be incorporated in the empirical analysis to follow. Finally, these studies propose some qualifications on the empirical results to be reported later, in the form of non-quantifiable motivations for direct investment.

---

[1] See, for example, Benjamin Ward's, What's Wrong With Economics (New York: Basic Books, 1973).

In performing a case study, one always has the problem that the sample is terribly small; hence it is essential to make it representative. Given the industrial diversity of foreign investment in United States manufacturing, this is difficult to do; however, in what follows I have tried to focus on industries in which multinationals predominate. In addition to this criterion, I have resorted to four other considerations in selecting the cases to be studied. The industry studied must have been one in which a moderate level of technological sophistication is required; it is in such industries that foreigners are alleged to have difficulty competing with U.S. firms. Further, in these industries multinational behavior is most likely to run afoul of government interests.

The investments studied must, as already noted, have been close cases. They must have been fairly recent investments, since a large proportion of the data base upon which the subsequent empirical analysis is based refers to investments made in the post war period, up to 1970-71. To complement the empirical analysis, it would be desirable if these investments took place after 1971. Finally, I required that the investments made have taken place in industries traditionally characterized by cross-investments; both Hymer[2] and Kindleberger[3] emphasize that strong theories of direct investment will explain this phenomenon.

---

[2]Stephen A. Hymer, "The International Operations of National Firms," (Ph.D. thesis, Department of Economics, Massachusetts Institute of Technology, 1960).

[3]Charles P. Kindleberger, American Business Abroad (New Haven: Yale University Press, 1969).

Using these criteria, I rejected the food, beverage, and tobacco industries because of their lack of technological sophistication. Chemicals was not selected because all the major European chemical firms have already invested in the U.S., and many of their initial investments were affected by war and/or motivated by the American Selling Price system, as noted in Chapter 1.[4] The Pilkington-Saint Gobain case was considered, but in this instance it seemed that the explanation was too well-known and the example a bit out of date.[5]

Automobiles and computers were the industries finally chosen; both satisfy all the criteria. The former is important because of its size in the Western industrialized world; "gross auto product" as calculated by the U.S. Department of Commerce was 3.8% of U.S. GNP in 1973. The latter industry is not (yet) a significant percentage of output, but has revolutionized and will continue to revolutionize the way production is organized and decisions are made. The automobile is the epitome of the technology developed in the late 19th and early 20th century which has been the foundation for the development of many of today's large multinationals, and which may now be eclipsed by technological change in other

---

[4]Most Japanese chemical firms have not invested in the U.S. The uniqueness of the Japanese experience with foreign investment and the small number of Japanese subsidiaries located in the U.S. in the data base to be analyzed later made the inclusion of a Japanese firm in a case study of questionable value. For more detailed information on the Japanese experience in the U.S., see Chapter 2 and M. Tamura, "Japanese Direct Investment in the United States: Opportunity for Future Growth" (Master's thesis, Alfred P. Sloan School of Management, Massachusetts Institute of Technology, 1973).

[5]See Charles P. Kindleberger, op.cit., p. 17 for a brief description. Later in this chapter we shall have occasion to refer to this case again.

industries as Emma Rothschild suggests.[6] The computer is one representative of that change.

Save for Japan, U.S. multinationals' presence in the home markets of the other industrialized countries is significant in automobiles and nothing short of omnipresent in computers. According to Y.S. Hu,[7] the U.S. share of the European automobile market is about 30% on average, and only in the U.K. does it exceed 50%. In computers, the percentages are reversed; the U.S. share of the European computer market is at least 70%, and only in the U.K. is it as low as 50%. However, the computer market is hardly homogeneous, and in one segment, minicomputers, the European share of the European share of the European market is nearly 40%; it is that segment analyzed here.[8,9]

The investments to be studied in these industries are:

- Volkswagenwerke AG's decision to buy, then sell a plant in New Jersey in 1955 and its vacillation concerning building a manufacturing plant in the U.S. since that time.
- Volvo AB's decision in 1973 to build a plant in Virginia.
- Nixdorf Computer AG's decision to acquire the computer division of its distributor, Victor Comptometer, Inc.,

---

[6]Emma Rothschild, Paradise Lost: The Decline of the Auto-Industrial Age (New York: Random House, 1973). Donald MacDougall saw the possibility of this decline in "A Lecture on the Dollar Problem," Economica, 21 (May, 1954), 185-200, when he stated "Cars...may prove to be the cotton textiles of tomorrow."

[7]Y.S. Hu, The Impact of U.S. Investment in Europe (New York: Praeger, 1973).

[8]There is no objective criterion universally accepted to delineate various computer markets (as IBM's current litigation shows!). As a frame of reference, we may adopt the criteria listed in Auerbach Minicomputer Reports, Vol. 10 (Philadelphia: Auerbach Information, Inc., 1970), which define a mini as a computer which 1) costs less than $25,000 (those are 1970 dollars); 2) has 4K or greater bits of memory; 3) uses stored program control; and 4) is not restricted to extremely specialized applications.

[9]Unless otherwise noted, this and all other statistics relating to the European computer market may be found in either The European Marketplace (Newtonville, Mass.: International Data Corporation, 1973) or Prospects for the European Computer Industry (Paris: Euroeconomics, 1973).

- Nixdorf Computer AG's decision to acquire the computer division of its distributor, Victor Comptometer, Inc., in 1972 and to construct a manufacturing facility in the U.S. for its small business computers.
- Philips Gloeilampenfabriken NV's decision to continue to supply the U.S. small business computer market through a sales subsidiary in the U.S.

Both pairs represent several significant contrasts in decision-making behavior, as discussed in what follows.

Automobiles: The Case of Volkswagen

The "people's car," promoted through Hitler's German Worker's Front, was never commercially produced before the second world war.[10] The Third Reich did turn out thousands of military vehicles based on the Volkswagen design. After the war, the bombed out VW plant at Wolfsburg was operated by the British occupation authorities. In 1948, Heinz Nordhoff was made the plant manager, and in 1949 he remained when the property was returned to the German government, having been refused by Ford.

Initially, the plant had all it could to to meet the burgeoning German post-war demand for any serviceable means of transport. But Nordhoff (and the German government) soon turned to export markets to earn the foreign exchange that Germany needed to pay for reconstruction. The U.S. was a natural focal point, with its economy intact and enjoying a post-war spending boom. Nordhoff's first emissary to the U.S. met with little response, however. No dealer would agree to handle the car

---

[10] See Walter Henry Nelson, Small Wonder (Boston: Little, Brown and Company, 1965), for a fascinating history of the origins of the Volkswagen enterprise.

which evoked memories of the Wehrmacht, and U.S. sales of the Volkswagen in that year, 1949, totaled 2. In 1950, a second effort at acquiring dealers was more successful, and sales in that year were 159.

By carefully selecting dealers and by strongly emphasizing service, VW was able to increase its sales in the U.S. from 390 in 1951 to 6343 in 1954. In 1955, VW bought a former Studebaker-Packard plant in New Brunswick, New Jersey for $4 million, with a telephone call. The plant had been used in fulfilling Studebaker's defense contracts, but VW planned to use it to assemble cars from U.S. and German parts. In the year of purchase, VW had produced its one-millionth car; it had 40% of the imported car market in the U.S.; and its sales in the U.S. had quadrupled from 1954 levels to 28,907. 10.5% of its output was going to the U.S.

The motivation for the purchase is given by Nelson[11] as a reduction in costs of intermediate capital goods (especially in sheet metal imported from the U.S.) and transportation costs. Yet six months later, with 1956 sales projected to double those of 1955, VW sold the plant, realizing a capital gain. Three reasons have been given for the sale. Nelson's account,[12] similar to that of White,[13] is that automotive parts suppliers changed their estimates when they saw VW's detailed and specialized requirements; the low volume of production planned for

---

[11] Ibid., p. 156.

[12] Ibid.

[13] Lawrence J. White, The Automobile Industry Since 1945 (Cambridge: Harvard University Press, 1971), p. 62.

the U.S. meant it would not be worthwhile for these suppliers to retool. Durston[14] mentions an additional consideration: the fact that it was less economical to transport cars by rail from the East Coast than to send them by ship from Germany. He asserts that Volkswagen would have needed at least two assembly plants to save on transport costs. Behrman[15] states that the transport cost issue was crucial, perhaps because of a technological development that allowed the reduction of shipping costs by half--the loading of a ship by driving cars on, rather than hoisting them one-by-one into the hold. Behrman also cites difficulties with the United Auto Workers (UAW), who demanded more in wages than VW thought would permit it to compete. The Volkswagen annual report for 1955 highlights the supplier problem:

> Es hat sich als unmöglich erwiesen, das Fahrzeug in den USA ohne Verkaufspreserhöhung bei gleicher Qualität herzustellen, solange man nicht Stückzahlen herstellen kann, die ausserhalb unserer Möglichkeit liegen.[16]

Common to all these explanations is the perfunctory planning (and lack of thorough consultation with suppliers and the UAW) given to the investment--and to its liquidation, for according to Nelson, Nordhoff simply said one day, "Well, I made a mistake. Let's sell."[17] As we shall see, Volkswagen would not skimp on planning when considering a return to the U.S.

---

[14]P.E.H. Durston, "Five European Companies in America," European Business, 27 (Autumn, 1970), 31-51.

[15]Jack N. Behrman, "Some Patterns in the Rise of Multinational Enterprise," Graduate School of Business Administration, Research Paper #18, University of North Carolina, 1969, 103.

[16]Volkswagenwerke AG Annual Report, 1955.

[17]Nelson, op. cit.

In 1956, the current corporate form of VW's representation in the U.S., the sales subsidiary Volkswagen of America, Inc., was established. In the following years VW continued its service orientation and sales continued to rise dramatically. In 1959 VW led all imports with 2.0% of the U.S. market at a time when the imports had their highest market penetration to date--10.2% of the market.[18] Then came Detroit's countermove with the introduction of the Corvair, Falcon, etc. By 1962 the imported car share of the market had been reduced to 4.9%; only VW had weathered the onslaught, as its market share rose to 2.8%.

During this period a significant change occurred in the character of Volkswagen's ownership. In 1961, VW was "reprivatized". The claims of the numerous small investors who had purchased shares in the car before the war were adjudicated, and 60% of Volkswagen's shares were sold on the open market. Twenty percent were retained by the state of Lower Saxony, where the company's main plant at Wolfsburg is located, and 20% were kept by the federal government in Bonn. Later, in 1966, when the federal government failed to exercise a stock option, 4% of the shares became the property of the Volkswagenwerke Foundation, a non-profit educational organization (the shares were always voted in accordance with the wishes of the federal government).

As Detroit made its small cars larger and larger, imports recaptured their former share of the American market, reaching 10.5% in 1968. From 1962 to 1968, Volkswagen's sales in the U.S. expanded by nearly 300%

[18]All statistics about the U.S. market come from <u>Ward's Automotive Yearbook</u>, various issues.

and its market share increased from 2.8% to 5.9%. During the same period, however, Volkswagen was being challenged in its home market, as imports increased their share of the West German market from 11.5% in 1962 to 21.0% in 1969. Since all barriers to trade in automobiles within the EEC were dismantled in 1968, the situation deteriorated further, and by 1971 imports held 25% of the West German market.

The early and mid-1960's were evidently a time of unprecedented prosperity for Volkswagen. The company easily withstood the 1961 revaluation of the mark and more than doubled its market share in the U.S. It expanded its production operations outside Germany to Belgium, Brazil, and Mexico. In 1964, VW acquired 50% of the German manufacturer Auto Union (partly to prevent a takeover by Chrysler); in 1966 it acquired the other half of the company from Daimler-Benz. VW intended to use the Auto Union factory at Ingolstadt to produce the Beetle. However, Rudolf Leiding, picked to head the new subsidiary, had other plans for the works. He helped design and promoted to Nordhoff the water-cooled, front-wheel drive Audi, a radical departure from the Beetle concept and an instant hit when it was introduced in 1968.

Indeed 1968, the year of Heinz Nordhoff's death, represents something of a high-water mark for Volkswagen; since that time, a combination of external economic circumstances and the company's internal inability to adapt to them have produced chaotic times for the largest corporation in Germany. Nordhoff, in ill health, had been succeeded in 1967 by Kurt Lotz, former chief executive of Brown Boveri's German subsidiary and a good friend of the Christian Democratic majority on Volkswagen's Aufsichtsrat, or supervisory board. Lotz had an impressive record as a former military officer and corporate manager, but he had one shortcoming; he knew nothing about the manufacture of automobiles.

His executive instincts saw correctly the demographic and economic changes occurring in VW's principal markets. Europeans, to whom VW had sold their first cars in the late 1950's and early 1960's, were enjoying a rising standard of living and were ready to trade their Beetle in for something better. Older Americans were becoming aware that other imported cars besides the Beetle could serve as second cars. Younger ones, whose parents had outfitted them with VW's on the premise that nothing significant could happen in a back seat <u>that</u> small, successfully made it through adolescence and became car buyers in their own right--with a taste for foreign autos, but desiring a little more class.

Lotz concluded that VW must broaden its product line, and determined to do it by analogy with General Motors' divisions. He had a head start because of the Audi and another model introduced in 1968 but developed during Nordhoff's tenure--the 411. In 1969, through Auto Union, he gained control of 60% of the shares of NSU Motorwerke AG via a merger voted by NSU's shareholders. NSU manufactured the tiny Prinz cars, smaller even than the Beetle, and the luxury Wankel-powered RO-80. Both products were being destroyed in their markets by Fiat and BMW respectively, but Lotz was after the extra production capacity and technology. He quickly learned, however, that 60% was not sufficient to give him firm control under German law. The battle to buy out discontented minority shareholders, including the Israeli-British Bank, took two more years and $120 million during which time the unprofitable lines offset the successes being achieved by the Audi.

Also in 1969, VW and Porsche brought out the first result of their joint venture, the mid-engine Porsche 914. In 1970, the Super Beetle was rushed into production; bottlenecks ensued, and output fell 100000 short of the target. Further, this model turned out to be a "bug with bugs"--200000 had to be recalled. Finally, the NSU-designed K70 was introduced in 1970, looking very much like an Audi and consequently receiving a lukewarm reception.

Lotz's diversification plan succeeded too well--the one product company was transformed into a menagerie. A total of a dozen cars were being built by VW; some had air-cooled motors mounted in the rear, others had water-cooled motors in the front, and one had the motor in the middle. Some had front-wheel drive, some rear-wheel drive, and one had a rotary motor. None, save the Audi and the reliable Beetle (whose suspension was different from the Super Beetle) ever gained acceptance. The diversity of product mix raised capital costs at a time when labor costs began to rise dramatically and competition in all markets intensified. The mark was revalued in 1969, largely as a result of the German export initiative spearheaded by VW; for the first time since the war VW's number of cars sold in the U.S. declined from the previous year. In 1970, VW restored its U.S. sales figure to that of 1968, but its worldwide return on sales was a miniscule 2.6%. In 1971, as the dollar was devalued and the (illegal) import surcharge was imposed, VW's share of the imported car market in the U.S. declined precipitously, from 46.3% to 34.8%, while in the auto market as a whole a record 10 million cars were sold. The growing acceptance of American manufacturers' small cars and the Japanese export initiative undoubtedly were other major reasons for Volkswagen's poor record. In Germany, the VW Group's market share fell from 32% in 1970 to 29% in 1971.

In the face of such disappointing results, it was natural that Lotz was in difficulty with the Aufsichtsrat. The conflict was further exacerbated when the Social Democrats came to power in 1970 and the German trade unions targeted Volkswagen (employer of 1 in 20 German workers) for the achievement of mitbestimmung (i.e., co-determination, or worker's representation on the supervisory board). Lotz was forced out in August, 1971, and was replaced by Rudolf Leiding, the veteran managing direction of Volkswagen's Brazilian and Auto Union subsidiaries.

Leiding's first move was to cancel yet another Lotz-conceived model, trimming the VW capital budget for 1971-76 from $2.6 billion to $2.1 billion. Leiding embarked on a four-model development program of his own designed to transform VW once and for all into a diversified automobile company. But this time Leiding included a Detroit analogy that Lotz had omitted; all four of the models in his program were to follow the "building block" system, aimed at achieving the highest possible number of interchangeable parts among the four cars. In an era of uncertain exchange rates, continually escalating wages, and increased competition, Leiding recognized that paring capital costs was essential.

In 1972, Volkswagen's sales in the U.S. declined again by nearly 7%. Total import penetration of the U.S. market dropped to 14.6% from the 1971 high of 15.1%, as U.S.-made subcompacts scored ever-increasing sales gains. On a worldwide basis, Volkswagen reported profits of $86.1 million on sales of $6.69 billion, an improvement over 1971's results. With the lifting of the surcharge, VW was able to keep the price of the basic Beetle under $2000 in the U.S.; this compared with a Beetle price in the early 1960's of about $1500.

1973 was a disastrous year for the company. First came the second devaluation of the dollar, which forced VW to raise its prices in the U.S. by 15% in the subsequent five months. This triggered re-opening of the file on establishing a manufacturing subsidiary in the United States; the enterprise had been examined several times during the 1960's, always with the same results--it was cheaper to export. VW was deluged with inquiries from nearly half the state development agencies, offering special incentives for the erection of a VW plant within their respective states. This active solicitation from the state groups, newly attuned to the possibilities of foreign investment after the dollar devaluation, must have helped erase the old memories of German properties twice expropriated. Nor was VW new to the direct investment game in the U.S., for in 1970 it had purchased Delenair

Engineering Co. of Texas, manufacturers of air-conditioners for cars.

VW sent a team of analysts to the U.S. in the summer of 1973. The American press reported at the time that the team's study concluded that investment in the U.S. should not be undertaken at this time, as the cost was still too high.[19] However, company officials refused to confirm the results of the study and said that a decision was still to be made.

Several weeks later, the company announced prices on its 1974 models. The basic Beetle, which listed at $1999 at the start of the 1973 model year, was tagged at $2625--a 31% increase in one year! The chairman of the American Imported Automobile Dealers Association, himself a Volkswagen dealer, responded to the price rise by saying that the only answer was VW production in the U.S. The company was reported to be reluctant to make the investment because of its fear of underutilization in its German factories. Nevertheless, VW continued to make other decisions of significance. It announced the sale of its share in the joint venture with Porsche to its partner, though it announced that it would continue to distribute Porsche cars in the U.S. It established a trading company-like unit in the United States, Volume Trading and Export Co., designed to emulate the activities of the Japanese trading companies. In the immediate future VTE is to take over the $40 million worth of automotive parts purchases VW makes annually in the U.S. and is to concentrate its activities in parts sourcing.

---

[19] New York Times, August 23, 1973.

If the VW management had in fact been ready to announce a decision on the U.S. operation in the fall, the Arab oil embargo and the resulting energy shortage in the Western industrialized world radically altered their timetable. As late as November 26, VW was able to report global sales up 7% in 1973 over 1972, and indicated that it saw no need to go on a shortened work week. But one month later, with German auto sales down by 20% in November from a year earlier, and forecast to be down 40-50% in December, the VW Christmas shutdown was extended from 12 to 15 days. The announcement about the American decision was put off until spring, after VW Treasurer Friedrich Thomée had had an opportunity to visit the U.S. personally.

In January, the U.S. press reported again that the further recovery of the dollar in the early months of the energy crisis had made the U.S. project no longer a top priority. Volkswagen scotched rumors of a possible link between it and American Motors, the early U.S. winner in the energy difficulties, though it did affirm the fact that it was still studying the possibility of assembly in the U.S. In announcing VW's introduction of three new front-engine models in the U.S. during the next year (of which the Dasher has been the first), Stuart Perkins, president of VWoA, commented, "My personal opinion is that we won't do it (invest in the U.S.)".[20] Perkins cited concern for drawing off production from somewhat idle German plants and the recovery of the dollar vis-à-vis the mark. He attributed VW's drop

---

[20]"VW to Introduce 3 Models in the U.S., Hoping to Shift Out of 3 Year Sales Slump," Wall Street Journal, January 23, 1974.

in U.S. sales in 1973 to 469,082 from 480,659 a year earlier to shipping and other difficulties in getting enough VW's to the U.S. during the early months of the energy crisis.

But on January 31, the roller coaster took another turn. The UAW, with 100,000 members laid off, broke with its traditional policy of free trade and called for temporary quotas on autos imported from outside North America. The quotas would be designed to limit auto imports to the average market share achieved over the last three years, about 15%. The move appeared to make little economic sense; U.S. small car plants were already producing at capacity, and consumers only wanted small cars, so choking off imports would benefit no one and harm the consumer. Nevertheless, in April of 1974 Congressman Reigle (D.-Mich.) introduced legislation implementing the UAW request.

Meanwhile, in March VW reluctantly aggred to an 11% wage boost for its workers, retroactive to February 1. The company explained its acceptance of union demands as essential to avoid a strike and the consequent delay in the introduction of new models (in 1973, the Beetle still accounted for 70% of total VW output). Also in March, the company raised prices 6.4% on its models in Germany, though the increases weren't posted in the U.S.

This reticence to pass on home costs reflected VW's conclusion that the market would bear no more price increases. VW's transfer price difficulties are an excellent example of the general intracorporate pricing problem faced by multinationals. Within these corporations, pricing at source or at market and pricing at cost or at market price involve divisional (i.e. subsidiary) efficiency, incentive, and performance evaluation issues, as well as tax and often regulatory questions. Pricing in the subsidiary's market leads to price discrimination when exchange rates change. But when the home country currency is revalued three times in four years, as Germany's was, pricing at the source can lead to a buildup of downward price pressures through dwindling subsidiary profits.

A company's decision to price at the market is often influenced by the type of product it sells. Table 3-1 shows that since 1968, the price of the high-margin Volvo has risen more as a per cent of 1968 price than the price of the low-margin VW, despite the fact that the mark experienced a greater percentage revaluation than did the kroner. Despite the fact that its price has risen less on a percentage basis, VW was reticent to pass on the wage increases.

In April, the first-quarter reports came in. New car deliveries in West Germany were down 18% from a year earlier; elsewhere in Europe they were off 25%, and in the U.S. they were reduced to 28%. Adding insult to injury was the report that GM's Opel had outsold the VW (not counting Audi's sales) in Germany in 1973. VW's stock plummeted to half its 1973 high. VW chairman Leiding blamed European efforts to reduce car use and much higher gasoline prices and took drastic action. To trim inventories, at 472,000 vehicles, up 40% from a year earlier, VW laid off half its West German workers for two weeks, starting in mid-April.

Table 3-1

PRICES OF VOLKSWAGENS AND VOLVOS

AND MARK-DOLLAR AND KRONER-DOLLAR EXCHANGE RATES, 1968-1973

Year	VW Price	DM/$	Volvo Price	Kr/$
1968	$1699	3.99	$2995	5.18
1969	$1799	3.97	$3020	5.17
1970	$1839	3.64	$3095	5.20
1971	$1845	3.63	$3270	5.17
1972	$1999	3.18	$3520	4.78
1973	$2199	2.84	$4160	4.54

Sources: Car prices are taken from the Automotive News Almanac, various issues. Exchange rates are taken from the IMF's International Financial Statistics, as of the end of April in the given year, when the Almanac is published. VW prices refer to the basic Beetle, while Volvo prices are for the 142-S 2-door hardtop.

By May, it appeared that Volkswagen's Vorstand (the management board) had finally made its decision on the U.S. project. In announcing 1973 profits of $88.2 million on $7.1 billion of sales (a rate of 1.2%, down from 1972's 1.3%) and a first quarter deficit, the company's first ever, of $39.5 million, Leiding stated, "I personally take the view that we can only hold the American market over the long run if we assemble there, or later even produce there."[21] The investments discussed by Leiding would involve $835-$1250 million for an assembly plant or plants, with the total to rise to $1650 million if the plants were to manufacture their own parts. According to Stuart Perkins, it is likely that any models assembled in the U.S. would be in VW's new line, rather than the Beetle, which the firm intends to de-emphasize. The announcement by Leiding suggested that VW had given up its alternate plans for serving the U.S. market, which included manufacturing in Canada or in Mexico. It may still use the Mexican subsidiary, which already exports 35,000 of the Afrika Korps-like "The Thing" to the U.S., to produce parts for the U.S. Such a procedure would result in lower cost parts and would satisfy Mexican government export requirements.

Three days later, Friedrich Thomée disclosed that VW plans to make all future auto plant expansions outside of Europe. Thomée indicated that only $300-$500 million would be spent initially on the U.S. plant, if the Aufsichtsrat approves. Such approval is hardly automatic, however, for two related reasons. First, the output and

---

[21]"Volkswagen Nears Decision to Assemble Cars in U.S.; Firm Posts First Period Loss," Wall Street Journal, May 14, 1974.

employment situation in the West German automobile industry continues to deteriorate, with VW ordering additional week-long layoffs in June and July. In June, VW offered bonuses of up to $3500 to any of its 100,000 workers who would quit immediately; it received 3000 acceptances. Production of the Beetle has been transferred out of Wolfsburg to make room for one of the new models, with the eventual intention of completely removing Beetle production from Europe in the long run.

As a consequence of this output-employment deterioration, the governmental members of the Aufsichtsrat are unlikely to look favorably on any proposals to export jobs. As noted earlier, the government of the state of Lower Saxony controls 20% of VW's shares, as does the federal government in Bonn;[22] the rest of the shareholdings are widely dispersed. Union members are also well-represented on VW's supervisory board with seven of the 21 members. Neither of these groups will sanction an expansion of production facilities which would deprive them of future tax revenues, on the one hand, and future wages, on the other.

Both of these groups have a tradition of activism in company affairs, at least in recent years and at least where plant expansions are concerned. It was the union members who initiated the ouster of Lotz and whose constituents pushed for the 11% pay raise in the spring. Louis Wells notes, "Although in most cases, governmental

---

[22]Bonn recently acquired the VW Foundation's 4% share for $30.6 million, after the Foundation said it wished to diversify its source of income! ("Bonn to Raise Stake in VW to 20% at Cost of $30.6 Million," Wall Street Journal, June 17, 1974.)

influence was limited to...relatively minor matters, Federal and especially state influence seem to have been strong in the decisions as to where new plants should be located."[23] A recent government study, the Potthoff report, has recommended that the government use its holdings in industry for social ends much more than it has in the past, so one may expect it to be skeptical of the U.S. project. In fact, when Leiding announced another 6% price increase in May, the Federal Cartel Office brought charges against VW on the suspicion that VW, with large stocks on hand, used its monopoly power to impose the price increases; the charge was later dropped in June.

The latest developments in the U.S. market only serve to confuse the issue. While VW sales worldwide fell by 18% in the first half of 1974, U.S. sales were off 33% over the same period, and June sales were down 46% from the previous June. In the face of a dwindling market for the Beetle and promising though inconclusive results for the first of its new models, it is uncertain whether, with cost conditions nearly equalized between West Germany and the U.S., short-run demand factors will once more shelve the project in the U.S. In July, VW actually lowered its U.S. price from $2625 to $2499 to recapture lost sales.

In my opinion, the project will be approved by the supervisory board, albeit in the dimensions suggested by Thomée because of the large amounts of capital needed to finance the project. The German economy's recent recession is in part attributable to the investment

---

[23]Louis T. Wells, Jr., "National Policies in an International Industry: The Europeans and the Automobile," Harvard University Graduate School of Business Administration mimeo, May 7, 1973.

tax and suspension of depreciation allowances imposed in March, 1973; currently, it is one of the more healthy economies in the EEC, with the lowest rate of inflation. The cheap foreign labor that once gave Germany its cost advantage is no longer available, both because of the new restrictions on hiring foreign workers and the higher wages available to them at home. The decline in demand for imports in the U.S. is very product-specific; just as VW, Toyota, Datsun and Opel are off 40-50% from a year ago, so Audi, BMW and Porsche are up like amounts. VW's Dasher is in the same price range as the Audi Fox, and one of its other new offerings will be an intermediate luxury vehicle much like the BMW. The threat of protectionism is ever-present in the U.S., and VW can't afford to lose further sales via shipping bottlenecks and burgeoning freight rates, as it did in the past. The U.S. is in the vanguard of product safety technology, which should eventually have worldwide application. Finally, the company is no newcomer to foreign investment, with production plants in Belgium, Brazil, Mexico, South Africa, Australia, Indonesia, and Yugoslavia; construction is under way in Nigeria, and negotiations for new plants are continuing in Iran and Rumania.

Still, it is true that VW might conclude that it can afford to continue to export to the U.S. Just as it is reducing the role of its main product, the Beetle, it will certainly try to reduce the dominance of its main market, the U.S. While the Beetle has been the vanguard of VW's success here, the margin on it is low. VW might be content to supply its new, more expensive models to the U.S. via export, and concentrate on selling the Beetle and its new, even smaller cousin, the Golf, in the developing countries. With its slower rate of population growth, environmental concerns, and high per-capita income, the U.S. is hardly the place to sell a "people's car" any more.

In any event, one thing is certain. Volkswagen's tortuous deliberations over making a direct investment in the U.S. represent the closest of close cases. In the sequel, we analyze a much more straightforward and refreshing decision process which has led to a different conclusion.

Automobiles: The Case of Volvo

Volvo AB was formed by a group of former SKF employees in 1926. Their first car was produced the next year, and in 1928 the company diversified into the more stable truck market. Exports played an important role in Volvo's development from the start. In 1934, the company exported 26% of its output.

After the war, Volvo's exports fell to less than 20% of sales. In 1953, its sales were 359.4 million kroner, of which exports represented 69.4 million. Sales of cars represented 40% of 1953 total sales; that year Volvo still had no exports to the U.S.

In 1955, the company sent its first cars to the U.S., through dealers in California and Texas. In 1956, it sold 5050 autos here--30% of its car output--and established a sales subsidiary in this country. By 1958, the U.S. was Volvo's single largest export market. In 1961 and 1962, as imports as a group were losing their market share, Volvo continued to post sales increases, reaching 13,157 vechiles sold in 1962, fourth among U.S. imported cars. Though this represented only 0.2% of all cars sold in the U.S. that year, the U.S. was still VW's largest export market.

The company's successful marketing effort in the U.S. made a virtue out of necessity; the car had been designed to withstand Swedish winters, so the company's advertising made much of its durability and longevity. The design of the car had been partly determined via intense marketing research on the type of vehicle desired by the Swedish consumer. With a government grant for the construction of a new factory, the company was able to transform its money-losing auto operation of the mid-50's into a strongly profitable one in the 1960's. Other cost minimizing techniques increasingly employed during this period included infrequent model change, to capture economies of scale in manufacturing the car,[24] and worldwide sourcing of parts (in 1959, 75% of the components of the vehicles Volvo assembled were purchased outside Sweden). The company had to be cost-conscious, for the wages in Sweden were (and are) the highest in Europe, and the automobile tariffs the lowest. Though

---

[24]Two recent analyses of the minimum efficient plant and firm size in the automobile industry have come to quite different conclusions. Lawrence White (op. cit.) finds that 200,000 vehicles is the minimum efficient plant size, while for the U.S. at least the minimum efficient firm size is 800,000, representing production of two models (to spread the risk) of 400,000 each, completely using up the lifetimes of sheet metal dies. D.G. Rhys (The Motor Industry: An Economic Survey (London' Butterworth's, 1972)) finds that 2 million is the optimal firm size, again to take advantage of economies of scale in using sheet metal dies and producing components. It is amusing to match these figures against Volvo's output, and to note that both authors failed to consider worldwide sourcing and infrequent model change.

Volvo's share of the Swedish market in 1960 was 25%, that represented only 43,500 vehicles; naturally the company was forced to export to realize scale economies.

In 1963, already concerned by rising costs at home, the company established its first foreign subsidiary at Dartmouth, Nova Scotia, Canada. This represented a cautious approach to the North American market, deriving from the fact that not all Volvo's initiatives in North America had proven successful. In 1958-60, Volvo had exported light trucks to the U.S. intending that they be used for intra-city delivery. Some purchasers, however, put them into service on inter-state routes, where they quickly developed a reputation for overheating. Volvo was forced to withdraw the product line.

There is no direct evidence that Volvo established the Nova Scotia subsidiary to serve the U.S. market. The plant's initial output was only 5000 vehicles, while Volvo's sales in the U.S. were three times that. Undoubtedly, the company was aware of Canadian concern for her automobile industry, as exemplified in the Bladen report of 1961, which led eventually to the Canada-U.S. Automotive Agreement of 1965. By producing in Canada, Volvo could import certain parts duty free, as long as parts and services supplied in Canada equalled 60% of the cost of a car. But the company's decision to build a Canadian factory was made well in advance of the negotiations leading up to the Canada-U.S. agreement. The agreement as signed in 1965 contained one U.S.-induced stipulation specifically aimed at non-U.S. companies producing in Canada. To qualify for duty-free treatment, imports into the U.S. had to have a minimum of 50% North American content. Of course, had Volvo met the Canadian content requirement, it would have met this one also.

Volvo invested in Canada because, like Sweden, it had a relatively high per-capita income level and its climate was similarly rugged. In 1967, the Canadian plant was moved to Halifax, Nova Scotia, and by 1973 its output had doubled to about 10,000 cars per year. During the entire 10-year life of the plant, Volvo has filled the overwhelming majority of its U.S. orders from its plant in Sweden.

During the 1960's, the company's strategy of consolidating its position in Europe was developed further. A factory was built in Ghent, Belgium, in 1965 to jump inside the EEC tariff barriers; yet initial capacity was only 14,000 cars. The company adopted a policy of balanced growth in all markets; no market outside Sweden was to represent more than 20% of total sales. Volvo's growth at home (in 1965, half of Volvo's auto output was sold in Sweden) was enhanced by Sweden's increasing per-capita income and the consequent result that cars per-capita in Sweden rose from 1:28 in 1950 to 1:5 in 1965, the highest ratio in the world after the U.S., Canada, Australia, and New Zealand.

By 1970, Volvo's worldwide sales were five times its 1960 total and profits consistently remained a healthy 9-12% of sales. This strong profit performance enabled Volvo to remain independent of the Wallenberg family and their Enskillda Bank, which controls much of Swedish industry, including Volvo's two competitors in the transportation field, Scania-Vabis and Saab.[25] Exports (of all vehicles) as a percentage of total sales grew from 43% in 1960 to 48% in 1970; car exports were 2/3 of total auto output. Except for a slight dip in 1969, Volvo's auto sales in the U.S. grew every year; in 1970 Volvo sold 44,630 cars in the U.S., about 0.5% of the market. Its Swedish plants were nearing their 200,000 capacity.

Undoubtedly, one reason for the company's consistent profit performance was its diversified product mix, with 70% of sales coming from autos and 30% from other vehicles and engines. In addition to trucks and autos, Volvo's operations include Svenska Flygmotor, which manufactures aircraft engines; Penta, which produces marine engines; and an agricultural and lumbering equipment subsidiary, Bolinder. Continued worldwide sourcing was important for keeping costs down too; in 1970, the company purchased $65 million worth of parts in England alone.

In 1971, Volvo's managing direction since 1956, Gunnar Engallau, was succeeded by his son-in-law, Pehr Gyllenhammar. In the three years since Gyllenhammar has effected a substantial further internationalization of the company's activities. To catch the rising incomes of Europe with its high-price, high-margin models, Volvo is expanding production capacity at Ghent, Belgium to reach 75,000 by 1975. Plant capacity at Halifax is to be increased to 15,000 by that date, and factories are also under construction in Indonesia, Australia, and Peru. Volvo has entered a joint venture with Renault and Peugeot to manufacture 360,000

---

[25]Saab acquired Scania-Vabis in 1969.

engines in France by 1980, and has acquired 33% of DAF, the Dutch manufacturer of small cars. The company has also joined with DAF, Germany's KHD and France's Saviem to develop components for light trucks.

Labor considerations have been paramount to Volvo's decisions to locate more production facilities abroad. Wages cum social insurance benefits have increased dramatically in Sweden at the same time that labor has become scarce. At the company's Torslanda plant, near Gothenberg, 65% of the workforce is non-Swedish, and turnover is high. One of the company's reactions to the turnover problem has been attempts to humanize the work environment. In the company's new $21.7 million car assembly plant at Kalmar, Sweden, 25 teams of 15 workers each are responsible for production, with decisions about techniques left partly to the workers. Cars are moved around the plant on battery-powered platforms equipped with a device which tilts a car to make it easier to work on. The plant is designed to produce 60,000 cars annually, using two shifts.

On September 13, 1973, Gyllenhammar announced the largest project to date in his internationalization program. Volvo is to build a plant for the manufacture of cars in the U.S. The plant is to be located in Chesapeake, Virginia, is to cost $100 million, is to be operational by 1976, and is to have a capacity of 100,000 cars by 1980. Initially, the plant will be used for the assembly of Swedish and U.S. components; hence its East Coast location. Later it will go into full production.

The decision to build in the United States came after three years of steadily increasing sales, which reached 52,503 vehicles in 1972.

Volvo's U.S. turnover was thus not reduced by the invasion of low-price Japanese imports and "captive" imports that cut so much into Volkswagen sales during these years. The company was forced to raise prices during this time owing to the devaluation, though the largest cost increases (14-16%) came in November, 1973, after the plant announcement.

According to Gyllenhammar, cost was not a factor in the investment decision.[26] Rather, he cited the desire to be closer and hence more responsive to the market which was responsible for 25% of the company's sales. Other considerations included:[27]

- shipping factors; a lot of air is being shipped in finished autos and goods in transit are valued higher for freight purposes when finished than when in components. In addition freight costs are rising drastically;
- difficulties in coordinating inventories with two stocking locations, one in Sweden and one in the U.S.;
- more effective market adaptation, especially in the installation of safety and pollution-control equipment;
- social responsibility to contribute to the U.S. market.

Gyllenhammar stated that the expansion into the U.S. had been planned for some time, as a part of Volvo's international expansion program.

Volvo's choice of the Virginia site derives from Governor Linwood Holton's promise to try to obtain the designation of a free trade zone (FTZ) for the Port of Hampton Roads area, where the Volvo plant is to be built. The port itself is the second busiest and fastest growing

---

[26]It is likely that this was the case because the wage costs in the two locations, including social insurance contributions, were so nearly similar. This similarity permitted other considerations to predominate.

[27]Edouard Seidler, "Report from Europe: An Interview with Pehr Gyllenhammar," Automotive News, April 29, 1974.

on the East Coast, handling 3 million tons of cargo in 1974. FTZ benefits for Volvo would include:

- the duties on a vehicle assembled in the FTZ would be half the sum of those on the imported parts;
- no duty is paid on production machinery imported into the FTZ as long as it stays there;
- an accounting advantage is obtained because any duty paid is delayed until the finished vehicle "enters" the U.S from the FTZ;
- any exports from the FTZ would be duty free--no tariff need be paid on imported components assembled in the FTZ and then re-exported;
- no duty is paid on U.S. components entering or leaving the FTZ.

Though Volvo's decision to invest in the U.S. was announced before the oil embargo, its effects have not caused Volvo to change its plans. Indeed, the only effects of the energy crisis on Volvo's Swedish production were a 4% production cut and a few 4-day weeks during the winter. Volvo's sales in the U.S. benefited at first from the energy crisis, as its reputation for longevity and quality attracted the American middle class as they traded in their gas-guzzling American cars in favor of an auto which promised economy with comfort; its 1973 sales in the U.S. totaled 61,042, still 0.5% of the market. In 1974, Volvo's sales dropped with most of the rest of the imports, as U.S. sales of all makes were off 21% in May, 1974 from a year earlier, and Volvo's sales dropped by 19% in the first five months of 1974.

In fact, Volvo announced a number of new ventures in the U.S. market for 1974. On January 1, 1974, Volvo Penta of America began producing marine engines in Ohio. Later in the year, a division of Volvo's automotive subsidiary was established to market Volvo's hydraulic equipment in the U.S. In June, the company announced the formation of an automobile leasing operation to serve 17 states and the East Coast. In the same month, it established a truck division for a second try at the U.S. market; this operation had been preceded by two years of tests of 24 models in the Ryder truck fleet in Texas.

If Volvo has been enthusiastic in its expansion abroad, the Swedish government has not. In March, 1974, the Social Democratic government proposed a law that would require all Swedish multinationals to submit foreign expansion plans for review. Behind the proposal are Sweden's trade unions, who object to a 70% increase in employment at Swedish-owned plants abroad over the last decade, as compared with only a 5% rate of growth at domestic plants. Perhaps Volvo's management sensed this growing sentiment and has decided to internationalize while that is still possible.

Automobiles: Linder's Theory and a Contrast of Products

The direct, straightforward nature of Volvo's direct investment decision process contrasts sharply with the convoluted path followed by Volkswagen over the last twenty years, and especially since the dollar devaluations. The difference cannot be ascribed to early failures in selling in the U.S., for both firms had one miscalculation--Volvo in trucks, VW in the New Jersey plant. To be sure, wariness of their World War II image may have kept the Germans out in the late 50's and early 60's, but it certainly does not explain their reticence to invest in recent years.

Rather, the difference in behavior can be traced to two considerations--the postwar economic environment in which each company grew up, and the type of product that was each company's strength. Volvo was no hothouse flower; it expanded in postwar years in a small and open economy where wages were high. From the start, it had to be concerned with worldwide sourcing at least cost and with achieving economies of scale via exporting. Its small scale meant that it could only produce a few models, so it manufactured a car that was guaranteed to sell in the rugged Swedish environment, where per-capita income also was high. The durability of such a car dictated that it would be moderately expensive, and thus Volvo was constrained in its export horizon to countries with per-capita income levels near its own. Such a marketing focus is entirely consistent with Stephan Burenstam-Linder's theory that trade tends to occur between countries with similar tastes and income levels. When protective sentiment developed in Canada, Volvo was quick to jump inside that barrier. To maintain its market share in the rapidly growing EEC, it built a plant in Belgium. The company was affected by higher wage costs and a labor shortage by the end of the 1960's, but its reputation for quality and traditional high price allowed most costs to be passed through to the consumer. As a longer-term solution, the company substituted capital for labor, but in such a way that the jobs of the remaining workers were more meaningful, thereby reducing labor turnover. Again, the high margin on the company's main product, and its diversified product mix, allowed it to take this chance. Similar considerations facilitated its establishment of a subsidiary in the U.S. in

1973, by the time that labor costs in the two countries were nearly equal.

Volkswagen's dilemma stems from the facts that 1) it is not a diversified corporation; 2) until very recently, the U.S. absorbed over 1/3 of its output; and 3) its product, true to its name, is a low-margin, high-volume item. VW's export success in the U.S. also followed, Linder-like with a twist, from rising U.S. incomes which allowed the purchase of a second car. In Europe the company's strength came from sales of first cars to an expanding middle class. As incomes increased in both locations, VW's basic model became something of an inferior good, passed over for a better second car or for a Japanese import in the U.S., and rejected in Europe as owners traded up. At the same time, the company was hit by rising labor costs and three revaluations of the mark in four years. The effect on its low-margin Beetle was disastrous. Efforts to diversify its automobile product line foundered because the expansion proliferated capital costs. The one right move the company made during the troubled late 1960's was investment in developing lands, recognizing that the Beetle could catch on in these countries as incomes rose. Just as the company's product line was being broadened, the oil embargo plunged the auto industry into a decline, at least for the short term.

In true Monday-morning quarterback fashion, it would be easy to assert that VW should have built a plant in the U.S. in the mid- to late 1960's, when the company was prospering. But this contention ignores the fact that VW was selling a low-margin standardized product, and cost minimization dictated production in Germany. A more valid observation is that VW should have broadened its product line sooner, to take advantage of consumers trading up as their incomes rose. Now that the company is doing this, direct investment in the U.S. remains filled with uncertainty, for the Dasher and its brothers and sisters do not have the long tradition of consumer acceptance possessed by Volvo.

Computers: The Case of Nixdorf

The lineage of Nixdorf Computer AG goes back to 1951, when Heinz Nixdorf dropped his studies in physics and business administration at Frankfurt University to go to work for Remington Rand. In 1952, Nixdorf left Remington and obtained a contract from the Essen public utility RWE for electronic calculators. Nixdorf left RWE in 1959 and established his Laboratory for Impulse Technology at Paderborn where, in 19 2, he developed a desk-top calculator. In 1965 Nixdorf produced his Model 820, a programmable accounting machine explicitly designed in modular fashion to allow it to be integrated with larger (non-Nixdorf) computer systems. Shortly thereafter, Nixdorf purchased Wanderwerke AG, an office equipment company, for $3.75 million to expand his manufacturing capabilities. The expanded enterprise was then renamed Nixdorf Computer AG.

Nixdorf's Model 820 met a need in the German market unsatisfied by any other manufacturer; IBM did not have a system that small, and

Nixdorf's subsequent American competition, Burroughs and National Cash Register (NCR), were not yet heavily involved in Europe. By using increasingly sophisticated integrated circuits, Nixdorf was able to supply more-than-adequate computing power at a reasonable cost, and his annual sales mushroomed to $25 million in 1968, with a total of 5000 820s installed.

In that same year, Nixdorf turned his attention to the U.S. market, after being contacted by Victor Comptometer in January. Victor had planned to purchase electronic desk-top calculators from General Microelectronics (later taken over by Philco-Ford), but the company could not produce the product in quantity at a reasonable price, owing to difficulties with the new MOS (metal oxide semiconductor) integrated circuit it was using. To avoid late entry into this burgeoning market, Victor found it essential to find a supplier, and Nixdorf fit the bill. Victor was further interested in Nixdorf's computer capabilities, as it wanted to avoid the estimated $50 million and six years of R&D it would take to develop a small business computer line. In June, 1968, Nixdorf and Victor signed a 10-year agreement calling for Nixdorf to supply $25 million worth of calculators and computers to Victor.

In the next four years Nixdorf's sales expanded fivefold as the small business computer market took off. At year end 1971, the company had an after-tax rate of return of 9% on $136 million in sales and heralded itself as "the only profitable computer company in Europe."[28] Sixty

---

[28]Heinz Nixdorf as quoted in "Nixdorf Entry to U.S. Worth Watching," Datamation (February, 1973), 106-113.

percent of Nixdorf's 1971 income came from computers for data processing, 36% from terminals, and 4% from computers for scientific and technical applications. During this period, subsidiaries were established in Switzerland, Spain, Greece, Italy, Austria, Sweden, England, France, Australia, Finland, Belgium, and Denmark, though none engaged in manufacturing. Worldwide installations in 1971 totalled 29,000 (mostly Model 820), with 20,000 in West Germany, where Nixdorf had more than 40% of the market for small business computers. Despite the fact that it did not have a line of computers with central processing units larger than IBM's System/3, the company was credited with 5% of the West German market for all types of computers, at the same time that the giant Siemens had only 14%.

As a symbol of strength and aggressiveness in the spectrum of generally weak European computer companies, Nixdorf soon became an object of governmental concern. When the German government failed to persuade AEG-Telefunken and Siemens to merge their computer operations, it was naturally pleased to subsidize a 50-50 joint venture between AEG-Telefunken and Nixdorf, to be called Telefunken Computer GMBH, with a $30 million contribution. Telefunken Computer is designed to develop the software for and to market AEG's large-scale TR400 computer, which so far has gained acceptance only within the scientific community. Nixdorf also explored a possible cooperative venture with the UK's International Computers Ltd. (ICL) for common marketing, though nothing came of the talks. In Japan, Nixdorf reached an agreement with Kanematsu-Gosho in 1971 to market 5000 of Nixdorf's computers there by 1975. Nixdorf also has a 49% interest in a leasing firm, Nixdorf Computer Miete KG, and a 20% interest in a software firm Deutsche Datel GmBH.

In 1972, Nixdorf grew increasingly dissatisfied with Victor's performance in merchandizing his models. Victor's sales of Nixdorf's product rose from $3.5 million in 1969 to $13.3 million in 1971, but stagnated in 1972 as Victor's computer division sustained losses of $1.5 million. The principal reason given by Victor was that Burroughs and NCR lowered their prices, a tactic which Victor could not emulate because of the mark's revaluation. However, computers accounted for only 5% of Victor's revenues in 1971, and the company's expansion was taking place via acquisitions in the recreational area. Hence it is likely that Nixdorf's concern was not without basis.

In any event, in December 31, 1972, Nixdorf Computer AG acquired the computer division of Victor Comptometer for $10 million, about the same as the computer division's sales in 1972. Through the acquisition, Nixdorf received service responsibilities for 1000 installations, a backlog of 600 orders, a staff of 470 and 26 sales and/or service outlets. Nixdorf also brought to the acquisition a sizeable buffer against the uncertainty involved--an order for 1000 terminals from Control Data. After announcing the acquisition, Nixdorf stated his intention of investing $100 million in the U.S. through 1980. About 70% of the total is to be used for construction of a manufacturing plant outside Chicago by late 1974 and expansion of sales and service facilities; 30% will go toward developing an R&D capability. Nixdorf himself will head the U.S. operation.

While cost factors played a minor role in Nixdorf's decision to invest in the United States, demand and technological considerations have been paramount. The heterogeneous U.S. minicomputer market, focusing in the 330,000 U.S. businesses with 20-200 employees, is expected to grow at astronomical rates through 1980, and Nixdorf's product line spans each segment of this market. The Model 820 encompasses invoices and visible record systems, with magnetic ledger card feeder, selection printer, punched card, paper tape cassette, and optical character recognition options. Its size is 256 to 32K 12-bit words of core memory, and it sells for $10,000-$100,000, with an average price of $30,000. Upgraded versions of the 820 include the 840 with disk and remote terminal displays, the 880, with multiple disk drives, and the 900, with up to 256K bytes and facilities for 156 terminals. At the lower end of the scale, Nixdorf has the 700 point-of-sale terminal, with 11 stations and 4K of core; 1000 of these have been installed in Europe as VAT has greatly multiplied commercial data processing needs. Only the 820 had been marketed in the U.S. when Nixdorf made his acquisition.

Another motivation for the establishment of manufacturing facilities in the U.S. is the fact that Nixdorf already spends 25% of its revenues for U.S. components, including CDC and Centronics printers, Potter tape drives, Texas Instruments semiconductors, Ampex core storage, and Century Data disks. By producing in the U.S. Nixdorf avoids tariffs on the components entering Germany and on the finished product entering the U.S.

The most compelling reason for Nixdorf's direct investment is the nature of the industry in which the company produces. Perhaps in no other industry does technology change as rapidly as in the computer industry, and the U.S. is the undisputed world leader in computer technology. Some semiconductor suppliers are themselves expanding their product range upward to include the range of products made by Nixdorf; since these suppliers are all located in the U.S., it is essential that Nixdorf have an R&D capability here to deal with the situation. U.S. minicomputer manufacturers are doing quite well in Nixdorf's home market in Europe, with U.S. producers of all types of minis accounting for 60% of European shipments in 1973. Undoubtedly, he felt that if they had sole access to the developing technology, the next ten years would bring a replay in the minicomputer market of the domination of American firms in the markets for medium- and large-scale computers in the 1960's.

In a sense, Nixdorf's entry into the U.S. carries little risk. Its link with the giant AEG-Telefunken gives it a source of capital to draw on if it should have difficulty in the highly competitive U.S. market. Telefunken's expertise is conveniently concentrated in the other sector of the computer market where rapid growth is foreseen--large-scale computers. The continuing emphasis of European governments in general and the German government in particular on developing companies which can compete effectively in the computer industry suggests they will assist one of Europe's brightest prospects through any difficulties.

Computers: The Case of Philips

It is striking that no other Japanese or European manufacturer has sought to produce computers in the United States. Part of the reason is that, just as in the case of semiconductors,[29] larger computer manufacturers were slow to recognize the possibilities in small business computers. In the United States, it is only in the last year that IBM announced the development of a System/2 model that will extend its product line into the upper range of what are called minicomputers. Abroad, the European and Japanese governments have been predominantly concerned with the development of so-called "national champions" which can compete with IBM in the medium- to large-computer range and which will insure that each country's national security will not be compromised by dependence on a foreign corporation for essential technology. Britain, France, and to a lesser extent Germany, and now the E.E.C., have been and continue to be preoccupied with large firms making large computers, so perhaps it is unrealistic to expect ICL or CII to be actively considering investment in the minicomputer market in the U.S.[30]

---

[29] See John E. Tilton, International Diffusion of Technology; The Case of Semiconductors (Washington: The Brookings Institution, 1971).

[30] Surprisingly, one of CII's most successful (least unsuccessful?) models, the Mitre 15, is a small computer, and ICL has invested in the U.S., purchasing a 1/3 interest in Computer Peripherals Inc., of which NCR and CDC each own another third. This move into the U.S. is to be expected of ICL, the business of which is entirely computers and which has 45 subsidiaries worldwide. This despite the recent comment of Mr. Geoffrey Cross, an ICL executive, explaining ICL's failure to concentrate on the U.S. market, "We know Europe better than the Americans, and they know America better than we do." Quoted in "Computers: Europe's Oyster," The Economist, March 17, 1973, 93-94.

Indeed, if a computer manufacturer were to invest in the U.S., one would expect that it would be in minicomputers, for that is the segment of the computer market in which the Europeans have shown the greatest strength. European firms were responsible for 40% of shipments of minis in the European market in 1973, while their share in all segments of the market was only 18%. Still, just as in the high technology area of semiconductors,[31] there is hardly a long tradition of foreign investment. According to Nicholas Jequier, "Except for the unsuccessful attempts of Ferranti in the 1950's and Elliott in the early 1960's, no European company ever tried to penetrate the American market, and as far as can be ascertained, none even considered the prospect."[32] Most of the European manufacturers of small business computers are hardly household names--Dietz, Krantz, Kiengle, Selenia, Norsk Data, Intertechnique, to name a few; naturally one would hardly expect these firms, still concerned about establishing themselves in Europe, to construct a plant in the United States. But there are two large European multinationals, Philips and Olivetti, which do manufacture products in the small business computer--electronic accounting machine category, and which market (but do not manufacture) these products in the U.S. Both companies have other manufacturing subsidiaries in the U.S.; Olivetti makes typewriters at a plant in Harrisburg, Pa., while Philips has over

---

[31]Tilton op. cit., Chapter 5.

[32]Nicholas Jequier, "Government Policies and the European Computer Industry" paper presented to the Conference on Government and Business in Western Europe, Center for International Affairs, Harvard University, January 20, 1973.

30 subsidiaries in the U.S. One would expect that at least one, and perhaps both, of these companies would have been drawn to the rapidly growing U.S. market to keep track of the latest technological developments, as Nixdorf was.

Perhaps the reticence of Olivetti to invest is the easiest to understand. The company's purchase of the Underwood Typewriter Company in 1959 and the subsequent immense ammounts of capital needed to make the subsidiary profitable have been well-documented.[33] Olivetti has already had one bad experience in the electronic computer business, when its computer division was taken over by GE (75% in 1964, the remaining 25% in 1968). The company's reentry into computer manufacturing was limited to minis and terminals, and while its annual reports portray an increasing role for data systems in the future, the fact remains that in 1972, sales of this division were only 20% of Olivetti's total turnover.

The case of Philips is more difficult. As noted in Chapter 1, the company has been represented in the U.S. since before World War II. As the fourth-largest industrial company outside the U.S., it could certainly bear the risk of establishing a computer manufacturing subsidiary in this country. Its failure to do so traces both to the changing nature of the company in general, and to the unique contribution that data processing activities make in the company. Until the 1960's Philips was a loose confederation of essentially national companies, each of which produced a broad range of products for local markets, chiefly

---

[33]As for example, in P.E.H. Durston, op. cit.

in Europe. When the tariff barriers in the Common Market were lowered, Philips was left with a group of inefficient, relatively small companies, duplicating each other's efforts. The company was slow to reorganize along product lines, and though sales rose from $1.3 billion in 1959 to $6.1 billion in 1972, profits in 1971 were the same as in 1960. By 1972, however, the reorganization had been substantially completed and Philips rate of profit on sales rose in 1972 to 3.4% from just over 2% in 1971. One effect of the reorganization along product lines was the decision to center computer systems development in Holland.

To understand the reason for this locational decision, one must understand the role that computers have within Philips. The basic concept is one of synergy; many of Philip's other electrical products increasingly require sophisticated small computer systems in their design. Philips can produce and market these products at a lower cost if it manufactures the components itself. Since 70% of Philips' sales came from Western Europe, it was natural that the firm would locate its production of computers in the same region.

The decision to locate in Holland is probably not a result of government pressure, for the Dutch have no national security illusions and Philips boasts that it has never received any government subsidy in its computer operation. Rather, the choice of Holland reflects the manner in which Philips first became involved with computers. In 1957 and 1959, the company built its own large-scale computer systems at its research facility in Apeldoorn in a "learning by doing" fashion. Six years later, it acquired the major Dutch computer manufacturer, Electrologica. Because of the internal reorganization taking place and the first priority of supplying Philips' other divisions, Philips did not market its first small business computer, the P-350, until 1969. The P-350 is an accounting computer terminal system in the same product line as Nixdorf's 820; core storage options only range from 2-12K.

The computer has been well-received, however. Total installations in 1973 totalled 17,000, and the company broadened its product line to include the medium size general purpose P-1000 in 1971. Philips computer (and semiconductor) operations have yet to turn a profit; in 1971 cumulative losses in the Data Systems Division totalled $150 million. Philips accounting practices have been described as masochistic; current expenditure on R&D is written off immediately. Still, in the highly competitive, rapidly changing environment of computer systems development they may not be inappropriate.

Philips' late entry into the small business computer market and its failure to show a profit to date are no doubt major reasons it has hesitated to commit resources to a manufacturing investment in the U.S. U.S. tariffs on electronic computers in 1969 were only 8-9% and have been further reduced by the Kennedy Round, so Philips does not pay a severe cost penalty for exporting to the U.S. and can still participate in the rapid growth of the minicomputer market. Unlike Nixdorf, Philips has no motivation to invest in the U.S. to be closer to its raw materials suppliers, since it produces almost all the components of its computer itself. Finally, Philips already has a sizeable research capability in the U.S., and despite the very arms-length relationship between the parent and its North American subsidiary, the two have an active program for the exchange of technical information.

Thus none of the considerations that made a Nixdorf investment in the U.S. sensible applies with equal force to Philips. In summary, it may be said that the underlying reason for Philips' failure to invest in the U.S. is that, unlike Nixdorf, selling computers isn't its only business. Further, now that Philips has reluctantly joined the latest artificial European computer company, Unidata, in the company of CII and Siemens, it is unlikely that it will produce computers in the U.S. in the near future. Unidata's emphasis is to be on commercial data processing, and Philips has been given major responsibility for the small computer market in France and Germany. But the coordination problems are massive, and are likely to keep Philips' Data Systems Division occupied for the foreseeable future.

Computers: Nixdorf an Interesting Contrast with Pilkington

The differing decisions of Nixdorf and Philips concerning construction of a manufacturing facility in the U.S. suggest a comparison of their behavior with that of Pilkington, the English glass manufacturer mentioned earlier. After it developed the revolutionary float glass process in 1959, which obviated the need to polish glass, Pilkington chose to license its production in the United States through Pittsburgh Plate Glass rather than manufacture in this country. This decision was all the more remarkable in view of the fact that the French manufacturer, Saint Gobain

Pont-a-Mousson, thought enough of the market in the U.S. to construct a plant in Tennessee using the old technology prior to the announcement of Pilkington's discovery.

Certainly Pilkington's lack of international experience was not a barrier. At the time of its discovery it had subsidiaries in Canada, South Africa, Argentina, India, and Australia, though it must be noted that all but one were located in the Commonwealth.

Pilkington, like Nixdorf a closely held family firm, explained its decision to refrain from producing in the United States as a consequence of the fact that to compete effectively with PPG and Libbey Owens-Ford it would be forced to offer a full line of products, something which it was not prepared to do. An element of reciprocity may have been involved also, for PPG licensed Pilkington to produce sheet glass in England in the late 1930's.

Given its large number of subsidiaries in the U.S., Philips is certainly prepared to offer a broad range of products; even within the computer industry, Philips definitely has a broader product line than Nixdorf, now that the P-1000 has been introduced. Yet it has opted for an export strategy, while the closely held Nixdorf has chosen direct investment.

The difference in behavior is likely attributable to the differing maturities of the two industries. Pilkington has been in glass manufacturing for 148 years; technological change in the industry is a discrete process, so that a successful company must concentrate more on marketing than research. In computers, however, technological change is continuous, and for a small company such as Nixdorf, survival means being close to the source of new discoveries. The larger Philips alrea y performs a good deal of R&D in the U.S. market, and communications on technical matters between its U.S. subsidiary and the parent corporation are excellent.

IBM's long domination of the industry has forced other manufacturers to make their equipment compatible with that of IBM. Nixdorf's concept of modularity is a reflection of this consideration, and in a rapidly expanding market enables the firm to achieve a high level of sales and profits without concern for offering a broad product line.

In the highly competitive computer industry, marketing is still quite important. It should be noted that Nixdorf's entry into the U.S. via acquisition provided it with a strong marketing network on its first day of business. Pilkington did not really have the acquisition option, since its competition was much more concentrated in a few producers, none of whom it could afford to take over.

In the rapidly growing small business computer market, most of the new orders came from first-time users, who will not need the larger system of the more established vendors in the foreseeable future; with the exception of Burroughs and NCR, these larger manufacturers do not even have products in the mini line. Hence few orders are likely to be generated by referrals from other ranges of the product line. In the more mature glass industry, the customer base is much more constant and oriented toward replacement and new orders to fill old requirements (e.g. from the automobile and construction industry). Established firms have reputations across product lines, and to generate new orders in one segment of the market a firm may need to establish itself in others.

Summary

If there is any leitmotiv in the two case studies just concluded, it is that relatively small firms are not reticent to invest in the United States, when they have had direct investment experience and when they have some technological advantage to exploit. To some extent, both direct investments made in the two cases were defensive in nature--in Volvo's case to better adapt its product to a market where safety and pollution regulations are proliferating, in Nixdorf's to keep up with the latest technological developments. Cost factors, partly induced by changes in exchange rates, played a minor role in both investment decisions. Lack of diversification of the parent firm across product lines was associated with one investment not made (Volkswagen) and one investment made (Nixdorf's). There is evidence that one investment was not made (by Philips) because other investments had been made earlier. In the newer, more technologically advanced industry, acquisition was the preferred mode of investment, while in the older, more established industry, the investment was made de novo.

Finally, both cases illustrate the industry-specific character of direct investment, and the wide variety of circumstances in which it can occur. In the last part of this thesis, I will attempt to use statistical techniques to identify those traits which are common to direct investments made in the United States, as distinguished from investments made elsewhere. Some of these traits will be those identified in these case studies. First, however, it is appropriate to review contributions to the theory of direct investment and empirical studies of direct investment behavior in the U.S. Then theoretical frameworks will be developed for the empirical analysis to follow.

PART II: THEORETICAL CONSIDERATIONS

Chapter 4

THE THEORY OF DIRECT INVESTMENT AND ITS APPLICATION TO FOREIGN DIRECT INVESTMENT IN THE U.S.

This chapter summarizes for later reference the major strains in the theory of direct investment and discusses the literature on the application of these theories to foreign direct investment in the United States. The various theories are well-known and have been the subject of several recent surveys,[1] so the exposition here will be brief. The analysis of the implications of the foreign direct investment experience in the U.S. for these theories will also be quite short, but for another reason--the literature on the subject is scarce.

The Theory of Direct Investment

Paradoxically, the unifying concept for analysis of direct investment has been the static, profit maximizing, perfectly competitive market model of general equilibrium, with perfect information and no transactions costs. Departures from this model provide rationales for direct investment. As Professor Kindleberger put it, "...in a world of perfect competition for goods and factors, direct investment could not exist."[2] Of course,

---

[1]Not surprisingly, I find the most useful survey to be C.P. Kindleberger, American Business Abroad (New Haven: Yale University Press, 1969). Other surveys include Georgio Ragazzi, "Theories of the Determinants of Direct Foreign Investment," IMF Staff Papers, 20 (July, 1973), 471-498; Gary Hufbauer, "The Multinational Corporation and Direct Investment," paper presented at the Conference on Research in International Trade and Finance at Princeton University, March 30-31, 1973; and Guy Stevens, "The Multinational Firm and the Determinants of Investment," to appear in J.H. Dunning, ed., The Multinational Firm and Economic Analysis (forthcoming).

[2]Op. cit., p. 13.

economists in all disciplines have criticized the Arrow-Debreu framework for its static nature, its assumptions that transactors maximize profits, and its focus on situations of equilibrium, and some explanations of direct investment (e.g. the product cycle, growth of the firm, and disequilibrium theories) have reflected this criticism. However, it is the assumptions of perfect competition and perfect information which are most incongruous in describing direct investment. As originally observed by Stephen Hymer,[3] local firms have much better information about the economic environment in their own country; firms which make direct investments must therefore have a countervailing advantage over the local firms to make such investment viable. Further, the market for the sale of this advantage must be imperfect, for otherwise its possessor would have no incentive to make a direct investment. The magnitude of this advantage must be such that it also dominates the fixed costs of establishing an overseas operation and the possible diseconomies involved in decentralizing production. Hymer also noted that direct investors were rarely atomistic price takers in their own markets; rather, they were often oligopolists. In tandem, Hymer's observations suggested that direct investment was more properly studied in the paradigm of industrial organization, rather than via the theory of capital movements.

Within this framework, one can make a taxonomy of market imperfections that give rise to such countervailing advantages. Professor Kindleberger[4] has proposed a useful categorization--imperfections in

---

[3]Stephen A. Hymer, "The International Operations of National Firms: A Study of Foreign Direct Investment," (Ph.D. thesis, Department of Economics, M.I.T., 1960).

[4]Op. cit., p. 14.

goods markets, in factor markets, scale economies, and government-imposed market disruptions. In the first category, Caves notes that the key element is product differentiation; "...the successful firm producing a differentiated product controls knowledge about serving the market that can be transferred to other national markets for this product at little or no cost."[5] Such firms will likely be large oligopolists, Caves notes, because, "...the theory of the multiplant firm and the likelihood of scale economies in national sales promotion (for differentiated products) suggest that a firm would not invest abroad while profitable opportunities remained for the exploitation of scale economies in production or sales in the home market."[6]

Imperfections in factor markets involve managerial skills, technological advantages, and capital market distortions. Managerial superiority usually requires other advantages to actualize its potential, and its precise character is not easily stated, though Servan-Schreiber[7] would certainly consider it a chief component of The American Challenge. Technological leads often allow product differentiation, and Caves has noted that "the bulk of industrial research expenditure is on new products and product development."[8] Johnson[9] indicates that such managerial

---

[5]Richard Caves, "International Corporations: The Industrial Economics of Foreign Investment," Economica N.S. 38 (February, 1971), 6.

[6]Ibid., 12.

[7]Jean-Jacques Servan-Schreiber, The American Challenge (New York: Atheneum, 1968)

[8]Op. cit., p. 9.

[9]Harry Johnson, "The Efficiency and Wefare Implications of the International Corporation," in C.P. Kindleberger, ed., The International Corporation (Cambridge: M.I.T. Press, 1970), pp. 35-36.

and technological knowledge is the essence of direct investment and at the core of the welfare issues it raises.

Capital market imperfections have had a pervasive role in theories of direct investment. The classical theory stated that direct investment was a capital movement cum control, which movement responded to differences in real rates of return presumably existing because of capital market imperfections or disequilibrium. The observation that capital flowed "uphill" as well as "downhill" caused this approach to fall into disfavor. Yet Hymer recognized[10] that portfolio considerations (where assets had an expected return with some variance around it) could cause capital movements in both directions via differences in risk preference and/or risk evaluation and attempts to diversify.

The gains from diversification across national boundaries have been well documented in the context of international investment in securities by Levy and Sarnat, Lassard, and Solnik.[11] Ragazzi[12] has suggested that the thinness of and relatively poor information in European securities markets has distorted quoted values of European firms and thus has induced American corporations to make direct investments to gain more certain access to the stream of returns these firms represent. Conversely,

---

[10] *Op. cit.*, p. 15.

[11] Haim Levy and Marshall Sarnat, "International Diversification in Investment Portfolios," *American Economic Review*, 60 (September, 1970), 668-75; Donald Lassard, "World, National, and Industry Factors in Equity Returns," paper delivered to the New York meetings of the American Finance Association, December 29, 1973; Bruno Solnik, *European Capital Markets* (Lexington, Mass.: D.C. Heath and Company, 1973).

[12] *Op. cit.*

U.S. securities markets are so efficient that foreigners wishing to diversify have only to purchase U.S. stocks. However, Ragazzi explains the inability of European investors to acquire control over their own firms by the investors' relatively small size, which again returns us to the industrial organization approach.

Differences in tastes and expectations are at the core of another theory related to the capital market, that of Aliber,[13] who argues that risk of exchange-rate change stimulates investment by firms of a strong-currency area in weak-currency areas. As summarized in Ragazzi, his argument is:

> Direct foreign investment reflects the fact that the firm in the source-country capitalizes the same income stream of expected earnings (that of the host-country firm) at a higher rate than does the host-country firm. When a change in the exchange rate is expected, capitalization rates on equities, as well as on debt issues, are lower (that is, interest and profit rates are higher) in the weak currency area. Under perfect market conditions... the exchange risk would offset the lower capitalization rate applied to the income stream of the weak-currency firm. However...the market for equities is biased, in that it does not attach a currency premium to the foreign income of the source-country firm. The latter may thus issue equities in its market (at a higher capitalization rate) and buy the host-country firm, whose income stream is capitalized by the market at a lower rate owing to the exchange risk."[14]

However, as noted by Ragazzi and in an unpublished paper by Mike Aho,[15] firms in weak-country areas would have an <u>advantage</u> investing in strong-

---

[13]Robert Z. Aliber, "A Theory of Direct Foreign Investment," in C.P. Kindleberger, ed., <u>op</u>. <u>cit</u>., pp. 17-34.

[14]Ragazzi, <u>op</u>. <u>cit</u>., p. 492.

[15]C. Michael Aho, "The Effects of Disequilibrium Exchange Rates on Foreign Investment Decisions," paper presented at the International Economic Workshop at M.I.T., March 24, 1974.

currency areas if interest-rate differentials fail to cover the exchange risk and especially if firms from strong-currency areas are restricted in their borrowing in the weak-currency areas, precisely the situation in the 1960's with a weak dollar and strong European currencies.

Exchange-rate levels can also influence foreign investment flows, as noted by Makin[16] and Ragazzi. According to Makin, overvaluation of the source-country's currency "shrinks the size of the domestic and foreign markets available to the firm, resulting in some redundancy of the firm's productive capacity."[17] If this capacity is not easily shifted to the non-traded goods sector, it may be forced abroad to spread the fixed costs inherent in such specialized managerial and technological capital.[18] In concentrating on the situation in the host country, Ragazzi has pointed out that the undervaluation of its currency is similarly an incentive to investment therein. However, since this incentive is the same for both local firms and outsiders, the latter still need a special advantage to induce them to enter. All of the capital-market imperfections can be represented in the firm's user cost of capital (and its variance) which in the absence of taxes is the price of capital goods (adjusted for the exchange rate) times the sum of the firm's discount rate on investment projects, the depreciation

---

[16]John H. Makin, "Capital Flows and Exchange Rate Flexibility in the Post-Bretton Woods Era," Essays in International Finance, #103 (Princeton: Princeton University Press, 1974).

[17]Ibid, p.8.

[18]Bernard M. Wolf has explored this excess capacity motive for U.S. direct investment in "Underutilized Resources, Domestic Industrial Diversification, and Internationalization," a paper presented at the Econometric Society Winter Meetings, New York, December, 1973.

rate on capital assets, minus the expected rate of change of capital goods prices and the expected rate of change of the exchange rate. Because of their size and ability to diversify across a number of risky projects, international firms will have a lower discount rate because they will have a better credit standing in the financial community; again the way leads back to the theory of industrial organization.

Imperfections in labor markets owing to labor immobility are similar to the effects described under exchange-rate levels. Unless offset by changes in the exchange rate, differing unit labor costs can motivate direct investment. If wages are out of line in the source country, they can force firms abroad. Abnormally low wages in the host country accompanied by a special advantage held by a source-country firm provide a basis for direct investment.

Economies of scale, both internal and external, often characterize firms and industries in which direct investment occurs. Scale economies internal to the firm result in horizontal direct investment exactly analogous, as Caves has noted, to the acquisition of multiple plants by a firm operating in an industry with submarkets that are regionally segmented. Economies external to the firm involve vertical integration, allowing the firm, rather than the market, to organize production, for example, to reduce uncertainties as to the source of supply, or to coordinate two technologically linked stages of production. Since raw materials are often located in countries other than the source country, firms make direct investments in the course of integrating "backward."

The validity of this explanation for direct investment in the extractive industries seems unquestionable.

"Forward" integration is a more recent phenomenon in these industries, but again replacing the market is the motive. As noted in Chapter 2, British Petroleum invested in Sinclair and Sohio in the U.S. to obtain a marketing outlet for its Alaskan oil. The National Iranian Oil Company's negotiation with Ashland Oil reflect the same considerations.

Both forms of integration can reflect another motive, however, instead of a desire for efficiency--the desire to increase market share, extract monopoly profits, and erect barriers to entry. Given an oligopolistic structure, direct investment can represent the interdependent optimization strategies of firms, as in Knickerbocker's "follow the leader" characterization of U.S. investment in Europe[19] and Graham's "exchange of hostage" description of some cross-investments in individual industries.[20] Of course, the ability to invest and accomplish such goals must rest on some market imperfection which gave the oligopolists their position in the industry in the first place. Again, high cost research and development expenditures leading to specialized knowledge are often the key.

Government-related imperfections can involve price regulation, output restrictions, and more broadly, limitations on the institutional

---

[19] F.T. Knickerbocker, Oligopolistic Reaction and Multinational Enterprise (Boston: Graduate School of Business Administration, Harvard University, 1973).

[20] Monty Graham, doctoral dissertation in progress, Graduate School of Business Administration, Harvard University.

environment in which economic activity takes place. Tariffs and quotas often make the export-direct investment choice for a firm which has a special advantage that allows it to produce a product more efficiently than local forms. Caves[21] has pointed out that a tariff in a competitive industry would not lead to direct investment in the absence of some countervailing advantage; with unlimited entry of domestic capital, a foreign firm would earn only windfall profits before coming up against the fundamental cost disadvantages of doing business at a distance. Ragazzi[22] has emphasized also that tariffs alone are only complements to direct-investment theories, in that the size of market they protect and the diseconomies of decentralizing production will still remain controlling factors.

Government attempts to fix exchange rates at other than equilibrium levels will also give rise to direct-investment flows, as discussed above. Finally, government actions such as abrupt tariff removals or exchange rate changes can have horizon-shifting effects, drawing more investors who possess specialized knowledge into considering its exploitation abroad.

All of the imperfections described may motivate direct investments which are not profitable in and of themselves, but which contribute in a synergistic way to the firm's stream of returns abroad <u>and</u> at home and thus are undertaken. Such investments are said to be defensive if they are undertaken to prevent losses on fixed investment which would

---

[21] *Op. cit.*, p. 8.

[22] *Op. cit.*, pp. 490-491.

otherwise occur; an example is Makin's firm forced abroad by an overvalued exchange rate. A positive motive for this form of investment is for purposes of learning about new techniques, as in Olivetti's entry into the U.S. typewriter market in 1959.

A persuasive synthesis of many elements of the industrial-organization approach, as well as of several contributions to international-trade theory, is Raymond Vernon's product-cycle model of U.S. direct investment abroad in the postwar era.[23] According to Vernon, the abundance of capital in the U.S. and the country's high income lead U.S. entrepreneurs to devel p capital-saving products, or those which satisfy high-income tastes. Uncertainties in product development and marketing force initial production also to be in the U.S. Over time, as the product is generally standardized (though it may be increasingly differentiated to maintain monopoly rents), and if it has a high income elasticity of demand or substitutes well for costly labor, it will be exported to other countries with rising incomes and scarce labor.

As the export market expands, the U.S. firm <u>may</u> consider the viability of setting up a production facility abroad. If it examines the opportunity, the scale of production achievable abroad and the associated labor costs are likely to be crucial factors. When the average cost of producing abroad falls below the marginal cost of home production plus transport costs, the direct investment will be undertaken. Or rather than take the initiative, the U.S. firm may response to a threat to the status

---

[23]Raymond Vernon, "International Investment and International Trade in the Product Cycle, <u>Quarterly Journal of Economics</u>, 80 (May, 1966), 190-207.

quo posed by a foreign producer of its now standardized and easily imitated product by making a direct investment in the foreign market.

Vernon's dynamic theory is based on a factor-market imperfection (which may give rise to a goods-market imperfection) and incorporates elements of oligopolistic reaction. But it also focuses to an extent on the existence of markets abroad, and thus bears some relation to alternative theories of direct investment which concentrate less on market imperfections and more on the motives of the transactors who make the direct investments. Specifically, these alternative theories can be considered under the general rubic of non-profit maximization rationales for direct investment, though it is not suggested that this classification is mutually exclusive with the market-imperfections approach.

The tendency of business to go anywhere there is a market is one strand of the growth maximization (also the sales maximization) approach to direct investment. Ownership and control of the firm are separate, and size or growth is to be accomplished subject to some minimum profit constraint.[24] The need for growth in Ms. Penrose's view[25] is found in the managers of the firm, who inexorably need new horizons to utilize their talents and justify their existence. Subsidiaries, when established, tend to take on a life of their own, as their managers seek to maximize their authority. This somewhat bureaucratic aspect also implies that

---

[24]Perhaps the clearest exposition of the issues in growth and size maximization is J.H. Williamson, "Growth, Sales, and Profit Maximization," Economica N.S. 33 (February, 1966), 1-16.

[25]Edith Penrose, "Foreign Investment and the Growth of the Firm," Economic Journal, 66 (June, 1956), 220-235.

subsidiary expansion will be via retained earnings as much as possible. Such a mode of expansion also meshes nicely with the other strand of the growth-of-the-firm theory, that which focuses on the cost of capital. In this version, earnings are the cheapest source of capital to the firm, and subject to some minimum dividend constraint, should be retained and reinvested at home and abroad in order to grow.

Growth of the firm explanations have a somewhat biologic, organic nature. Behavioral approaches are of much the same character.[26] Barlow and Wender[27] have suggested a "gambler's hypothesis" of foreign investment, in which the subsidiary is considered as a lottery, independent of the parent, and its retained earnings are reinvested according to some rule of thumb.

Similar "satisficing" behavior is suggested by Aharoni,[28] who characterizes the decision to invest as a horizon-lifting look abroad (forced by some exogenous event), followed by a sequential examination of the possibilities and concluding in the investment. In his inverview study, Aharoni's investors found that once they scanned foreign horizons, the investment projects available were less risky than they thought; hence, they had been satisficing.

These behavioral and biological approaches blend nicely with the imitative and interdependent oligopolistic behavior which can lead to

---

[26]As is evident in Sidney Winter, "Satisficing, Selection, and the Innovating Remnant," <u>Quarterly Journal of Economics</u>, 85 (May, 1971), 237-261.

[27]E.R. Barlow and J.T. Wender, <u>Foreign Investment and Taxation</u> (Englewood Cliffs, N.J.: Prentice-Hall, 1955).

[28]Yair Aharoni, <u>The Foreign Investment Decision Process</u> (Boston: Graduate School of Business Administration, Harvard University, 1966).

direct investment, described earlier.[29] The oligopolistic conditions which prevail can be traced to market imperfections. And since satisficing is optimizing when decisions are made in a sequential fashion,[30] there is a unified framework for the discussion of theories of direct investment--but more on this in the following chapter.

The theories described above share, in general, two failings. First, it is not always clear which direct-investment decision of the firm they are meant to describe--the first one outside the home country, the first one in a particular host country, or subsequent investments. As Ms. Penrose,[31] Stevens,[32] and Richardson[33, 34] have emphasized, the initial investment decision is qualitatively different from later efforts to expand--it involves issues of strategy and timing and search costs not found in subsequent investment decisions. Of the theories reviewed here it may fairly be said that the approach of Aharoni and the market imperfections viewpoint which concentrates on discrete, government-caused

---

[29] Such a synthesis is evident in Lawrence G. Franko's "The Growth, Organizational Structure and Allocative Efficiency of European Multinational Firms: Some Emerging Hypotheses," paper prepared at the Centre d'Etudes Industrielles, Geneva, November, 1972.

[30] As shown by Meir G. Kohn, "Sequential Decisionmaking and the Theory of the Firm," (Ph.D. thesis, Department of Economics, M.I.T., 1973) and Steven M. Shavell, "Essays in Economic Theory," (Ph.D. thesis, Department of Economics, M.I.T., 1973) in the jointly written first chapters of their dissertations.

[31] _Op. cit._, p. 224.

[32] Guy Stevens, "Fixed Investment Expenditures of Foreign Manufacturing Affiliates of United States Firms: Theoretical Models and Empirical Evidence," _Yale Economic Essays_, 9 (Spring, 1969), 137-200.

[33] J. David Richardson, "Theoretical Considerations in the Analysis of Foreign Direct Investment," _Western Economic Journal_, 9 (March, 1971), 87-89.

[34] J. David Richardson, "On 'Going Abroad': The Firm's Initial Foreign Investment Decision," _Quarterly Review of Economics and Business_, 11 (Winter, 1971), 7-22.

changes in the environment of economic activity (e.g. tariff reductions, exchange-rate changes, customs and/or currency union formation) are the rationales which most relate to the initial investment decision. Conversely, Barlow and Wender's gambler's hypothesis and Ms. Penrose's focus on the growth of the firm seem particularly directed at expansion investment. Intermediating these emphases is Horst's[35] empirical finding that investment in Canada provided a "stepping stone" for investment elsewhere in the world for U.S. multinationals.

Second, the form the direct investment takes is rarely discussed; that is, is it _de novo_ or acquisition. The market-imperfection approach gives a strong rationale for either _de novo_ or a 100% acquisition--the foreign investor has an advantage, so why share it? Further, disagreements about the value of the advantage and about future policies of the subsidiary are likely. One motive for sharing, however, is reduction of risk and set-up costs. Of the other theories, only the portfolio-diversification motive seems attuned to acquisitions, since it intrinsically involves the purchase of existing securities.

Hypotheses Concerning Foreign Direct Investment in the U.S.

Let us first, as promised, discuss the motivations for foreign direct investment in the U.S. before the first world war. Investments in land, cattle, mining and finance occurred principally because these ventures offered a higher rate of return than that available at home.

---

[35]Thomas Horst, "Firm and Industry Determinants of the Decision to Invest Abroad: An Empirical Study," _Review of Economics and Statistics_, 54 (August, 1972), 258-266.

This validation of the classical theory of direct investment simply results from the fact that the 19th century economy was a classical economy, in the sense that price signals were received and heeded.[36] To be sure, vertical integration played some role, as British textile manufacturers sought to secure cotton supplies for their factories, but in the main the rate of return called the tune.

Direct investments in manufacturing are subject to a variety of explanations, however, just as today. Saving transport costs and serving the market were undoubtedly important to foreign owners of iron and steel mills in the U.S. Oligopolistic behavior influenced many investments made near the turn of the century, as discussed in Chapter 1; successful cartels obviated the need for direct investment, while those that failed often resulted in its occurrence, as in the case of the first transnational company, Royal Dutch-Shell. Such "exchange of hostage" behavior was also important in the case of Lever Bros.,[37] though there are also the words of Lord Leverhulme, founder of Lever Bros., written in 1902: "The question of erecting works in another country is dependent upon the tariff or duty."[38] Tariffs were clearly responsible for initial investments in the chemical industry, as discussed earlier. Some investments came to escape war (Hoffman-LaRoche) while others were liquidated because of it.

---

[36]Though, it must be said, not always in a predictable fashion. See C.P. Kindleberger, "Foreign Trade and Economic Growth: Lessons from Britain and France, 1850-1913," Economic History Review, 14 (December, 1961), 289-305.

[37]Monty Graham, op. cit.

[38]Christopher Tugendhat, The Multinationals (New York: Random House, 1972), p. 14.

Explanations of the flow of manufacturing investments into the United States in the postwar period are also varied, though there has been little empirical analysis of the various motivations suggested.

Nicholas Faith[39] has discussed the characteristics of European investments in the U.S. in a descriptive fashion. In Faith's view, European investors in the U.S. are "explorers with a visible respect for what goes on about them."[40] They are here to learn, and rely on a specific, specialized product advantage rather than their size to launch them in the U.S. market. Their entry into the U.S. has been on a wider industrial front, with none of the imitative rush that characterized U.S. investments abroad. Because they have less of the standard advantages of size, technological sophistication, managerial expertise and financial depth, and because they are entering a large and very competitive market, they often take a local partner.

Faith discerns two strands in the European invasion of the U.S. First, European multinationals, buoyed by the recent boom in mergers and managerial training, are completing their world wide coverage. Smaller companies, with some specialized technological expertise, are investing to exploit that expertise and to learn how to update it. Both groups, in Faith's view, are responding to the positive motivation of serving the market, rather than defensive considerations. Rainer Hellman[41] also believes that successful European firms with special know-how have "penetrated" market openings in the U.S., and emphasizes raw

---

[39]Nicholas Faith, The Infiltrators (London: Hamish Hamilton, 1971).

[40]Ibid., p. 2.

[41]Rainer Hellman, The Challenge to U.S. Domination of the International Corporation, translated by Peter Ruof (New York: Dunellen, 1970).

material sourcing and learning motivations.

Christopher Tugendhat[42] sees the renewed availability of financing as the key, attained via the dismantling of exchange controls, the growth of European companies' earnings and the development of the Eurodollar market. He also mentions the attraction of the size of the American market, the need to produce locally to serve it and adapt to it, and the learning benefits generated from operating in the most sophisticated market in the world. Tugendhat is also quick to point out that the size and sophistication of the U.S. market increase the risk of investment and the resources needed. He cites the European merger boom of the late 1960's as a facilitating vehicle for raising the necessary capital, but cautions that such a movement toward size must be accompanied by improvement in management techniques.

Arnold Sametz[43] considers the essence of European investment in the U.S., especially since 1965 to be found in the development of companies of sufficient size which then invest in the U.S. in order to be able to compete with U.S. companies in the world and European markets. The Common Market's formation permitted this increase in size, in his view, by providing a framework within which intra- and inter-country mergers could take place.[44] Sametz sees the very recent undervaluation of the dollar and basically positive governmental attitudes on both sides of the Atlantic as supporting this phenomenon.

---

[42] _Op. cit._

[43] Arnold W. Sametz, "The Foreign Multinational Company in the U.S.," Working Paper #9, Salomon Brothers Center for the Study of Financial Institutions, New York University, October, 1973.

[44] Sametz contrasts this development with the U.S. experience in Europe. It, too, waited on the development of the Common Market, but for a different reason--to have a market of sufficient size to justify the establishment of production facilities.

European companies need to invest in the U.S. more as a substitute for factor importing than for commodity exporting. Though their technology has traditionally specialized in material- and land-saving innovations, the widening of European markets and the development of labor shortages have increased the need for labor-saving technology of the U.S. variety if they are to compete with U.S. firms. European subsidiaries in the U.S., established to learn, should be in high technology industries and should be characterized by substantial independence from the parent company, a high rate of reinvestment of retained earnings, and a dependence on acquisition or take-over techniques.

Sametz qualifies his analysis for the established European corporations, who respond to interdependent oligopolistic strategic motives and reside in industries characterized by product differentiation. But even with this qualification, his approach is squarely in the profit-maximizing industrial organization camp.

Raymond Vernon[45] has suggested that product-cycle considerations will have only qualified explanatory ability for the investment decisions of European and Japanese companies in the U.S. manufacturing sector. In particular, he expects such investments to be based on material-saving or capital-saving innovations in which these areas of the world have traditionally specialized; stimulated by the need to service the market, to jump a tariff or non-tariff barrier, or to offset transport costs; or undertaken to learn.

---

[45]Raymond Vernon, "Some Tentative Hypotheses on the Behavior of European-Based and Japanese-Based Multinational Enterprises," Harvard University Graduate School of Business Administration, mimeo, October 15, 1971.

Lawrence Franko[46,47] suggests that the size of the American market and the desire to be closer to the "innovative stimuli" of the U.S. market are the major attractions in drawing European investors to the U.S. The "negotiated environment" of international business in Europe in much of the 20th century inhibited European companies' ability to organize for operations at a distance; most of those that came into the U.S. during that time were responding to tariff and non-tariff barriers to trade. In Franko's opinion, recent (post 1968) investments by Europe's largest companies have been facilitated by the streamlining of European management operations into multi-divisional structures and the concomitant abandonment of "mother-daughter" parent-subsidiary relationships which were characterized by autonomous subsidiaries.

Vernon has argued that national origins should influence multinational behavior; however, Franko's comments are restricted to firms of continental Europe. The United Kingdom, Japan and Canada are or will be important investors in the U.S.--what of specific hypotheses concerning them? Some authors consider Canadian investments in the U.S. to be quite similar to U.S. investments in the other direction--they are "stepping stone" investments putting one toe in the water, and as such have motivations really quite close to those of domestic investment. However, some Canadian investments relate to special circumstances, such as the advantages gained by Canadian liquor companies during prohibition; others, such as Massey-Ferguson, reflect motivations to serve markets in countries where the per-capita income level is the same as in the home country.

---

[46]Franko. op. cit.

[47]Lawrence G. Franko, European Business Strategies in the United States (Geneva: Business International S.A., 1971).

As for the British, John Stopford[49] cites mergers as a strong force throughout the 20th century, with cartels and a protected home market limiting expansion, except in the Commonwealth, before 1945. After the war, Stopford believes that changes in organizational structure also were key, though he doubts that any one theory of direct investment has primacy for this period.

Japanese motives were discussed partially in Chapter 2, where it was indicated that manufacturing investment in the U.S. was likely to involve elements of tariff jumping, input sourcing, and serving the market. Yoshi Tsurumi[50] has applied an interesting variant of the product cycle analysis to some Japanese exports to the U.S. which, when logically concluded, provides a rationale for some Japanese direct investment here. Tsurumi observes that Japanese technology is occasionally sufficiently sophisticated to produce products for the U.S. market which are not yet demanded by the lower-income Japanese consumer--such as color television. Such products can be exploited over time along an international product cycle as other nations' incomes rise. Just as U.S. firms felt the need to go abroad to protect their market shares, so may Japanese firms be forced to invest in the U.S. And just as product-cycle logic dictates the need to continue innovating to maintain markets, so Japanese firms may invest in the U.S. to be abreast

---

[49] John Stopford, "The Evolution of U.K.-Based Multinational Enterprises," paper presented at the Graduate School of Business Administration, Harvard University, December, 1972.

[50] Yoshi Tsurumi, "Japanese Multinational Firms," Journal of World Trade Law (January-February, 1973), 74-90

of the latest technology. The recent investment by Sony in Southern California seems to fit both of these situations.

Finally, the popular press has been fond of citing the currency realignments of 1971-73, the depressed stock market, foreign fear of increased protectionism, and rising wages abroad as motives for what can only be described as the wave of direct investments that have been made in the U.S. in the past year.[51] Such investments will be in neither the macro or micro data to be analyzed, but the forces cited may be important for earlier times.

In summary, one may distinguish several themes in the descriptive literature. First, motives for direct investments undertaken before the second world war differ from motives for investments since that time, in that in the former period the population of potential international firms was much smaller, the technological facilities for communication and control much less developed, and institutional arrangements among firms via cartels and among governments via tariffs were more important than market considerations. A corollary distinction is suggested between investments of firms established before the war and those founded after it.

Second, even within the postwar period some qualitative change occurred in the latter half of the 1960's. The nature of this change is disputed--the development of firms of sufficient size,

---

[51]See, e.g., Frank V. Fowlkes, "Direct Foreign Investments Increase/ Administration and Industry Endorse Trend," National Journal Reports (November 24, 1973), 1756.

the increased availability of needed financial resources, and the streamlining of management procedures are all candidates.

Third, the size and sophistication of the U.S. market were of critical importance. The former involves promise of return but implies substantial risk which often must be offset with some narrow specialized advantage. The latter also contributes to the risk of investment, but provides rewards in the sense of observing tomorrow in one's own country today in the U.S.

Fourth, government-related activity--in forming customs unions, erecting trade barriers, making decisions about exchange rates--was of continued significance.

These themes and their variations encompass the spectrum of theories of direct investment and will be examined further in the empirical part of this thesis. Now let us review the efforts that have already been made in the literature to analyze these motives for direct investment in the U.S.[52]

Empirical Analyses of Foreign Direct Investment in the U.S.

Only six completed *empirical* studies exist that focus specifically

[52]An excellent descriptive review of the economic motivations and issues involved in foreign direct investment in the U.S. is C. Michael Aho, "Economic Analysis of Foreign Investment in the United States," in U.S. House of Representatives, Committee on Foreign Affairs, Subcommittee on Foreign Economic Policy, 93rd Congress, 2nd session, *Foreign Investment in the United States* (Washington: U.S. Government Printing Office, 1974), 299-368.

on foreign direct investment in the United States.[53] These include three fairly large-scale interview studies, and three econometric analysis of the Department of Commerce data, one of which is an unpublished paper which I have revised for inclusion in this thesis.[54] Three studies of an empirical nature relating to this topic are in progress, and in what

---

[53]I use the word empirical to mean studies which either used statistical techniques to analyze Department of Commerce data, or made the effort to secure a separate data sample of reasonable size. There do exist several descriptive theses on the subject, all of which are principally concerned with the historical and institutional issues discussed in Chapters 1 and 2 of this thesis. See Milton D. Stewart, "Foreign Direct Investments in the United States," (Ph.D. thesis, University of Texas, 1972); Masataka Tamura, "Japanese Direct Investment in the United States: Opportunities for Future Growth," (Master's thesis, Alfred P. Sloan School of Management, M.I.T., 1973); Jacques Bojin, "French Investments in the United States," (Master's thesis, Alfred P. Sloan School of Management, M.I.T., 1964); Takeshi Yano and Dominique Hardy, "The Acquisition as a Form of Foreign Direct Investment in the USA," (Master's thesis, Alfred P. Sloan School of Management, M.I.T., 1974); Piero Telesio di Toritto, "The Experience of European Direct Investment in the United States," (Master's thesis, Alfred P. Sloan School of Management, M.I.T., 1970).

[54]The interview studies are Lawrence G. Franko, European Business Strategies in the United States (Geneva: Business International S.A., 1971); John D. Daniels, Recent Foreign Direct Manufacturing Investment in the United States: An Interview Study of the Decision Process (New York: Praeger, 1971); and Jeffrey Arpan and David Ricks, "Foreign Direct Investments in the United States in Manufacturing, Mining and Petroleum," paper read at the New York meetings of the Academy of International Business, December 28, 1973. The econometric studies are M.F.J. Prachowny, "Direct Investment and the Balance of Payments of the United States: A Portfolio Approach," in F. Machlup et al., eds., International Mobility and Movement of Capital (New York: National Bureau of Economic Research and Columbia University Press, 1972), pp. 443-464; Robert B. Leftwich, "Foreign Direct Investments in the United States, 1962-71," Survey of Current Business, 53 (February, 1973), 29-40; and by the author, "A Neoclassical, General Disequilibrium Model of Foreign Direct Investment in the United States," unpublished paper, January, 1974.

follows I shall discuss the preliminary results of one of them.[55] Finally, I want to mention here one other available study, a recently published statistical compendium by James Vaupel and Joan Curhan based on one of the data sources I use in this study, the Harvard Multinational Enterprise Project Data Bank.[56]

Under the supervision of Lawrence Franko, in mid-1970 Business International interviewed 49 European companies of Fortune--200 size that had equity interests of more than 25% in U.S. operations to ascertain the strategic and administrative alternatives for the management of European companies' manufacturing operations in the U.S. The proportion and nature of responses to each question asked were not always tabulated for presentation, and little statistical analysis of the data was performed. Accordingly, I shall only list the report's major findings:

> - European companies invest in the U.S. because of the size of the market and the opportunity to learn new technology. Antitrust laws are not viewed as significant barriers to survival; rather it is the extremely large and competitive market they foster, as well as innovative American management practices, that cause Europeans difficulty. These laws are viewed as significant barriers to entry.

---

[55] In particular, these are the continuing work of Arpan and Ricks; research being conducted at N.Y.U by Arnold Sametz; and the thesis under preparation by Monty Graham. Mention should also be made of two other related studies. An older study of management techniques of 59 European subsidiaries in the U.S. is Jean-Luc Rocour, "Management of European Subsidiaries in the United States," Management International 6 (February, 1966), 13-27. Rocour concludes that U.S. subsidiaries tend to be quite independent of their parents, owing principally to their large size or U.S. legal considerations. Jeffrey S. Arpan has analyzed the transfer pricing decisions of 60 non-U.S. firms with subsidiaries in the U.S. in his International Intracorporate Pricing: Non-American Systems and Views (New York: Praeger, 1972).

[56] James W. Vaupel and Joan P. Curhan, The World's Multinational Enterprises (Boston: Graduate School of Business Administration, Harvard University, 1973).

- However, the proximate cause, or "trigger" for investments in the U.S. was most often tariff or non-tariff barriers. "Historical accident" was given as the other leading direct stimulant.

- To compete successfully, European firms must possess and maintain a successful technological or marketing competence. Product lines must be continually adapted, which often necessitates the performance of R&D in the U.S. Parent R&D and subsidiary sales and profit growth were highly correlated.

- 16 of 40 responding companies had "mother-daughter" (president-to-president) lines of reporting and control; 11 had product divisions. 5 had international divisions, and 8 had a headquarters executive with full-time responsibility for the subsidiary. U.S. subsidiaries enjoy a good deal of independence, though company headquarters are getting more involved, especially in low-technology industries. Reasons for this independence include antitrust and tax considerations, as well as differing economic environments.

- 29 out of 49 companies had only wholly owned subsidiaries. Half of the remainder were involved in joint ventures (80% of these were in high technology areas) while the other half had minority or majority participation via shares quoted on the U.S. stock exchange. The paucity of joint ventures reflects fear of antitrust and difficulty in integrating subsidiary operations with those of the parent company. Despite antitrust concerns, acquistion is the preferred route to entry or expansion in the U.S. market, principally because it allows quick access to technology and marketing skills, which can then be passed on to the parent.

In 1970, John Daniels conducted interviews with 40 firms making initial direct manufacturing investments in the U.S. during the period 1954 to 1967, in order to ascertain the nature of their foreign investment decision process. Sixteen of the firms were Canadian, nine were British, six were French, six were German, and three were Dutch. The firms were concentrated in the pulp and paper, raw materials processing, and aerospace industries. Five of the firms had consolidated sales in excess of $500 million, ten were in the $100-$500 million range, six were in the $50-$100 million category, ten were between $10-$50 million, six had sales under $10 million, and sales were not available for three firms. Only frequencies of response were reported; no statistical analysis was conducted.

Daniels found the overwhelming number of firms produced first for their home country market, then for export, and finally engaged in overseas production. The major impetus initially to consider selling abroad was about equally divided between passive stimuli, of which a response to a proposal made outside the company was the principal type, and active stimuli, of which the requirements to lower unit costs and to alleviate excess capacity were equally important.

Despite this familiar cycle in firm behavior, 22 of the 40 investors had never exported to the U.S. or exported negligibly before setting up a subsidiary here. However, 24 of the 40 had established foreign investments elsewhere before locating in the U.S. and of the 16 whose direct investment in the U.S. was their first anywhere, 14 were Canadian. Among the 24 whose first direct investment was outside the U.S. half said they were forced to do so by government pressures to produce locally, seven cited cost and marketing reasons, while five indicated a desire to diversify their operations outside their home country to avoid a slowdown in their home economy's growth.

Concerning the proximate cause for their investment in the U.S., 24 of the 40 firms cited government restrictions prohibiting importation; half of these related to Buy American provisions, nine related to tariffs and quotas, and three to government safety regulation. Of the remaining 16 firms, eight cited cost advantages of U.S. production, four consumer pressures to manufacture in the U.S., and four the need to produce a different product for the U.S. market.

Finally, 21 of the firms expressed a strong preference for 100% ownership of the subsidiary, nine indicated a definite preference for less than 100% ownership, and ten were flexible. In fact, 27 of the 40 had 100% ownership of their initial subsidiary, 13 in the first group and seven in each of the other two. Twenty-five of these firms started operations by acquisition and 15 via de novo.

It is difficult to believe that any general principles can be drawn from such a study. Besides the absence of statistical tests, the sample is heavily biased toward a few industries and one country, Canada. The Canadian presence explains why over 50% of the sample had never exported to the U.S. in any substantial amount before setting up a subsidiary here, and why 40% of the sample invested in the U.S. before anywhere else. Similarly, the striking incidence of Buy American provisions is explained by the defense-related character of aerospace work.

The work of Jeffrey Arpan and David Ricks represents an attempt to overcome the data limitations that plagued the previous two studies. They describe their purpose as "conducting the first comprehensive survey of foreign investors in the United States."[57] By scanning various private directories and Department of Commerce, state agency, and consultate lists, they produced a mailing list of nearly 2000 foreign-controlled firms reputed to be located in the U.S. In mid-1973 they sent each firm a questionnaire concerning location decisions,

---

[57] Op. cit., p. 2.

number of employees, product types, etc. Over 1600 did not reply, and they received 100 responses from foreign-owned manufacturing firms. Since some of these 1600 undoubtedly do not exist or are sales companies, they estimate the total population of firms at 100-1100, which is roughly in agreement with Commerce Department estimates that there were approximately 900 U.S. manufacturing subsidiaries of foreign firms in mid-1973. On the basis of (unreported) classifications by country, by size and by industry, they conclude that their sample is representative.

Based on this sample of 100, they report the following results:

- Commerce Department estimates of the book value of foreign investment in the U.S. appear to be too low.
- The labor force of these firms is almost wholly composed of U.S. citizens, and their projections of its size to the population of foreign firms in the U.S. has these firms accounting for more than 1% of the labor force.
- The overwhelming majority of subsidiaries were 100% owned by their parents.
- The overwhelming majority financed their entry from parent funds.
- The majority of subsidiary presidents are U.S. citizens and the nationalities of their boards of directors are equally divided between U.S. and non-U.S. citizens.
- 90% of the firms in the sample were created <u>de novo</u>.

Again, other than the reporting of frequencies, no statistical analysis has been performed with this data at this time. The Arpan-Ricks study is continuing with the mailing of a second questionnaire containing questions of a more confidential nature. It is unlikely the response rate will improve.

If there are any unifying themes in these interview-survey studies, one is the agreement on government-caused market imperfections as forces which trigger much of direct investment into the U.S. Another is the consensus on the tendency of foreign firms in the U.S. to be 100% owned by their parents. A major point of difference is the conflicting evidence on whether acquisition or *de novo* is the preferred entry technique.

The data in these studies are meager, yet more statistical analysis could have been done. However, all the works cited suffer from one major defect--the only subsidiaries in the sample are those who *did* invest in the U.S. To get an accurate barometer of what characteristics distinguish foreign subsidiaries *in the U.S.* one needs data concerning subsidiaries which are not in the U.S. As described in Chapter 6, such data are now available.

All the econometric studies have analyzed foreign direct investment in the U.S. from a macroeconomic point of view. Robert Leftwich has hypothesized that three variables should be positively related to the flow of foreign direct investment into the United States (F): the size of the U.S. market (S), represented by U.S. GNP; the market's rate of growth (G); and the level of tariffs in the U.S. (T), as represented by the ratio of total tariff proceeds to the total value of dutiable imports. For the period 1952-71, he obtained the following results using ordinary least squares (values in parentheses are ratios of coefficients to their standard errors):

$$F = \underset{(1.26)}{1456.16} + \underset{(3.13)}{1.04S} - \underset{(1.11)}{21.75G} - \underset{(1.36)}{121.63T}$$

$$R^2 = .72 \qquad DW = 1.60$$

Only the size of the U.S. market has a significant coefficient.

Such studies must be inconclusive by their very nature (as the storm of controversy over similar efforts to estimate the determinants of U.S. direct investment in the EEC shows[58]), since the model specifications are not derived from any existing corpus of macroeconomic theory. Some writers despair of ever formulating such specifications, preferring instead to rely on "persistently observed relationships."[59] While I have some sympathy for the search for basic "constants" in economic behavior, it seems to me that models inscribed in a well-known theoretical construct facilitate discussion of the subject at hand, and are valuable in that they provide a check on the applicability of received theory.

Certainly portfolio theory is a well-entrenched paradigm. M.F.J. Prachowny has applied it to both U.S. investment abroad and to foreign direct investment in the U.S. (though not simultaneously). He estimates the ratio of foreign direct investment in the U.S. to the total value of corporate stock in Canada and the United Kingdom (the principal investors in the U.S.) as a linear function of relative expected rates of return, relative varainces in the expected rates, the lagged value of the U.S. balance of payments (which he interprets as a proxy for external risk) and a dummy variable representing Europe's return to convertibility of

---

[58]See A.E. Scaperlanda and L.T. Mauer, "The Determinants of the United States Direct Investments in the E.E.C.," American Economic Review, 59 (September, 1969), 558-568; M. A. Goldberg, "Comment (on Scaperlanda and Mauer)" American Economic Review, 62 (September, 1972), 692-699; Scaperlanda and Mauer, "Reply (to Goldberg)," same issue, 700-705.

[59]R. Herring and T.D. Willett, "The Relationship Between United States Direct Investment at Home and Abroad," Rivista Internazionale di Scienze Economische e Commerciali, 20 (1973), 73-82.

currencies in late 1958. For the period 1953-64, he concludes that only relative expected rates of return are important determinants of direct investment inflows into the United States.

It is well known that characterization of assets in a portfolio in terms of means and variances of returns requires either that individuals' utility functions be quadratic (implying increasing absolute risk aversion as wealth increases, an undesirable result), or that the distribution of returns is normal. More importantly, as Leamer and Stern[60] have noted, one weakness of this approach is that net worth is taken as given, to be allocated among stocks of competing assets. With direct investment, it is much more likely that the resultant capital flows are owing to decisions involving the accumulation of net worth, rather than its allocation. In terms of aggregating the behavior of economic transactors, there are good reasons to reject the portfolio approach when discussing the behavior of non-financial corporations, as noted by Leamer and Stern:

> Given the complexity of the firm's decisions and the fact that there will surely be important constraints on firm behavior in the short run, it is difficult to see how the attainment of long-run portfolio balance can be anything but a rather distant objective.[61]

In justifying his approach, Prachowny claims that "it would be difficult to conceive of a theory that denies categorically the assumptions made here."[62] While it is true that the portfolio approach highlights rather well one theory of direct investment (that of diversification),

---

[60]E.E. Leamer and R.M. Stern, "Problems in the Theory and Empirical Estimation of International Capital Movements," in F. Machlup, et al., op. cit., pp. 171-206.

[61]Ibid., p. 177

[62]M.F.J. Prachowny, op. cit., p. 445.

I believe it to be ill-suited to characterize the behavior of transactors for whom investing in the U.S. is, as Nicholas Faith put it, the biggest adventure of their lives. Finally, portfolio theory has the defect of focusing on asset demands, ignoring any constraints imposed by the supply of funds on acquiring these assets.

Finally, mention may be made of one piece of research in progress, from which some preliminary results are available. In a doctoral thesis at the Harvard Business School, Monty Graham is investigating whether the "exchange-of-hostage" oligopolistic behavior which characterized several direct investments before World War II is found in any significant degree in different industries in the postwar period, when the cartel arrangements that obviated the need for direct investments are no longer operative.

He hypothesizes that, in any industrial classification i, the number of European firms which invest in the U.S. at time t (E_t^i) will be a function of the number of U.S. firms which invested in that industry in Europe k periods ago (U_{t-k}^i). The obvious extension to a distributed lag relationship is being analyzed by Graham, but his preliminary results indicate that the lag relationship does differ among industries, though such differences are not related to industry concentration ratios.

Summary

It is evident that all of the usual theories of direct investment have been suggested as explanations for the flow of such investment into the U.S. Very little analysis, however, has been done. No statistical techniques have been used on any of the available cross-sections,[63] none of which have data on subsidiaries which were not established in the U.S. Analysis of macro data has proceeded in piecemeal fashion, in econometric frameworks which do not accommodate a wide range of theories of direct investment.

Of course, such accommodation depends in part on the existence of sufficiently large samples, as well as on specification of a general framework for analysis. The perfect sample for analyzing direct investment decisions does not exist, though the next chapter will provide some indication of what it should look like. It will also derive two theoretical specifications for analyzing direct investment at the micro and macro levels. Chapters 6 and 7 will use a large sample of Harvard Multinational Enterprise Project micro data and the Department of Commerce macro data, which complement each other nicely in terms of the theories they can test, to analyze in an econometric fashion the various hypothesized motives for investing in the U.S.

---

[63]Excepting Graham's research-in-progress.

Chapter 5

MICROECONOMETRIC AND MACROECONOMETRIC SPECIFICATIONS OF DIRECT INVESTMENT BEHAVIOR

This chapter presents two mathematical formulations of direct investment behavior which lead, respectively,to the econometric specifications to be estimated in the empirical analyses of foreign direct investment in United States manufacturing industries in Chapters 6 and 7. The specification used in analyzing the aggregate data is a variant of the neoclassical theory of optimal capital accumulation. This treatment is closely related to the approach used in the microeconomic situation, which describes the firm's direct investment decision as a Markov decision process (MDP). Viewing the decision to establish a subsidiary abroad as a MDP leads to a specific econometric approach at the micro-level, and suggests what manner of data must be collected if direct investment behavior is to be properly understood.

Direct Investment and Markov Decision Processes

The essence of the direct investment theories enumerated in the previous chapter is that they all characterize decision-makers (the managers or owners of the parent firm) making choices about whether to invest and, if so, how much, and in what form. These choices have typically been preceded by others, such as the decision to produce at all and the decision about what production techniques to use,[1] and are

[1] See Richard Nelson and Sidney Winter, "Toward an Evolutionary Theory of Economic Capabilities," American Economic Review, 63 (May, 1973), 440-449, for an exposition of a situation in which firms search probabilistically for techniques of production. Nelson and Winter's exploration of a probabilistic, evolutionary alternative to the neoclassical theory of the firm has provided some of the stimulus for the theoretical approach to follow.

usually made simultaneously with the decision to export to a market or to license another firm to produce in that market. By studying the realizations of these decisions, it is hoped that something can be inferred concerning the motivations for the choices made.

In formally characterizing this behavior, it is necessary to make the fundamental assumption that the managers/owners of a firm are maximizing some objective function. This may seem to run counter to the theories of Simon et al.,[2] which assert that firms "satisfice" (that is, aim for some target rate of return not explicitly related to maximizing behavior). Further, it may seem to be at variance with Aharoni's[3] analysis of the foreign investment decision process, cited in the last chapter, which identifies personalities of chief executives and other non-economic factors as being crucial to the direct investment decision.

Fortunately, describing direct investment behavior via a MDP allows the inclusion of these non-profit maximizing theories. The essence of an MDP is that decisions are made sequentially, rather than once-and-for-all. Aharoni[4] has identified such sequential decision-making as characteristic of the direct investment decision process, and Kohn[5] and Shavell[6]

---

[2]H. A. Simon, Models of Men (New York: John Wiley & Sons, 1957) is one good source for these ideas.

[3]Yair Aharoni, The Foreign Investment Decision Process (Boston: Harvard Graduate School of Business Administration, 1966).

[4]Ibid., pp. 42-46.

[5]Meir G. Kohn, "Sequential Decision-making and the Theory of the Firm," (Ph.D. thesis, Department of Economics, M.I.T., 1973).

[6]Steven M. Shavell, "Essays in Economic Theory," (Ph.D. thesis, Department of Economics, M.I.T., 1973).

have shown under fairly unrestrictive assumptions that when decisions are made in a sequential manner, satisficing _is_ optimizing.

The MDP framework also admits of interpretation in terms of managerial theories of the firm, for the objective function can be taken to be simply the discounted sum of expected future utilities of the managers. These utility functions can be allowed to depend on the size of the firm,[7] its expected rate of growth,[8], on expected profits, and on non-economic factors as indicated by Aharoni and Penrose.[9]

Of course, under perfect competition, firms are merely "windows" and managers merely instruments through which shareholder desires are transmitted. But the industrial organization approach to direct investment asserts that the essence of the phenomenon is market imperfection, and as Horst[10] has noted, it is in large (often multinational) corporations that ownership and control are likely to diverge.

In summary, then, in a study aiming to explain direct investment behavior, it is desirable to have a theoretical formulation which includes a wide variety of approaches to the problem. Characterization of the direct investment process as a MDP not only achieves this aim, but also suggests what manner of data need to be collected if direct

---

[7] In the tradition of William Baumol, _Business Behavior, Value and Growth_ (New York: The Macmillan Company, 1959).

[8] As suggested in Edith Penrose, _The Theory of the Growth of the Firm_ (New York: John Wiley & Sons, 1959).

[9] Edith Penrose, "Foreign Investment and the Growth of the Firm" _Economic Journal_, 66 (June, 1956), 220-235.

[10] Thomas Horst, "Multinational Enterprise and the Theory of the Firm" in J.H. Dunning, ed., _The Multinational Enterprise and Economic Analysis_, forthcoming.

investment is to be properly understood. Before elaborating on this second point, it will be useful to give an example of a MDP in the direct investment context.

A Simple MDP Model of Direct Investment

Consider a non-U.S. firm exploring the possibility of investing in the United States. Define the state space of the firm, S, as the integers 1,2,...,n. For our simple problem, let $n=2$; 1 denotes the situation when the firm does not have a subsidiary in the U.S. but rather serves the market, if at all, via export or licensing, while 2 represents the situation when the firm does have a subsidiary in the United States. For each state $s \in S$, there is a set of actions, A_s, which the firm can take, labeled by the integers $a = 1,2,\ldots,A_s$. Again in the simple case, let $A_1 = A_2 = 2$, with the actions to be taken enumerated as:

action 1 in state 1 - do not invest in the U.S.

action 2 in state 1 - invest in the U.S.

action 1 in state 2 - liquidate the investment in the U.S.

action 2 in state 2 - continue to operate the U.S. investment

The Cartesian product of A_1 and A_2 is the firm's policy space, A.

The parent firm receives utility U_s^a from taking action a in state s (as noted above, this utility can be made identical with expected profits if one wants to consider only profit-maximizing theories of direct investment). U_s^a is assumed to be bounded for all $a \in A_s$ and $s \in S$. The parent firm's managers have subjective probabilities about the consequences of taking action a in state s. In particular $p^a_{ss'}$ is the managers' subjective probability of being in state s' in period t + 1 if they take action a in state s. For our simple problem, the $p^a_{ss'}$ are defined as follows:

$p^1_{11} = 1$ (if the firm does not have an investment in the U.S. in period t and decides not to invest, then the managers are certain that the firm will not have an investment in the U.S. in period t + 1)

$p^1_{12} = 0$

$p^2_{11} = 1 - \alpha$ (see below)

$p^2_{12} = \alpha$

$p^1_{21} = 1$ (the firm will experience no difficulty in liquidating its investment)

$p^1_{22} = 0$

$p^2_{21} = 1 - \tau$ (see below)

$p^2_{22} = \tau$

α is the managers' subjective probability that the firm will earn a normal profit by making a direct investment in the United States, while τ is their subjective probability that it will earn sufficient profits to justify continued operation of a subsidiary in the U.S.[11] Normal profits do not form the criterion in the second case because, at least in the short run, any profit above overhead costs on an established investment tends to lead to a decision to continue the investment. One would expect $\alpha < \tau$ owing to learning effects and the like. For U.S.

---

[11]Note that what is normal may be determined by some satisficing rule of thumb.

firms investing in Europe, α was fairly high in the 1950's and early 1960's. Though one might expect τ to be near 1, the experience of Volkswagen in New Jersey cited in Chapter 3 is proof that $\tau = 1$ is not the case.

It is assumed that the managers of the firm discount their expected utility through time via the discount factor B^t, $t = 0, 1, 2, \ldots$, where $0 \leq B < 1$ and $B = \frac{1}{1+r}$, where r is the exogenously given discount rate. Further, it is assumed that there is an initial distribution of probabilities over states (γ_1, γ_2), where $\sum_{s \in S} \gamma_s = 1$ and $\gamma_s \geq 0$ for $s \in S$.

The firm's situation as described is a nonstationary Markov chain with returns. The firm's sequential decision problem is: given a state $s \in S$ at time $t = 0, 1, 2, \ldots$, choose an action $a \in A_s$ to maximize the total sum of discounted expected utility. If the name of a strategy is given to a sequence of decisions in each time and each state, the managers' problem is to find strategies which maximize the total sum of discounted expected utility.

Before explicitly presenting the firm's objective function, it will be useful to expand on the notion of a strategy. Let F be a set of functions from the state space S to the policy space A; since S and A are finite, F is finite. If f is a function in F, a strategy π is defined as a sequence $\{f_t, t = 0, 1, 2, \ldots\}$, where f_t is the decision vector at time t (i.e., $f_t(s)$, the s^{th} element of f_t, is an action of state $s \in S$ at time t). A strategy may be written

$$\pi = (f_1, f_2, \ldots, f_t, \ldots)$$

A stationary strategy $\pi = f^{\infty}$ is

$$\pi = (f, f, \ldots, f \ldots)$$

i.e., one which is independent of time.

Given a strategy π, a nonstationary Markov chain obtains, with t-step transition probability matrix

$$P_t(\pi) = P(f_1)P(f_2) \cdots P(f_t) \qquad t = 1, 2, \ldots$$

where $P(f_t)$ is the $n \times n$ transition matrix whose ss'th element is $p^a_{ss'}$, $a = f_t(s) \in A_s$. For $t = 0$, $P_0(\pi) = I$ (the $n \times n$ identity matrix). For any $f \in F$, the $n \times 1$ expected utility vector $u(f)$ can be defined, with s'th element U^a_s, $a = f(s) \in A_s$. Then, defining the $n \times 1$ vector of the sum of discounted expected returns in each state if strategy π is used as $V(\pi)$, the managers' problem is to maximize

$$V(\pi) = \sum_{t=0}^{\infty} B^t P_t(\pi) u(f_{t+1})$$

by choice of π. The boundedness of the U^a_s and the B^t guarantees the finiteness of $V(\pi)$.

In such a problem, for given preferences (the U^a_s), expectations (the $p^a_{ss'}$) and discount rate (r), an optimal strategy exists and is stationary.[12] That is, given that the firm is in state s at time t, and

---

[12]Proofs of these and other propositions related to MDP can be found in H. Mine and S. Osaki, Markovian Decision Processes (New York: American Elsevier, 1970), Chapter 2. The theoretically inclined reader will have recognized that this optimization problem, like any other, offers opportunities for comparative static analysis. Since the purpose of introducing the MDP approach is to motivate an econometric specification rather than to derive comparative static results, such exercises will not detain us here. The interested reader may pursue them in Mine and Osaki, Chapter 2, Section 7.

that expectations are unchanged, the managers would always take the same action $a \in A_s$, no matter what t happens to be. The implication of this result is that if these preferences, expectations and the discount rate were known exactly, one could ascertain precisely whether a firm would have a subsidiary in the U.S. in period $t + 1$.

Implications for Empirical Studies of Direct Investment

For purposes of studying the motivation for a firm's initial direct investment into a particular market (such as the U.S.), or more generally, for the firm's direct investment anywhere, one would want a cross-section of all the firms in state 1 at time t. By observing which firms invested in the U.S. between time t and $t + 1$, and by observing their associated preferences, expectations and discount rates, one could infer which theory or theories of direct investment are validated. Of course, in practice these attributes of the firm and its managers are never known precisely, and hence one cannot say with complete accuracy whether a firm would locate a subsidiary in the U.S. during a given time period. Rather, one can only try to classify the firms in one's sample into those which made an investment in the U.S. during the time period and those which did not, where the classification is derived from the probability that a firm located a subsidiary in the United States, calculated on the basis of the observed characteristics of the parent firms and the subsidiaries they establish. These observed characteristics are proxies for the preferences, expectations and discount rate of the parent firms' managers, and hopefully are chosen to be good representatives of competing theories of direct investment. In summary, then, viewing direct investment as the change in a state in a MDP leads to an empirical procedure identical with probability models and statistical discriminant analysis, in which members of a sample are placed into mutually exclusive groups depending on their observed characteristics.[13,14]

---

[13]It should be noted that characterization of the behavior of economic agents as expected utility maximizers in a MDP is related to the approach of assuming that these agents receive utility from various alternative actions available to them, but the utility they receive is observed to be stochastic because complete information is not available on the agents. In the later formulation, discussed extensively by Charles Manski "The Analysis of Qualitative Choice" (Ph.D. thesis, M.I.T., Department of Economics, 1973), if the econometrician is willing to make a very specific assumption about the form of the uncertainty, estimation difficulties can be reduced dramatically. In particular, Daniel McFadden has shown ("A Disaggregated Model of Urban Travel Demand" (Cambridge, Mass.: Charles River Associates, 1972)) in the context of individuals choosing among several alternative transportation modes that if the probability distribution of the unobserved characteristics is the reciprocal exponential distribution, then a "conditional logit" model of individual choice results. Because this model is characterized by the "independence of irrelevant alternatives" axiom, it is efficient in dealing with situations in which the number of alternatives is large. As we shall see later in this chapter, the attractiveness of this approach depends upon one's definitions of the states the decision-maker can be in. Further, the stochastic assumptions made in the micro-econometric analysis reported later pertain not to the <u>unobserved</u> characteristics, but rather to those characteristics on which data are available. There is, however, a probability model formally identical to the discrimination technique used in Chapter 6--the multinational logit probability model. As we shall see in Chapter 6, it involves no <u>restrictive</u> assumptions about the unobserved characteristics.

[14]After I had decided on a discriminant analysis approach to direct investment, I learned that Robert R. Miller and Dale R. Weigel used broadly the same statistical technique to analyze motivations for direct investments in Brazil ("The Motivation for Foreign Direct Investment," <u>Journal of International Business Studies</u> (December, 1972), 67-79). Though their analysis, conducted at the industry level, was not based on any formal behavioral model, in spirit it is very close to my own beliefs concerning direct investment, which have been shaped a great deal by Aharoni's work.

The observed characteristics which determine the flow of direct investments made in the interval $(t, t+1)$ can, of course, change over time, which is to say that the managers' preferences, expectations and discount rates can change over time. This fact, well-recognized by students of labor market behavior and welfare policy, dictates the need for a longitudinal sample of firms (i.e., a time series of cross-sections) to study the changing nature of direct investment behavior over time. Further, if the firm's optimal strategy were not stationary, then its behavior at time t would depend on its history before that time, and again a longitudinal sample is required to analyze behavior.

Longitudinal samples are, of course, expensive to obtain, and often just two cross-sections can outline the major contours of direct investment behavior. However, it is essential that these two cross-sections be collected at points in time not too removed from each other if one is to analyze the flows across states between the cross sections, for then it is safe to assume that preferences, expectations and discount rates have remained relatively stable over the time interval separating the cross-sections.

Students of direct investment behavior are rarely fortunate enough to have such extensive samples. (Of course, aggregate statistics on direct investment flows are usually available from government sources, and under certain conditions enumerated in a later section, these data can be interpreted as realizations of a MDP.) In particular, the micro-econometric analysis in this thesis is based on a cross-section of the subsidiaries of non-U.S. multinational firms as of January 1, 1971. If it is really true that the direct investment process is sequential and dynamic, how much can a "snapshot" of these firms at a moment in time reveal about the motivations behind their direct investment behavior?

The answer lies in the relationships between the stock of direct investments in the United States at any point in time (the cross-section) and the flow of direct investments into and out of the U.S. over time. Since the stock is the cumulated flow over time, the preferences, expectations and discount rate that determined the flow in each time interval before the date of the stock also determine the stock. In the unlikely event that these three factors can be assumed to be constant over time, proxies for them collected at the same date as the stock can be used just as described above to discriminate accurately between the two states to which the elements of the stock belong. In the much more likely situation that these three factors have changed over time, retrospective proxies for their past values are required to perform the discriminant analysis suggested above. As indicated in Chapter 6, a limited amount of such data is available in the cross-section used in this study.

Another way of viewing what is being done in a cross-section analysis is derived from an alternative interpretation of what discriminant analysis does. As noted earlier, if preferences, expectations and the discount rate were exactly known, one could predict with complete certainty whether a firm would locate a subsidiary in the U.S. during a given time interval. Since these factors are unknown, one can only estimate the probability that a firm would establish a subsidiary in the U.S.--i.e., the probability that a firm would transit from state 1 to state 2 in a given time period. In a cross-section analysis, one can only estimate the joint probability of transiting to state 2 if in state 1 during the time period immediately before the cumulation of the stock and of remaining in state 2 if already there at the beginning of the time period before the cumulation of the stock.[15]

It may be objected that the discussion thus far has treated direct investment as if it were a simple qualitative matter which either occurs or it does not. Of course the issue is much more complex, but fortunately the simple model outlined above is easily elaborated by the device of proliferating the states. For example, remaining for the moment with qualitative behavior, it is an easy matter to designate state 1 as the act of exporting to the U.S. through an agent, state 2 as the act of licensing another firm to produce in the U.S., state 3 as the act of establishing a sales subsidiary in the U.S., and state 4 as the act of establishing a manufacturing subsidiary in this country. If the focus of interest is the location of subsidiaries in one or more of n geographical areas, then state 1 can be designated as the situation of serving all markets via export of licensing while states 2 through 2^n represent having direct investments in various combinations of the n

[15]While it is useful to think of these issues in terms of probabilities, it is important to remember that discriminant analysis is not the same as what are usually called probability models. The key difference, as suggested in footnote 13, and further elaborated in Chapter 6, is whether the observed or unobserved characteristics are viewed as stochastic.

locations.[16] Similarly, if one is interested in the manner in which the investment is made, state 1 can be the export/licensing situation, state 2 the situation of making a direct investment de novo, and state 3 that of making a direct investment via acquisition; in such a regime the differential probabilities of transition from state 1 to state 2 and from state 1 to state 3 would be of interest. Finally, if one is interested in both initial and expansion investment, state 1 could again represent export or licensing, state 2 an initial investment in a subsidiary in the U.S., and states 3,4,...,n the second, third, ...(n - 1)st additions to the capacity of the original subsidiary. In the case where a firm has multiple subsidiaries, each subsidiary's establishment represents a transition between states.

The size of a direct investment, as well as its occurrence, can be investigated simply by defining state 1 as export/licensing, state 2 as an investment of, say, less than $25 million, and state 3 as an investment of $25 million or more. Of course, if one has information on the precise size of each investment undertaken, then it is inefficient to categorize it. This brings up the issue of analyzing quantitative as opposed to qualitative flows of direct investment, and the question of whether the two modes of analysis can be related. Before discussing

---

[16]The economy which could be achieved by a conditional logit formulation, mentioned in footnote 13, is evident. But the n regions for investment must be defined so as to be independent alternatives. An American businessman considering investing in the Common Market would not consider investment in Belgium independent from investment in The Netherlands, since many of the consequences of location in either place would be the same. Similarly, a European businessman might not consider investment in Canada and the U.S. as independent alternatives.

this question, I first digress to present the theoretical framework for the macroeconometric analysis of direct investment in the United States. Then this macrotheoretic approach is related to the view of direct investment as a MDP.

A Specification for the Macroeconomic Analysis of Direct Investment

As indicated in Chapter 4, the ad-hoc and portfolio approaches to the analysis of aggregate direct investment data have several serious drawbacks. Perhaps their principal deficiency is their failure to recognize that an important element of direct investment behavior is its concern with capital accumulation. Accordingly, it is natural to derive a macroeconomic specification of direct investment behavior that is based on the neoclassical theory of optimal capital accumulation. Indeed, in reviewing the empirical literature on direct investment, Stevens[17] concluded that the neoclassical framework remains the most successful paradigm.

Still, it is true that the neoclassical paradigm, as developed below, aggregates the initial investments of firms with their additions to existing capacity, and makes no distinction between assets obtained via acquisition and those constructed de novo. If data were available on these four classes of direct investment, aggregate equations could be estimated for each type; the equations for acquisitions could have more of a portfolio flavor, while those for initial investments might incorporate some of the insights obtained from the qualitative view of direct

[17]Guy V.G. Stevens, "The Multinational Firm and the Determinants of Investment," International Finance Discussion Paper #29, Board of Governors of the Federal Reserve System, May 23, 1973.

investment in the context of an MDP, including horizon-shifting effects and sequential investigation of investment possibilities.[18]

Further, it seems obvious that it would be desirable to have an aggregate formulation that allows a firm's worldwide investment decisions to be interdependent. As Stevens[19] has observed, such interdependencies can take the form of competition for scarce funds available for investment, production interdependencies, and portfolio interdependencies. In what follows, such production interdependencies are ignored, though they could easily be incorporated into the framework, because data are not available to describe them. Portfolio interdependencies are represented via the Tobin-Brainard "general disequilibrium" concept,[20,21] while liquidity considerations are represented by making the speeds of adjustment of actual to desired stocks variable, depending on the size of the cash flow relative to the investment task to be accomplished, following Coen.[22] Explicit consideration of financing factors is essential in this aggregate analysis of direct investment motivations, since the major shortcoming of the panel of microeconomic data used in

---

[18]These issues have been highlighted by Guy Stevens ("Fixed Investment Expenditures of Foreign Manufacturing Affiliates of U.S. Firms: Theoretical Models and Empirical Evidence," Yale Economic Essays, 9 (Spring, 1969), 137-200) and J. David Richardson ("Theoretical Considerations in the Analysis of Direct Foreign Investment," Western Economic Journal 9 (March, 1971), 87-98).

[19]Stevens, ibid., 141-142

[20]J. Tobin and W. Brainard, "Pitfalls in Financial Model Building," American Economic Review, 58 (May, 1968), 99-122.

[21]Stevens uses a different device to capture the interdependency in financing decisions, namely choice of financing to minimize the risk of exchange rate loss. G.V.G. Stevens, "Capital Mobility and the International Firm" in F. Machlup et al., eds., The International Mobility and Movement of Capital (New York: Columbia University Press and National Bureau of Economic Research, 1972), pp. 323-353.

[22]Robert M. Coen, "The Effect of Cash Flow on the Speed of Adjustment" in G. Fromm, ed., Tax Incentives and Capital Spending (Washington, D.C.: The Brookings Institution, 1971).

Chapter 6 is the absence of financial data of the firms surveyed.

Consider, then, a firm with headquarters in country 1 operating in n countries. In each country i at each point of time t, net revenue after taxes is $R_i(t) - D_i(t)$, where $R_i(t)$ is net revenue before taxes and $D_i(t)$ is the taxes paid. The objective of the firm is assumed to be the maximization of the present value of all future net revenues on a worldwide scale:

$$\int_0^{\infty} e^{-rt} \sum_{i=1}^{n} (R_i(t) - D_i(t))\, dt$$

where r is the rate of return. The firm is constrained by

$$Q_i(t) = F_i(K_i(t),\ L_i(t)) \qquad i = 1,\ldots,n$$

$$K_i(t) = I_i(t) - d_i\, K_i(t) \qquad i = 1,\ldots,n$$

where F_i is a standard neoclassical production function country i, d_i is the instantaneous rate of depreciation, $Q_i(t)$ is the level of output in location i at time t, $I_i(t)$ is the gross flow of investment, $L_i(t)$ is input of labor services, and $K_i(t)$ is the level of fixed capital services (assumed proportional to the capital stock).[23] By further specifying the form of the net revenue functions $R_i(t)$ and the tax systems $D_i(t)$, and by assuming a form for the production functions F_i, following Stevens[24]

[23] Current assets have not yet been well-integrated into neoclassical production functions; accordingly, the discussion here is entirely in terms of fixed capital. As will be discussed in Chapter 7, this poses some problems in adjusting the available data

[24] Stevens, "Capital Mobility and the International Firm," op. cit.

in the manner pioneered by Jorgenson,[25] we obtain from the necessary first-order conditions for maximization of the present value of all future net revenues optimal capital stocks $\overset{*}{K}_i(t)$ for each of the $i = 1,\ldots,n$ locations. (Since more than one country's direct investments in the U.S. are analyzed in Chapter 7, and since the tax systems differ somewhat from country to country, the specific derivation of the optimal capital stocks for each country is relegated to the appendix of that chapter. The derivations there assume a CES production function, and are structured to incorporate tax considerations and tariff-jumping motivations for direct investment behavior. Despite these incorporated inter-relationships, the optimal capital stocks in each location are dependent only upon variables indigenous to that location, with the exception of output prices, which contain both home country and i'th country prices, and the tariff imposed by the i'th country). By postulating a theory of replacement investment and adjustment of actual to desired capital stocks, a complete theory of investment is obtained.

Jorgenson[26] has shown that if replacement is viewed as a recurrent event, then for almost any assumed mortality distribution of the capital stock, replacement investment will be a constant fraction of that capital stock. Thus we may write

$$I_i^r(t) = d_i K_i(t)$$

Gross investment in location i, $I_i(t)$, equals $I_i^r(t) + I_i^n(t)$ where $I_i^n(t)$

---

[25] Dale W. Jorgenson, "Anticipations and Investment Behavior," American Economic Review, 53 (May, 1963), 247-259.

[26] Ibid.

is net investment in location i. $I_i^n(t)$ is then equal to $I_i(t) - d_i L_i(t)$, and by definition equal to $K_i(t) - K_i(t-1)$.

In view of the postulated interdependency of the firm's investment decisions, the adjustment mechanism must be complex. Yet to be feasible econometrically, it must not contain too many parameters to be estimated. The Koyck lag distribution certainly satisfies the latter requirement, while its generalized form, inspired by the Tobin-Brainard "general disequilibrium" framework, meets the former. Specifically, the adjustment mechanism for each location i is

$$K_i(t) - K_i(t-1) = \sum_{j=1}^{n} v_{ij}(\overset{*}{K}_j(t) - K_j(t-1)), \qquad i = 1,\ldots,n .$$

In the one-dimensional case, Griliches[27] has shown, following the lead of Eisner and Strotz,[28] how cost considerations can lead to this type of specification. If the costs of adjustment involve costs of being out of equilibrium and costs of change, and if the cost function is quadratic, a stock-adjustment model is the outcome of the attempt to minimize costs. The appendix to this chapter generalizes this to the two-dimensional case; as explained shortly, this is the only case subjected to econometric analysis.[29]

[27] Zvi Griliches, "Distributed Lags: A Survey," Econometrica, 35 (1967), 16-49.

[28] R. Eisner and R. Strotz, "Determinants of Business Investment" in Commission on Money and Credit, Impact of Monetary Policy (Englewood Cliffs, N.J.: Prentice Hall, 1963).

[29] Bisignano has provided a theoretical rationale for interdedendent asset demand adjustment equations in the n-dimensional case (J. Bisignano, "Adjustment and Equilibrium Costs and the Estimated Brainard-Tobin Model," Special Studies Paper #62, Board of Governors of the Federal Reserve System, July, 1971). Lucas has done the same for the adjustment of n factors of production to their optimal stocks in a single production function, and has shown that the optimal adjustment speeds will, in general, be variable (R.E. Lucas, "Optimal Investment Policy and the Flexible Accelerator," International Economic Review, 8 (February, 1967), 78-85). Nadiri and Rosen have extensively used the Lucas formulation to analyze fixed and variable inputs in the production process (M.I. Nadiri and S. Rosen, A Disequilibrium Model of Demand for Factors of Production (New York: Columbia University Press and the National Bureau of Economic Research, 1974)).

One of the attractive features of this general disequilibrium framework is that it allows overshooting of targets, as long as the firm's balance sheet constraint is satisfied at each moment in time. Indeed, it was the fact that the balance sheet constraint made the adjustments of financial assets to their optimum stocks interdependent that motivated the formulation of this structure by Brainard and Tobin. Here we assume that the constraint is always satisfied by current asset flows, recognizing that if better data were available it would be preferable to incorporate current asset adjustment equations into the specification. Current assets in this formulation are assumed to be affected by but not to affect the adjustment of fixed assets to their optimal stocks; this is consonant with the view that current assets exist merely to "lubricate" the production process.

Similarly, we are ignoring the adjustment of the variable inputs in each location to their optimal stocks, again implicitly assuming that their behavior is affected by but does not affect the adjustment of the capital stocks to their target values.

As presented, the general equilibrium formulation fails to capture the interdependent liquidity considerations mentioned earlier. One resolution would be to incorporate cash flow considerations into the cost of capital in each location, expressing this variable as a weighted average of rates of return on equity, debt, and retained earnings. An alternative, more explicit presentation of such issues is to make the adjustment speeds themselves depend on liquidity in location i. Then if we define

$$v_{ij} = f_{ij} + g_{ij} \frac{C_j(t-1) - d_j K_j(t-1)}{\overset{*}{K}_j(t) - K_j(t-1)} , \qquad i = 1,\ldots,n$$

where the liquidity variable is represented as the cash flow available to the firm for new investment in country j, $C_j(t-1) - d_j K_j(t-1)$ relative to the new investment task to be undertaken in that location, $\overset{*}{K}_j(t) - K_j(t-1)$, the adjustment equation for the i'th fixed asset becomes

$$K_i(t) - K_i(t-1) = \sum_{j=1}^{n} f_{ij}(\overset{*}{K}_j(t) - K_j(t-1)) + \sum_{j=1}^{n} g_{ij}(C_j(t-1) - d_j K_j(t-1))$$

$$i = 1,\ldots,n .$$

As applied in Chapter 7, $n = 2$, the home country and the United States. The fundamental reason for this limitation is the lack of long time series on direct investments abroad by firms domiciled in these countries. At a theoretical level, what is assumed is, familiarly, that the adjustment of fixed assets to their desired levels in countries $i = 3,\ldots,n$ are affected by but do not affect the adjustment of fixed assets to their targets in countries 1 and 2. In practice, this may be a good approximation, since direct investment in the United States is always of the "uphill" variety (from a lower per-capita income to a higher per-capita income country), or was during the sample period before the 1971 devaluation.[30]

[30] For econometric estimation, this device of making the coefficient matrix block diagonal must be accompanied by the assumption that the disturbances from the block of equations to be estimated are uncorrelated with the disturbances from other blocks.

The Macroeconomic Specification and Its Relation to a MDP

It was concluded earlier that qualitatively, direct investment represents a transition between states in a MDP, and that this interpretation leads directly to an analysis of the flow of direct investments made during any given time period. Since the aggregate approach just described is specifically concerned with (quantitative) investment flows also, it is not surprising that the two approaches can be related. The tie-up can be made in two steps.

First, suppose that longitudinal data on direct investment behavior were in existence but were not available owing to confidentiality requirements. Such is the case with the Department of Commerce data on foreign direct investment in the U.S.--i.e., their published aggregate figures are derived from a confidential survey. Now suppose the Commerce Department published annually the number (instead of the value) of direct investments in the U.S. during the past year. Then, in the paradigm of a MDP, it has published the number of transitions between appropriately defined states. If some of the numbers represent additions to existing capacity, say an increase in the value of assets of a subsidiary from $10 million to $25 million, these simply represent transitions from the state of having a $10 million investment in the U.S. to the state of having a $25 million investment in the U.S.[31] Now

[31] It may seem that, when different states represent different values of investment, the state space becomes infinite dimensional. As a theoretical point, such is not the case. Dollars and cents totals are rational numbers, hence the state space is at least discrete. Since optimal investment must be bounded (since utility is assumed to be), the state space is thus finite. Actually, infinite dimensionality causes no difficulty for the MDP approach, since in such situations the optimal strategy still exists, though it is not stationary (Mine and Osaki, op. cit., Chapter 7).

if each transition is weighted by its value, the Department of Commerce published data on foreign direct investment in the United States results. The MDP approach tells us each transition is a function of the firm's managers' preferences, expectations and discount rate. If the managers' preferences are exclusively for profit and if they know the future values of all prices and output (these are their expectations), then the relationship of the neoclassical theory of optimal capital accumulation to the MDP formulation, with transitions weighted by value, is evident. Indeed, the increased generality of the MDP potentially allows the testing of the profit-maximizing assumptions inherent in the neoclassical approach. The optimal capital stock in such a situation is simply the optimal strategy.

One final comment may be useful. Suppose one only had data on the number of transitions in each time period; what would an aggregate approach in the MDP framework be? It would consist of determining the total number of firms capable of making a transition (all the firms in state 1), which may involve a significant task of enumeration. Then the rate of transitions in each period would be determined by dividing the number of transitions in the period by this total capable of making a transition in the period. The resulting flow variable would then become the dependent variable in an analysis whose independent variables represent preferences, expectations, and the discount rate in the population as a whole.[32]

[32]Martin Holmer is implementing this approach in his doctoral thesis at M.I.T., in which he analyzes federal welfare programs.

Summary

In this chapter, I have suggested that direct investment decisions are essentially qualitative in nature and can be well-represented as transitions between states in a MDP; quantitative aspects of direct investment are easily handled by proliferation of the states in such a process. This viewpoint suggests that longitudinal data are desirable for the explanation of direct investment behavior and indicates that probability models and discriminant analysis are the appropriate statistical tools to analyze the qualitative aspects of direct investment. A more traditional framework has been developed to treat the quantitative aggregate flows of direct investment, and has been shown to be closely related to the MDP approach.

APPENDIX

In this appendix, I derive the specification of an interdependent adjustment mechanism, along the lines suggested by Griliches[1] and Eisner and Strotz.[2] In what follows, the speeds of adjustment will be taken as constant. Lucas[3] has generalized the Eisner-Strotz concept to a firm producing over an infinite horizon, and has shown that, in general, the adjustment speeds will be variable, as they are assumed to be in the text of this paper. For a strong defense of integrating the specification of the lag structure into the decision-making process of the firm and a sophisticated extension of the basic Eisner-Strotz notions, see Nerlove.[4]

Suppose then that costs of adjustment in each of two locations are of two kinds--costs of being out of equilibrium, and costs of change to equilibrium. Assume further that the cost function is quadratic and given by the form $W(t) = x(t)'Hx(t)$, where $x(t)$ is the column vector

$$x(t) = \begin{pmatrix} K_1(t) - \overset{*}{K}_1(t) \\ K_1(t) - K_1(t-1) \\ K_2(t) - \overset{*}{K}_2(t) \\ K_2(t) - K_2(t-1) \end{pmatrix}$$

---

[1]Zvi Griliches, "Distributed Lags: A Survey," Econometrica, 35 (1967), 16-49.

[2]R. Eisner and R. Strotz, "Determinants of Business Investment," in Commission on Money and Credit, Impacts of Monetary Policy (Englewood Cliffs, N.J.: Prentice Hall, 1963).

[3]Robert E. Lucas, "Optimal Investment Policy and the Flexible Accelerator," International Economic Review, 8 (1967), 78-85.

[4]Marc Nerlove, "Lags in Economic Behavior," Econometrica, 40 (1972), 221-252.

H is a positive definite matrix, and the prime means transpose.

The first-order conditions for a regular cost minimum are

$$H'x(t) = 0 .$$

These equations may be written

$$h_{1j}(K_1(t) - \overset{*}{K}_1(t)) + h_{2j}(K_1(t) - K_1(t-1)) +$$
$$h_{3j}(K_2(t) - \overset{*}{K}_2(t)) + h_{4j}(K_2(t) - K_2(t-1)) = 0 , \qquad j = 1,\dots,4$$

We can simplify this to two equations by addition equations 1 and 2, and adding equations 3 and 4, obtaining

$$(a+b)K_1(t) - a\overset{*}{K}_1(t) - bK_1(t-1) + (c+d)K_2(t)$$
$$- c\overset{*}{K}_2(t) - dK_2(t-1) = 0$$
$$(e+f)K_1(t) - e\overset{*}{K}_1(t) - fK_1(t-1) + (g+h)K_2(t)$$
$$- g\overset{*}{K}_2(t) - hK_2(t-1) = 0$$

where

$$a = h_{11} + h_{12} \qquad e = h_{13} + h_{14}$$
$$b = h_{21} + h_{22} \qquad f = h_{23} + h_{24}$$
$$c = h_{31} + h_{32} \qquad g = h_{33} + h_{34}$$
$$d = h_{41} + h_{42} \qquad h = h_{43} + h_{44} .$$

Solving the first equation for $K_1(t)$ yields

$$K_1(t) = \frac{a}{a+b}\overset{*}{K}_1(t) + \frac{b}{a+b}K_1(t-1) - \frac{c+d}{a+b}K_2(t)$$
$$+ \frac{c}{a+b}\overset{*}{K}_2(t) + \frac{d}{a+b}K_2(t-1) .$$

Solving the second equation for $K_2(t)$ and substituting in the value of $K_1(t)$ obtained above, we have

$$K_2(t) = \frac{g}{g+h} \overset{*}{K}_2(t) + \frac{h}{g+h} K_2(t-1) + \frac{e}{g+h} \overset{*}{K}_1(t)$$

$$+ \frac{f}{g+h} K_1(t-1) - \frac{e+f}{g+h} \left\{ \frac{a}{a+b} \overset{*}{K}_1(t) \right.$$

$$+ \frac{b}{a+b} K_1(t-1) - \frac{c+d}{a+b} K_2(t)$$

$$\left. + \frac{c}{a+b} \overset{*}{K}_2(t) + \frac{d}{a+b} K_2(t-1) \right\} .$$

Simplifying further yields

$$K_2(t) = \frac{B}{A+B} \overset{*}{K}_2(t) + \frac{A}{A+B} K_2(t-1) + \frac{C}{A+B} \overset{*}{K}_1(t) + \frac{D}{A+B} K_1(t-1)$$

where

$$A = h(a+b) - d(e+f)$$

$$B = g(a+b) - c(e+f)$$

$$C = e(a+b) - a(e+f)$$

$$D = f(a+b) - b(e+f) .$$

Thus

$$K_2(t) - K_2(t-1) = \frac{B}{A+B} (\overset{*}{K}_2(t) - K_2(t-1)) + \frac{C}{A+B} \overset{*}{K}_1(t) + \frac{D}{A+B} K_1(t-1) .$$

Note now that

$$C = e(a+b) - a(e+f) = be - af$$

$$D = f(a+b) - b(e+f) = fa - be = -C$$

and hence

$$K_2(t) - K_2(t-1) = \frac{B}{A+B} (\overset{*}{K}_2(t) - K_2(t-1)) + \frac{C}{A+B} (\overset{*}{K}_1(t) - K_1(t-1))$$

which is the specification used in the text. A similar result obviously holds for $K_1(t) - K_1(t-1)$.

PART III: EMPIRICAL RESEARCH AND CONCLUSIONS

Chapter 6

MICROECONOMETRIC ANALYSIS

In this chapter 2051 foreign investments in manufacturing industries by 114 non-U.S. multinational firms from 11 major industrialized countries are analyzed using statistical discriminant techniques. After a brief description of the data base, the specific statistical tool to be used, logistic discrimination, is introduced and related to other discriminant methods and to multinomial logit probability models. Then the variables used in the analysis are described and related to the theories of direct investment surveyed in Chapter 4. Finally, the estimation results are reported and their implications for the validity of various theories of direct investment are explored. Full details concerning the data used in this study are in an appendix to this chapter.

Data Characteristics

The data analyzed in this chapter are of four types:

1) data on individual subsidiaries of 114 non-U.S. multinational firms (<u>subsidiary</u> data);
2) data on the non-U.S. firms themselves (<u>parent</u> data);
3) data on the 32 industries in which the subsidiaries produce their principal product (<u>industry</u> data);
4) data on the 11 countries in which the parent firms' headquarters are located, and on the U.S. (<u>nation</u> data).

The exclusive source for the subsidiary and parent data is the Harvard Business School Multinational Enterprise Project, while the industry and nation data come from a variety of sources, as delineated in the appendix.

The HBS MNE Project recently collected data on more than 17,000 subsidiaries of over 200 of the largest corporations with headquarters outside the United States. An attempt was made to include all former subsidiaries of these corporations, and to include former parent corporations, such as the Japanese <u>zaibatsu</u>.[1] From this base 2051 manufacturing subsidiaries (in existence on January 1, 1971) of 114 corporations domiciled in 11 major industrialized countries were selected according to the criteria described in the appendix. These subsidiaries were treated as realizations of direct investment decisions, and as such were the unit of observation in the analysis. Data on each subsidiary were then augmented by data on its parent, on the principal industry in which it operated, and on the nation in which its parent had its corporate headquarters.

It should be noted that this data base is inadequate to describe the considerations involved in corporate decisions to invest abroad in the United States, as opposed to investing in the home country. Because all the observations are foreign subsidiaries already established, all that can be done is an analysis of those characteristics which distinguish direct investments of the U.S. from those made in other lands. In the language of Chapter 5, the states are defined conditional on a firm's having a direct investment. Further, the data do not contain any information on the financial accounts of the parents or subsidiaries, apart

---

[1]An extensive description of this data base, including hundreds of cross-tabulations, is contained in James W. Vaupel and Joan P. Curhan, <u>The World's Multinational Enterprises</u> (Boston: Graduate School of Business Administration, Harvard University, 1973).

from profits, assets, and net worth figures; hence they are not suitable for testing any of the theories of direct investment that focus on the importance of retained earnings or capital markets imperfections. Finally, the data exclusively describe the operations of large multinational firms. Investments by these firms certainly represent a significant proportion of the number of subsidiaries in the U.S., especially by value, but by no means represent the total number of investments in the U.S.[2]

Logistic Discrimination and the Multinomial Logit Probability Model

In Chapter 5, it was indicated that viewing direct investment in the context of a Markov decision process suggests that statistical discriminant analysis is the proper approach for treating the quantitative aspects of direct investment. In the standard formulation, discrimination between k populations, $H_1, \ldots, H_k$, is based on a vector of characteristics $x' = (1, x_1, \ldots, x_p)$ for each observation, where the prime denotes transpose.[3] Let the likelihood of x' given H_s be $f_s(x)$, $s = 1, \ldots, k$, and assume the observations to be allocated are from the mixture of the

---

[2]According to Vaupel and Curhan, ibid., pp. 32, 38, 400 manufacturing subsidiaries of 226 non-U.S. parents were located in the U.S. as of January 1, 1971. According to the U.S. department of Commerce's Bureau of International Commerce, 881 manufacturing subsidiaries of 580 foreign corporations were in existence as of October, 1972 (U.S. Bureau of International Commerce, Foreign Direct Investors in the United States). Not all of the 400 subsidiaries reported in Vaupel and Curhan were suitable for inclusion in the sample, owing to lack of data on some variables for the subsidiary or its parent. For further details see the appendix.

[3]Much of the discussion to follow is based on J.A. Anderson, "Logistic Discrimination with Medical Applications," in T. Cacoullos, ed., Discriminant Analysis and Applications (New York: Academic Press, 1973), pp. 1-16.

distributions of $H_1, \ldots, H_k$ in the proportions $\eta' = (\eta_1, \eta_2, \ldots, \eta_k)$ where $\sum_{s=1}^{k} \eta_s = 1$. Then with equal costs of misclassification, the probability of correct allocation will be maximized if x is allocated to H_s when

$$\eta_s f_s(x) \geqq \eta_t f_t(x) \qquad t = 1, \ldots, k, \quad t \neq s \tag{1}$$

which is equivalent to

$$pr(H_s|x) \geqq pr(H_t|x) \qquad t = 1, \ldots, k, \quad t \neq s \tag{2}$$

The fundamental dependence of the allocation rules on the posterior probabilities led Cox[4] and Day and Kerridge[5] to postulate the logistic form for them:[6]

$$pr(H_s|x) = \frac{e^{x'\alpha_s}}{1 + \sum_{t=1}^{k-1} e^{x'\alpha_t}} \qquad s = 1, \ldots, k-1$$

$$pr(H_k|x) = \frac{1}{1 + \sum_{t=1}^{k-1} e^{x'\alpha_t}} \tag{3}$$

where $\alpha'_s = (\alpha_{s0}, \alpha_{s1}, \ldots, \alpha_{sp})$ for $s = 1, \ldots, k-1$ and $\alpha'_k = (0, \ldots, 0)$. Their insight was to estimate the $\{\alpha_s\}$ directly, as opposed to the

---

[4]D.R. Cox, "Some Procedures Associated with the Logistic Qualitative Response Curve," in F.N. David, ed., Research Papers in Statistics: Festschrift for J. Neyman (London: John Wiley & Sons, 1966), pp. 55-71.

[5]N.E. Day and D.F. Kerridge, "A General Maximum Likelihood Discriminant," Biometrics, 23 (1967), 313-323.

[6]This k-population approach was presented in D.R. Cox, The Analysis of Binary Data (London: Methuen, 1970), p. 104.

usual discrimination method which effectively estimates the $\{\alpha_s\}$ as functions of the estimates of the means and covariances of the elements of x.

The validity of this approach depends of course on the extent to which equations (3) hold. Fortunately, they hold exactly if the variables in the vector of characteristics x are

1) multivariate normal with equal dispersion matrices;
2) multivariate independent dichotomous;
3) multivariate dichotomous following the log-linear model in contingency table analysis with equal second-order and high effects;
4) a combination of (1) and (3).

Situation (4) characterizes most discriminant problems and the logistic approach is the first successful effort to provide a general framework which allows for the inclusion of both continuous and discrete variables in the discrimination situation.[7]

As mentioned in Chapter 5, the key difference between the discriminant approach taken here and the probability model formulation is that in the former, stochastic assumptions are made concerning the variables in the

---

[7] Day and Kerridge, op. cit., p. 316, show that Bayes theorem is at the heart of why the logistic form of the posterior probabilities must be the optimal discriminant if the variables in the vector x are distributed as described above. More recently Marc Nerlove and S. James Press have made the same observation ("Univariate and Multivariate Log-Linear and Logistic Models," Rand Corporation Study R-1306-EDA/NIH, December, 1973, pp. 14-15). Nerlove and Press also note that the logistic form for the posterior probabilities has the advantage of being a closed expression, and hence easily estimated, and that its cumulative distribution function is close to that of the normal distribution, whose estimation of course involves more complicated calculation.

vector x of observed characteristics, while in the latter stochastic assumptions are made about the unobserved characteristics. If one views the vector of observed characteristics x as fixed, and views the unobserved characteristics as stochastic, then the logistic discriminant function just presented is formally equivalent to the multinomial logit probability model.[8] In the estimation results reported below it will be instructive to focus on the posterior probabilities estimated by the logistic approach. By examining how these probabilities change for given changes in the vector of characteristics x, insight may be gained into which characteristics (and hence which theories of direct investment) have a strong influence on the decision to locate a subsidiary in the U.S. As is evident from equation (2), the discriminant rule depends crucially on these probabilities; it is equivalent to the rule: allocate x to H_s if $(\alpha_s - \alpha_t)'x > 0$ for $t = 1,\ldots,k$, $t \neq s$, where for convenience, $\alpha'_k = (0,\ldots,0)$.[9] Thus the logistic approach yields linear discriminant

---

[8]As noted by N.A. Barr and Robert Hall ("The Probability of Dependence on Public Assistance," M.I.T. Department of Economics Working Paper #131, May, 1974), the multinomial logit probability model involves no restrictive assumption about the distribution of unobserved characteristics of decision-makers. They distinguish this model from the conditional logit probability model, used extensively by McFadden (see Chapter 5). In the latter model, the specification is derived from the strict utility model of the theory of stochastic choice, which does require a specific assumption about unobserved characteristics. Further in the conditional logit model the vector of characteristics x refers to the choices available, while in the multinomial logit model it refers to the characteristics of the decision-makers. One final attractive feature of the multinomial logit model is that, given that the vector x can include qualitative variables and non-linear transformations of the original variables, the logistic specification can approximate any probability to any desired degree of accuracy.

[9]Such a normalization is necessary to identify the parameters of the model, since the posterior probabilities must sum to one.

rules. Note that in the case where $k=2$, the rule is equivalent to allocation of observations to states if the predicted probability of the observation being in that state is greater than 1/2.

The precise manner in which the $\{\alpha_s\}$ are estimated is by maximum likelihood. If there are T observations and k events, and if we define

$$z_{st} = \begin{cases} 1 \text{ if the s'th event occurred for observation t} \\ 0 \text{ otherwise} \end{cases}$$

then the likelihood function is (with α_k not normalized)

$$L = \prod_{t=1}^{T} \prod_{s=1}^{k} \{\exp(x_t'\alpha_s)[\sum_{r=1}^{k} \exp(x_t'\alpha_r)]^{-1}\}^{z_{st}}$$

and the log-likelihood is

$$\log L = \sum_{t=1}^{T} \sum_{s=1}^{k} z_{st}\{x_t'\alpha_s - \log[\sum_{r=1}^{k} \exp(x_t'\alpha_r)]\}$$

The first-order conditions for a maximum are (now normalizing α_k to zero),

$$\frac{\partial \log L}{\partial \alpha_s} = \sum_{t=1}^{T} x_t'(z_{st} - pr(H_s|x)) \qquad s=1,\ldots,k-1$$

which can be solved by an iterative non-linear procedure for $\{\alpha_s\}$. Since the logistic specification results in a concave likelihood function, if this procedure converges it will be to the global maximum of the likelihood function.[10]

McFadden[11] has shown that the maximum likelihood estimator of the logistic specification is consistent and asymptotically normal. The inverse of the matrix of second derivatives of the likelihood function converges to the variance-covariance matrix of the limiting distribution of the estimate and serves as an indicator of the sampling dispersion of the estimates in small samples.

Variables Included in the Analysis

In most of what follows, two states will be considered; in the previous notation, $k=2$. State 1 is defined as the situation in which one of the 114 non-U.S. parent firms has a manufacturing subsidiary in the United States as of January 1, 1971; state 2 is the event that one of these parent firms has a subsidiary located elsewhere at that time. The need to include as many variables as possible to serve as proxies

[10] All estimations reported here were performed on the IBM 370/165 at M.I.T. using M.G. Kohn's "Computer Programs for Cross-Section Data," version 3, June 1972. The iterative procedure used in this package is

$$\alpha^{(j+1)} = \alpha^{(j)} - [\partial^2 \log L/\partial \alpha^{(j)2}]^{-1} (\partial \log L/\partial \alpha^{(j)})$$

where $\alpha^{(j)}$ is the j'th iteration estimate. Convergence criteria were $|\Delta\alpha^{(j)}| \leq .01$ or $|\Delta\alpha^{(j)}|/|\Delta\alpha^{(j-1)}| \leq .01$ for each coefficient in the vector α where $\Delta\alpha^{(j)}$ is the increment to each coefficient in the vector α in the j'th iteration and $\alpha^{(j)}$ is the estimated coefficient after the j'th iteration

[11] Daniel McFadden, "The Revealed Preferences of a Government Bureaucracy," Technical Report #17, Institute of International Studies, University of California (Berkeley), November, 1968.

for different theories of direct investment dictated the decision to keep the number of states at a minimum in order that the coefficients of these proxies could be estimated with reasonable accuracy. Further, the principal focus of this thesis is the determination of those characteristics which distinguish subsidiaries in the U.S. from those located elsewhere, so the use of two states is natural. The coefficients of state two are those normalized to zero $\alpha_2 = (0,\ldots,0)$, so one may think of the "dependent variable" in the analysis as taking on the value 1 if a subsidiary is located in the United States and the value 0 if it is located elsewhere.

The locational distribution of the subsidiaries in the sample, cross-classified by country of the parent, is given in Table 6-1. Since all those subsidiaries not in the U.S. were aggregated together in state 2, the state frequencies in the sample were: state 1, 0.0683; state 2, 0.9317. While this figure for state 1 may seem low, it should be noted that in the sample only France, Australia, other Europe and the rest-of-the-world category have more subsidiaries within their borders than the U.S.

Indeed, the striking aspect of state 2 is the high proportion of subsidiaries in the state that fall into the rest-of-the-world sector (46%). Within state 1, it is interesting to note that the leading home countries are The Netherlands, with 44 subsidiaries in the U.S. (nearly 20% of The Netherlands total number), the United Kingdom with 36, and Germany with 25. The small number of Canadian subsidiaries seems somewhat surprising. Though confidentiality restrictions prevented

Table 6-1

CROSS-TABULATION OF COUNTRY OF PARENT BY COUNTRY OF SUBSIDIARY

Country of Subsidiary	Country of Parent: Germany	France	Belgium	Netherlands	Italy	Sweden	Switzerland	United Kingdom	Australia	Japan	Canada	Total
Germany	0	5	3	30	1	0	18	43	0	2	5	107
France	62	0	8	26	2	1	12	25	0	0	5	141
Belgium	9	4	0	12	0	0	3	8	0	3	1	40
The Netherlands	8	0	3	0	3	1	5	19	0	0	2	41
Italy	15	0	3	11	0	1	10	21	0	0	7	68
Sweden	7	0	0	4	0	0	0	7	0	0	1	19
Switzerland	9	1	0	6	0	0	0	1	0	0	1	18
United Kingdom	15	7	3	19	4	2	9	0	0	0	23	82
Australia	4	.2	0	5	0	3	1	149	0	7	8	179
Japan	20	0	0	6	1	0	1	6	0	0	11	45
Canada	8	1	2	3	1	0	2	40	0	3	0	60
United States	25	4	4	44	1	0	7	36	0	9	10	140
Other Europe	68	12	4	23	13	6	22	6C	0	7	18	233
Rest-of-the-World	120	22	3	71	16	8	30	298	2	265	43	878
Total	370	58	33	260	42	22	120	713	2	296	135	2051

ascertaining for certain, it seems likely that the bulk of The Netherlands total reflects the 30+ subsidiaries of Philips Gloeilampenfabriken N.V. located in the U.S. Since these subsidiaries have been established over a period of thirty years, it is probably not unreasonable to treat them as independent observations in a statistical sense.

Table 6-2 contains a list of the initial independent variables employed in the analysis. The inclusion of a constant term provides a naive model against which to compare the performance of the more elaborate specification; the coefficient of the constant term in a specification absent of any other characteristics yields the sample frequencies as the estimated posterior probabilities.[12] Hence a naive model would predict that all the observations should be in state 2 (since the computed probability for every observation would be 0.9317). Evidently in an unbalanced sample such as the one used here, the naive model does fairly well--since it would classify 93.17% of the observations correctly. But of course it would misclassify every observation with a subsidiary in the U.S.

In Chapter 5, it was indicated that retrospective data are essential to infer dynamic behavior from cross-section data. The variables submatur, subentry1 and subprdcy2 are all retrospective in nature. Submatur is designed to test the hypothesis that the probability that a subsidiary is located in the U.S. is different for different-aged subsidiaries, and to serve as a general proxy for the other retrospective data which are not

---

[12]Note that direct estimation of the posterior probabilities thus takes into consideration the prior probabilities over the states, at least when these are viewed to be the sample frequencies in each state.

Table 6-2

INITIAL SET OF INDEPENDENT VARIABLES USED
IN THE LOGISTIC SPECIFICATION

Variable Name	Meaning
constant	one for all observations
subsidiary variables	
submatur	age of the subsidiary, in years
subentry1	one if the subsidiary was formed *de novo* zero if not
subprdcy2	one if the subsidiary had originally been a sales subsidiary zero if not
subindep1	one if more than 50% of the subsidiary's sales were to its parent or to other subsidiaries of the parent zero if not
subdiver2	one if the subsidiary produced products in more than two 3-digit SIC's zero if not
subcntrl2	one if the subsidiary's parent held a 50% or less interest in the subsidiary zero if not
submrktx2	one if the subsidiary's exports from the host country or regional market represented more than 50% of its sales zero if not

Table 6-2 (cont'd)

	Meaning
parent variables	
parsizes	parent size, as measured by total sales, in millions of 1970 dollars
par3dsic	number of 3-digit SIC's in which subsidiary's parent produced
parrdsls	parent R&D expenditure as a % of total sales
parinsls	parent sales outside home country as a % of total sales
parexsls	parent sales derived from exports as a % of total sales
parindpf	the ratio of: the parent firm's rate of profit on all its operations to the rate of profit in the U.S. in the industry in which the subsidiary produces its principal product; rate of profit in both cases is the ratio of profits to net worth.
industry variables	(defined for one of 32 industries in which the subsidiary produces its principal product; unless otherwise noted, data refer to U.S. industries)
indgoods1	one if the subsidiary's principal product is a consumer good zero if not
indtechn1	one if the subsidiary's principal product is a high-technology product zero if not

Table 6-2 (cont'd)

	Meaning
indpngre	the "penetration" of world markets by U.S. firms, where penetration is defined as the number of subsidiaries established abroad by U.S. multinationals in the years 1950-1970, divided by the total number of firms in the industry in the U.S. in 1967
inddeltf	the change in effective tariff rates between 1964 and 1972, for subsidiaries established before 1968, when the tariff cuts negotiated in the Kennedy Round went into effect. Defined as zero for those subsidiaries established in 1968, 1969, or 1970.
indconcn	the 8-firm concentration ratio
indprddf	an index of product differentiation
indklrat	book value of assets per employee in dollars
indscalc	an index of scale economies
indgrow2	rate of growth in industry value added during the 1960's
indmktsz	value added in billions of dollars in 1970
indfollw	one if foreign firms in this industry were markedly clustered in the timing of their investments abroad, and if the subsidiary was established during this time of clustering zero if not

Table 6-2 (cont'd)

	Meaning
nation variables	
natxopen	the openness of the parent firm's economy (as measured by trade as a percentage of GDP)
natrlgdd	the ratio of the annual average rate of growth of GDP in the U.S. to a similar datum for the parent firm's country for the years 1960 to 1970
natrlulc	the ratio of unit labor costs in the U.S. to unit labor costs in the parent firm's country for the year 1970
natrluld	the ratio of the average rate of change in unit labor costs in the U.S. over the years 1965-70 to a similar datum for the parent firm's home country
natrlpcp	the ratio of per capita income in the U.S. in 1970 to per-capita income in the parent firm's country in 1970
natxrate	a measure of the undervaluation of the parent firm's country's currency, compared to the dollar in 1970 as measured by the percentage difference between exchange rates at year-end 1970 and their value in May, 1973
natfollw	one if parent firms in this country were unusually clustered in the timing of their investment abroad and if the subsidiary was established during this time of clustering zero if not

Table 6-2 (cont'd)

	Meaning
nateecef2	one if a parent firm's home country was not a member of E.E.C. or E.F.T.A.; also one for all subsidiaries established before 1958, zero otherwise
industry dummy variables	
indforgn1	one if the subsidiary's principal product was in 2-digit SIC's 20 or 21 (food, beverage, and tobacco) zero if not
indforgn2	one if the subsidiary's principal product was in 2-digit SIC's 22 or 23 (textiles and apparel) zero if not
indforgn3	one if the subsidiary's principal product was in 2-digit SIC's 24-27 (lumber and wood, furniture & fixtures, paper & allied products, printing & publishing) zero if not
indforgn4	one if the subsidiary's principal product was in 2-digit SIC 28 (chemicals) zero if not
indforgn5	one if the subsidiary's principal product was in 2-digit SIC's 29 or 30 (petroleum refining or rubber) zero if not
indforgn6	one if the subsidiary's principal product was in 2-digit SIC's 33 (primary metal) zero if not

Table 6-2 (cont'd)

	Meaning
indforgn7	one if the subsidiary's principal product was in 2-digit SIC's 34 or 35 (fabricated metals & non-electrical machinery & equipment) zero if not
indforgn8	one if the subsidiary's principal product was in 2-digit SIC 36 (electrical machinery & equipment) zero if not
indforgn9	one if the subsidiary's principal product was in 2-digit SIC 37 (transportation equipment) zero if not
indforgn10	one if the subsidiary's principal product was in 2-digit SIC 38 (instruments) zero if not

The normalized category is 2-digit SIC's 31, 32 or 39 (leather goods, stone, clay & glass, and miscellaneous)

variables also considered

natstock	the correlation of the stock market index in the parent firm's country with the U.S. index for the period 1959-72
natrlgdm	the ratio of the gross domestic product in manufacturing in the U.S. in 1970 to the same datum for the parent firm's country
indeftaf	the effective tariff rate (including provision for non-tariff barriers) in 1970

Complete details on all variables are in the appendix to this chapter.

available in this sample. Subentry1 is included to test the notion that subsidiaries in the U.S. are less likely to be established de novo than subsidiaries elsewhere, because of the high risk associated with investing in the fast-paced and sophisticated U.S. market. Subprdcy2 is designed to test one particular aspect of theories of international investment that stress the cyclical nature of forms of selling in a market--the notion that sales subsidiaries precede manufacturing subsidiaries. This precedence could be a result of product maturation, as described by the product cycle concept, or may reflect the initial desire to avoid risk in selling to the U.S. marketplace.

Of the remaining subsidiary variables, three are included to test the hypothesis that U.S. subsidiaries are more independent of their parents than subsidiaries elsewhere--subindep1, subcntr12, and submrktx2. Subindep1 tests the hypothesis that U.S. subsidiaries are less likely to provide products for the parent firm or its other subsidiaries than subsidiaries elsewhere. Subcntr12 treats the question of whether foreign parents are less likely to own less than half of their U.S. subsidiary than they are to have a minority interest in subsidiaries elsewhere. Submrktx2 tests the hypothesis that U.S. subsidiaries are less concerned with exporting from the U.S. than subsidiaries established in other countries are designed to export from those nations.

A negative coefficient for the final subsidiary variable, subdiver2, would support the hypothesis that subsidiaries located in the U.S. are less likely to produce a large number of products than subsidiaries located elsewhere; this is consistent with "product niche" explanations of direct investment in the U.S.

The parent variables included are designed to test whether the standard notions of what makes a firm a multinational enterprise distinguish the parent firms of subsidiaries established in the U.S. In particular, parsizes explores the issue of whether parent firms of subsidiaries established in the U.S. are larger than parent firms of subsidiaries established elsewhere. Par3dsic treats the issue of whether parents of U.S. subsidiaries are more diversified, while parrdsls is intended to indicate whether these parents spend more on R&D per dollar of sales. Parinsls and parexsls both are designed to test the hypothesis that parents of U.S. subsidiaries are more likely to have extensive operations in or contact with foreign markets than parents of subsidiaries located elsewhere.

Parindpf measures the subsidiary's parent's rate of profit on net worth on all its operations relative to the rate of profit on net worth in the U.S. in the industry in which the subsidiary is located, and is intended to test the hypothesis that parents of U.S. subsidiaries are less concerned with relative rates of return (and presumably more concerned with learning about the technological and marketing future in their home market today in the U.S.) than parents of subsidiaries established in other nations. Ideally, of course, the industry rate of profit in the denominator should be the rate in the country in which the subsidiary is located.[13] Unfortunately, industry statistics for

[13]Still better would be the subsidiary's rate of profit on its operations.

countries other than the United States are not uniformly available and where available are often not computed on a conceptual basis comparable to that of the United States statistics. Accordingly, it has been necessary to use U.S. industry characteristics as a proxy for industry characteristics in other countries. There is some precedence for this procedure in empirical work in international economics,[14] and some very tentative evidence that the industrial structure of the major Western economies is not too dissimilar.[15] However, little reliance may be placed on these results,[16] and in consequence a group of industry dummy variable, indforgn, has been introduced to recognize explicitly the fact that some industry-related variables have been omitted from the analysis.

The majority of the industry characteristics listed in Table 6-2 are self-explanatory and are included to represent the industrial organization approach to direct investment. The variables indconcn, indprddf, indklrat, indscalc, indgrow2, and indmktsz are all of this type and allow the determination of whether subsidiaries in the U.S. are in industries in which these variables take on smaller or larger values than elsewhere. Several industry variables do deserve elaboration, however. Indpngre measures the penetration of foreign markets by U.S. subsidiaries. It was

---

[14]See Gary Hufbauer, "The Impact of National Characteristics and Technology on the Commodity Composition of Trade in Manufactured Goods," and William Gruber and Raymond Vernon, "The Technology Factor in a World Trade Matrix," in Raymond Vernon, ed., The Technology Factor in International Trade (New York: Columbia University Press and the National Bureau of Economic Research, 1970), pp. 145-304.

[15]See Frederick Pryor, "An International Comparison of Concentration Ratios," Review of Economics and Statistics, 54 (1972), 130-140.

[16]Especially since such a large proportion of the sample are not located in the Western industrialized countries.

designed to capture oligopolistic reaction behavior, and it is also a good summary measure of the industry-specific nature of U.S. direct investment abroad.

Inddeltf was designed to represent tariff-jumping considerations. Since the Kennedy Round, most tariffs have been reduced. The size of this reduction from 1964 to 1972 in absolute terms was taken as an index of the amount of flexibility in an industry's tariff structure which existed before tariff negotiations began, as well as an index of the concern which foreign corporations (and hence their governments) had over the height of the U.S. tariff barrier. It was hypothesized that the larger this change, the greater the concern on the part of a foreign corporation for "jumping over" the industry's (artifically high) tariff barrier. Since the height of old barriers was less relevant once they started falling, this variable is only non-zero for subsidiaries established before 1968; since foreign corporations were assumed to be aware of the implications of input tariffs on output production costs, effective rates were used.

Inddeltf was used after efforts at capturing tariff-jumping effects using indeftaf, defined as the 1970 level of effective tariffs, met with little success. The shortcoming of indeftaf is, of course, that there is no guarantee that industries in which tariffs were high in 1970 were industries in which they were high when the subsidiary was founded. Tariff levels at one point in time have the further shortcoming that they convey no standard of comparison for determining what "high" or "low" is for a particular industry. Of course, inddeltf is not exactly the correct variable either; what is really needed is an aggregate time series of tariff rates for each industry. Then each subsidiary's record would include an industry tariff variable defined as the level of the industry tariff in the year the subsidiary was established. Inddeltf has been included in the hope that it will be large for industries in which tariffs were high and small for those in which they were low (and hence could be reduced little by the Kennedy Round). A comparison of the cross-sections of 1964 rates and of the inddeltf variable suggests this was almost always the case.

Indfollw is designed to detect "follow the leader" behavior in the establishment of foreign subsidiaries in the U.S., and was constructed by analogy with Knickerbocker's work.[17] Indgoods1 and indtechn1 are qualitative variables designed to test the hypotheses that subsidiaries located in the U.S. are more likely to be in consumer goods industries or high-technology industries than subsidiaries located in other countries.

The nation variable natxopen is designed to test the hypothesis that subsidiaries in the United States are more likely to be owned by parent firms from nations where trade is a large percentage of GNP. This variable was developed in response to persistent evidence that parent firms from small countries were extraordinarily represented in the U.S.; this finding will be elaborated upon later, at which time the variables natstock and natrlgdm will be discussed.

---

[17] F.T. Knickerbocker, Oligopolistic Reaction and Multinational Enterprise (Boston: Graduate School of Business Administration, Harvard University, 1973).

Natrlgdd was included to measure aggregate relative growth rates in the U.S. and the parent firm's home country in the 10 years before 1970. Since the numerator of this variable is the U.S. growth rate, constant across all observations in this sample, the variable effectively represents the inverse of the rate of growth of the parent firm's home economy. As such, it allows the performance of a test of whether subsidiaries in the U.S. are more likely to come from economies with rapid rates of growth than subsidiaries elsewhere.

Natrlucc and natrlucd allow the exploration of issues of whether subsidiaries in the U.S. are more likely to be from countries with high levels of unit labor costs or rapidly rising unit labor costs. Again, since the numerators of both variables (the U.S. unit labor cost and its rate of change) are constant over the sample, the variables can be viewed as the inverse of the parent firms' countries' unit labor costs and their rate of change.

Natrlpcp was included to test the Linder-like hypothesis that countries with similar income levels and similar tastes will make direct investments in each other. One motivation for its consideration was the case study conducted in Chapter 3, in which Volvo's and Volkswagen's fortunes in the automobile industry and their direct investments were related to dynamic relationships between per-capita income levels in their home market and in their export markets.

Natxrate is a measure of the undervaluation of the subsidiary's parent's country's currency, relative to the dollar, at the time the sample was taken. Designed to analyze exchange-rate motivations for direct investment, like the indeftaf variable it suffers from the defect of not being defined for the year in which the subsidiary was formed.

Natfollw is a twin of indfollw and is a representation of the follow-the-leader concept applied to firms from the same nation. Nateecef2 allows one to test the hypothesis that subsidiaries in the U.S. are less likely to belong to parents whose countries were not members of a customs union or free trade area.

Finally, the group of industry dummies, indforgn, is designed to pick up industry-specific effects not recognized in the other variables. The normalized category for this variable (i.e. the situation when all ten of the indforgn variables are turned off) is miscellaneous industry, which includes leatherworking. The broad industry categories used are described in Table 6-2.

Estimation Results

As described in the appendix, only 80 of the 114 parent firms reported data on sales, profits, net worth, R&D expenditures, total sales outside home country and export sales. Since the latter two variables were thought to be important, it was originally intended to limit the sample to 1443 subsidiaries of these 80 parent firms.

Accordingly, the vector of characteristics x was defined to include all the variables listed in Table 6-2 (save "variables also considered") and the posterior probabilities were estimated by maximum likelihood; convergence was obtained in this case and in all cases to be reported after about 7 iterations. Examination of the asymptotic standard errors and coefficients of parinsls and parexsls suggested that they made no significant contribution to the determination of the posterior probabilities. Accordingly, the posterior probabilities were re-estimated by maximum likelihood with the coefficients of parinsls and parexsls constrained to be zero (they were jointly constrained, then individually constrained to check on the possibility that collinearity between them was obscuring both their effects). A likelihood ratio test was then performed on the null hypothesis that these coefficients were in fact zero; the conclusion of the test was that the null hypothesis could not be rejected even with the large critical region given by a 75% level of significance.[18]

The 608 subsidiaries established by the 34 parent firms for which data on total sales outside home country and export sales were not available (and for which total sales, profits, net worth, and R&D expenditure data were available) were then added to the sample.

Using the expanded sample, the posterior probabilities were again estimated via maximum likelihood, using the vector of characteristics x as described before (with parinsls and parexsls excluded, of course). After examining the estimation results, it was hypothesized that the coefficients of the following variables were in fact zero:

---

[18]A similar test was performed on parrdsls; while the null hypothesis could not be rejected at the 5% level of significance, it was rejected at the 10% level. In view of the presumed importance of R&D expenditures in firms which make direct investments, and since parrdsls was nearly twice its asymptotic standard error, it was decided to leave the variable in the specification.

subentry1	inddeltf	indfollw
subprdcy2	indklrat	natxrate
subdiver2	indprddf	natfollw
parsizes	indscalc	nateecef2
indgoods1	indgrow2	natrlulc

The likelihood function was then maximized with the coefficients of these variables constrained to be zero. Minus 2 log m (where m is the ratio of the value of the log-likelihood function at the maximum in the constrained case to a similar datum in the unconstrained case) is distributed as chi-square with q degrees of freedom, where q is the number of independent constraints on the coefficient vector $\{\alpha_i\}$. In this case, $-2 \log m = -2(-435.27-(-430.58)) = -2(-4.69) = 9.38$ and $q = 15$. The null hypothesis cannot be rejected even at the .75 level of significance.

The sample means and correlations of the variables included in the constrained estimation are given in the appendix.[19] Table 6-3 presents the coefficients and asymptotic standard errors of these variables. All coefficients listed in Table 6-5 are nearly twice their asymptotic standard errors, with the exception of indtechnl, parrdsls, natrlpcp, and several of the indforgn variables.

The results provide a number of insights into which factors differentiate subsidiaries established in the U.S. from those located elsewhere. First, consider parinsls, parexsls and the 15 variables the coefficients of which were not statistically significant from zero and which thus made no significant contribution to the estimated posterior probabilities. Perhaps the most striking fact about this group is that subsidiaries in the U.S. are not distinguishable

[19]Perhaps a comment should be made about the mean of indprddf. Reported parent profits as a percentage of net worth were in the range .30-.50, while similar figures for U.S. industry ranged from .001 to .15. It was not feasible to reconcile differences in accounting procedures, and the industrial distribution of subsidiaries was such that the mean was rather high.

from those established in other countries by examining the size of the parent firm as measured by sales. Still, it must be remembered that all the firms in the sample are among the 200+ largest non-U.S. firms in the world, so that a finding that size is unimportant in this sample cannot be viewed as a conclusive indication that size is unimportant for direct investment per se. However, it does show that parents of U.S. subsidiaries need be no larger than parents of subsidiaries located elsewhere.

Equally interesting is the finding that both measures of the international experience of the parent firm, parinsls and parexsls, also fail to distinguish U.S. subsidiaries. In particular, on these measures a firm in the sample need have no more international experience to have an investment in the U.S. in 1970 than elsewhere. Again, since the firms in our sample have the most international experience in the world (of non-U.S. firms) it cannot be concluded that smaller firms need not have this experience to invest in the U.S.

An unexpected result was the fact that U.S. subsidiaries were neither more nor less likely to be founded on a _de novo_ basis than subsidiaries elsewhere, since the coefficient of subentryl was not statistically different from zero. Because of the large and sophisticated nature of the U.S. market, it is usually thought that the acquisition will be preferred as a form of investing in the U.S., compared to elsewhere.[20] Perhaps the large size of the firms in the sample obviates their need to take over an existing organization to reduce the risk of investing in the U.S. Still, the large number of subsidiaries in the rest-of-the-world category, where _de novo_ behavior would be

---

[20]Takeshi Yano and Dominique Hardy, "The Acquisition as a Form of Foreign Direct Investment in the U.S.A." (Master's thesis, Alfred P. Sloan School of Management, M.I.T., 1974).

Table 6-3

CONSTRAINED ESTIMATION RESULTS

variable	coefficient	asymptotic standard error
constant	-7.381	1.411
submatur	-0.037	0.010
subindepl	0.583	0.297
subcntrl2	-1.057	0.236
submrktx2	-2.233	1.027
par3dsic	0.062	0.020
parr.dsls	7.015	4.173
parindpf	-0.012	0.005
indtechnl	-0.441	0.302
indpngre	-8.433	4.449
indconcn	3.524	1.646
indmktsz	0.101	0.027
natxopen	2.215	0.444
natrlgdd	-1.493	0.426
natrluld	0.802	0.277
natrlpcp	0.447	0.302
indforgn1	-0.483	0.929
indforgn2	-1.964	1.302
indforgn3	0.919	0.872
indforgn4	1.326	0.790
indforgn5	0.763	0.835
indforgn6	-0.446	0.897
indforgn7	0.444	0.810
indforgn8	0.216	0.837
indforgn9	-1.054	1.288
inforgn10	2.376	0.907

number of observations: 2051

value of log-likelihood at maximum: -435.27

strongly expected, makes this a surprising result.

The facts that the coefficients of subdiver2 and subprdcy2 were not statistically different from zero indicates that U.S. subsidiaries are neither more nor less likely to produce a number of products or to be preceded by a sales subsidiary than subsidiaries located elsewhere. Similarly, they are neither more nor less likely to be producing consumer goods (indgoods1), or to belong to parents whose home countries fail to belong to a customs union or free trade area (nateecef2). Again, for smaller companies, not in the sample, it may still be the case that such institutions are essential for developing the scale and sophistication to invest in the U.S.

The failure of the industry characteristics indprddf, indklrat, indscalc, and indgrow2 to discriminate between subsidiaries in the U.S. and those elsewhere is in part due to the imprecision with which some of the concepts are measured and to the extent to which these variables are representative of the same considerations captured by those industry variables retained in the constrained estimation. Still, it is important to note the failure of the industry capital-labor ratio to have any distinguishing effect, in view of the opinion expressed in Chapter 4 that investments in the U.S. should tend to be based on capital- or material-saving innovation. And the fact that industry rate of growth is unimportant as a discriminator squares with the findings of Leftwich mentioned in that chapter.

The poor showing of the two follow-the-leader variables indicates that such phenomena have not been important individual effects in direct investment behavior in the U.S. The failure of the variables representing levels of unit labor costs and the extent of exchange-rate disequilibrium in 1970 to discriminate between U.S. subsidiaries and others cannot be taken as conclusive evidence that such considerations were unimportant, though in the 1970 cross-section they fail to have independent effects. As noted earlier, the construction of the latter variable represents only a rudimentary measure of the effect of exchange rate disequilibrium on direct investment.

Inddeltf is also not the ideal variable to capture tariff-jumping behavior, as noted above. In any event, inddeltf's failure to discriminate between subsidiaries in the U.S. and those elsewhere does not mean that tariff-jumping behavior is not important, only that it is not more or less important in the U.S. than elsewhere.

Turning now to the variables contained in the constrained estimation reported in Table 6-3, it is first apposite to note the negative sign on the constant term. It indicates that, despite the inclusion of a number of characteristics designed to discriminate between U.S. subsidiaries and others, the posterior probability that a subsidiary is located in the U.S. is even lower than these characteristics indicate. This is a reflection of the facts that several of the characteristics are keyed to the U.S. environment and the fact that the sample contains 6.83% subsidiaries in the U.S. and 93.17% subsidiaries elsewhere.

Next we may note the negative sign on submatur, indicating that older subsidiaries are less likely to be U.S. subsidiaries. This finding mitigates the earlier conclusion that experience in international operations is not a characteristic of parents with subsidiaries in the U.S. Subsidiaries in the U.S. tend to be younger than those established elsewhere, so some direct investment experience is implied on the part of the parents in our sample.

Subsidiaries in the U.S. are distinguished by the fact that they do not tend to be minority controlled, as the negative sign on subcntrl2 indicates.[21] This result is in agreement with the findings of Arpan and Ricks and others noted in Chapter 4. Further, the coefficient of submrktx2 indicates that, compared to subsidiaries established elsewhere, U.S. subsidiaries are very unlikely to derive more than 50% of their sales from exports from the U.S. Again, this is to be expected, since the attraction of the U.S. is partly its size and volume of spending, rather than its cost advantages.

In view of this result, the positive sign of the coefficient of subindep1 is somewhat surprising. It indicates that U.S. subsidiaries are more likely than those located elsewhere to sell more than 50% of their output to their parent firm <u>or</u> to other affiliates in the parent's system. If they are not exporting this output, then the sales must be going to other subsidiaries of the parent in the U.S. What is the explanation for this seemingly incongruous result?

The answer is to be found in the confluence of two effects, one related to statistical procedures and one to that familiar phenomenon in the study of direct investment in the U.S., the domination of an aggregate by an individual effect. The statistical effect relates to the fact that, while only 12% of the subsidiaries in the U.S. in the sample sold more than 50% of their output to their parent or its affiliates, in the rest of the sample only 9% exhibited this behavior. Hence U.S. subsidiaries were 33% more likely to

---

[21]The subcntrl variable was originally trichotomized into absolute, majority and minority control, but U.S. subsidiaries were not distinguishable from those elsewhere on the basis of the absolute/majority distinction. Hence the trichotomy was reduced to a dichotomy.

have this trait, rare in the sample as a whole, than subsidiaries elsewhere and the statistical procedure found this 33% significant.

The individual effect related directly to why as many as 12% of the U.S. subsidiaries exhibited this behavior. As noted earlier, Philips Gloeilampenfabriken N.V. has over 30 subsidiaries in the U.S. Since the parent company, perhaps out of fear of anti-trust activity, has kept a strong arms-length relationship with its subsidiary operations in North America (not including their operating results in its annual reports until the late 1960's), it is not surprising that the subsidiaries in the U.S., following Philips practice worldwide, would source from each other to some extent.

The signs on the coefficients of the parent variables are quite instructive. The positive signs on par3dsic and parrdsls indicate that parents of U.S. subsidiaries tend to be more diversified and more R&D oriented than parents of subsidiaries located elsewhere. Though the coefficient of parrdsls is not quite twice its asymptotic standard error, together these results show that it is the most diversified and innovative of the world's largest companies that tend to invest in the U.S.

Remembering that parindpf is a ratio of the parent's rate of profit on all its operations to the rate of profit in the U.S. industry in which the subsidiary is located, we can observe that the negative sign on the coefficient of parindpf provides strong confirmation that the firms in our sample are quite concerned with relative rates of return and hence profit maximization in their U.S. operations, compared to their operations elsewhere. For it shows that as the ratio rises (the parent's rate of profit becomes larger relative to the rate of profit in the U.S. in the subsidiary's industry), the posterior probability that a parent will locate a subsidiary in the U.S. as compared to elsewhere, falls; similarly as the ratio falls, the probability rises.

Among the industry variables, the negative sign on the coefficient of indtechnl indicates that subsidiaries in the U.S. are less likely to be in high technology industries than subsidiaries elsewhere. This, of course, is consonant with the view that the U.S. comparative advantage in trade is in these high technology goods and has not been transferred to foreign firms in these industries. However, this result does not imply that innovation is an unimportant factor in direct investment in the U.S. (recall the positive coefficient on parrdsls). Rather, it suggests that this innovation is more directed to refinement of existing, well-understood technologies than development of new ones. In concert with the demonstrated concern for relative profitability, the negative coefficient of indtechnl suggests that the emphasis placed on learning behavior in the descriptive literature is mistaken.

The negative sign on the coefficient of indpngre indicates that foreign multinationals have been reticent to invest in the industries in which U.S. multinationals have made the largest number of investments abroad. To the extent that these industries are high technology industries, this result reinforces the conclusion that the "going up against the fastest gun in the West" mode of learning behavior does not characterize foreign investment in the U.S. Prior to 1970, at least, foreign multinationals seems to have been reticent to challenge U.S. corporations in their home markets in retaliation for U.S. investments abroad.

The positive signs on the coefficients of indconcn and indmktsz indicate that U.S. subsidiaries tend to be in industries in which firms are more concentrated and there is a larger U.S. market. The latter result reaffirms the notion that it is the size of the U.S. market that draws direct investment here. The former strongly suggests that the industrial organization paradigm with its emphasis on market imperfection is well-attuned to foreign direct investment in the U.S.

Focusing on the nation variables, we observe that the positive coefficient of natrluld (which, recall, is essentially the inverse of the rate of change of unit labor costs in the subsidiary's parent's home country) indicates that U.S. subsidiaries are less likely to be owned by parent firms from countries where wages are rapidly rising. Unit labor cost levels, however, do not appear to be important discriminators, as the coefficient on natrlulc is not significantly different from zero. Table 6A-6 in the appendix shows a strong negative correlation between natrlulc and natrlgdd, which may be obscuring the effects of unit labor cost levels. Economies with high wage levels are not likely to be the fastest growing economies. Similarly, the negative coefficient on natrlgdd (essentially the inverse of the rate of growth of aggregate output in the parent's home country) suggests that U.S. subsidiaries tend to be owned by parents whose countries are experiencing rapid growth. Since these are variables attempting to capture dynamic effects in a cross-section, these conclusions must be viewed in a very tentative light.

The positive coefficient on the variable natxopen indicates that, in our sample, it is much more probable that subsidiaries established in the

U.S. are owned by parents whose headquarters are in relatively open economies. The rationale for this result is interesting and provides some insight into the often-used argument that foreign direct investment in the United States had to wait upon the development of home markets of sufficient size to support the achievement of economies of scale in production and management to allow a firm to compete in the U.S. market. In this sample, this appears not to have been the case.

The decision to use the specification natxopen had its origins in the original use of the variables natstock and natrldgm in the model. The former was included to test diversification motives for direct investment in the U.S. It was expected that its coefficient's sign would be negative, indicating that parent firms from countries whose stock market indices were highly correlated with that of the U.S. were less likely to locate subsidiaries in the U.S. Instead, the coefficient estimated was positive and significantly different from zero. One explanation is, of course, that diversification is less likely to be a motive when industrialized countries invest in the United States than when they invest elsewhere, if elsewhere includes areas where returns are not very correlated with those in the U.S.; such, of course, is the case in our sample. But this would not explain a significant positive coefficient—only the absence of a significant negative one.

Moreover, the strong correlation (.61) of natstock and the latter variable, natrlgdm, suggested there was more content to the result than that given by diversification considerations. Natrlgdm was defined as the ratio of U.S. gross domestic product in manufacturing to a similar datum abroad. Hence the correlation of the two suggested that the larger the U.S. economy compared to the parent firm's home economy, the more highly correlated were their stock market indices. Such a relationship is to be expected in the case of Canada (where the stock market correlation is in fact .8), but it is hard to understand for such countries as The Netherlands and Switzerland.

Analysis of the stock market indices used in the estimations revealed that the indices of smaller countries were dominated, in value terms, by the shares of the large multinational companies in the sample to a much greater extent than the indices of larger countries. Hence it seemed obvious to search for the unexplained factor in the behavior of large multinationals with headquarters in small countries. Why were these firms more likely to establish subsidiaries in the U.S. than large multinationals from other countries?

One consistent explanation is a synthesis of two significant insights in the theory of international trade and investment; I have given this synthesis the name of the "small country product cycle." The first observation was made by Professor Kindleberger in a comment on the Hufbauer paper mentioned earlier (see footnote 14). To quote, it is

> ...the possibility that small countries can achieve exports in scale-economy goods where standardization is set by large countries; and...the possibility that the differentiated products of small countries, such as Dutch electrical equipment, Swedish machinery and telephones, Danish furniture, and Swiss pharmaceuticals (but not Belgian products), get accepted as the international standard.[22]

[22]Charles P. Kindleberger, "Comment" in Raymond Vernon, ed., The Technology Factor in International Trade, op. cit.

Clearly the description of Volvo's development in Chapter 3 fits this characterization.

Now consider two corporations in the same industry, producing the same product, starting up or resuming production at about the same time (as, for example, after a world war); one of the corporations is located in a large country and one in a small country. The small country firm will be forced into exporting before the large country firm, in order to achieve the scale economies necessary for efficient production.[23] If the small country firm is producing a product which is technologically advanced or which has a high income-elasticity of demand, then the United States is likely to be one of the countries to which it exports; the large country, not needing export markets so much, will delay exporting at all, and especially to the sophisticated U.S. market, where demand for product quality is high.

Consider now the product-cycle concept developed by Professor Vernon. As the product becomes standardized and easy to imitate, it is quite likely that in the technologically sophisticated United States it will be difficult for the small country firm to hold onto its market share by exporting. It will be forced to make a direct investment in the United States and reduce its exports here, at the same time as its counterpart in the large country is just beginning to export in volume to the U.S.[24] [25] Hence, given that

[23]The polar case of this situation is making all of one's sales in the export market. Tsurumi ("Japanese Multinational Firms," op. cit.) notes that in the 1960's Japanese manufacturers with the technological knowhow for products too sophisticated for the Japanese market (e.g., color television) have produced them in Japan for export to the U.S.

[24]There is some irreversibility here. In order to have a successful export program in the first place, the small country firm must produce a differentiated product which is a style-setter. If it does, the large country firm will necessarily be at a disadvantage when it begins to export, unless the small country firm can't meet the demand for its product.

[25]The reduction in exports will not hamper the achievement of economies of scale in production at home if other export markets are expanding with sufficient rapidity. Even if some production economies are sacrificed, economies of scale in marketing the product in the U.S. may be achieved.

both small and large European corporations started business essentially afresh after the second world war, the snapshot of our sample taken in 1970 would find that firms from small, open economies would have a plurality of the direct investments in the United States, according to the small country product cycle.[26],[27]

An aggregate representation of this need for small country firms to export and then make direct investments to maintain their markets is the variable natxopen.

The positive sign of the coefficient of natrlpcp indicates that Linder-type rationales for direct investment are apparently not involved in the experience of most foreign firms in the U.S., for as the value of natrlpcp rises (U.S. per-capita income becomes more dissimilar to that of the parent firm's country), the probability that a subsidiary is located in the U.S. will increase. Indeed the fact that the coefficient is 1.5 times its standard error suggests that this approaches a significant relationship. This result likely reflects in part the underrepresentation of subsidiaries of Canadian, Australian and Swedish parents in the sample. To the extent that countries with open economies are densely populated and hence have relatively low per-capita incomes (e.g. The Netherlands) , this result tends to support the small-country product cycle.

Finally, consider the coefficients of the variables indforgnl-10. Of this group, the coefficient of indforgn10 (instruments) is twice its

---

[26]This concept serves not only to explain this occurrence in the sample, but also in the Department of Commerce aggregate data, where Switzerland and The Netherlands rank third and fourth in value of assets in manufacturing industries in the U.S.

[27]Another example of an instance in which the economic development of a small nation has differed from that of a large nation is given by Eric Schiff, Industrialization without National Patents: The Netherlands, 1869-1912; Switzerland, 1850-1907 (Princeton, Princeton University Press, 1971).

asymptotic standard error, while the coefficients of indforgn2 (textiles) and indforgn4 (chemicals) are nearly 1.5 or more times their asymptotic standard errors. In these broad industry categories, then, there are considerations not emboided elsewhere in the vector of characteristics x which make it more likely that subsidiaries in the U.S. are in the instruments and chemicals industries and less likely that they are in textiles, rather than in the normalized category, miscellaneous industry, compared to subsidiaries elsewhere. The chemicals dummy is undoubtedly picking up historical effects described in Chapter 1, while the textiles dummy indicates that firms are quite unlikely to locate in industries in which the U.S. has lost its comparative advantage, and in which competition within the industry in the U.S. is strong. The strong showing of the instruments dummy suggests learning motivations in this high technology industry.[28]

Comparative Statics

To get a clearer picture of the importance of the various characteristics in determining the posterior probabilities, it is instructive to perform a few comparative statics experiments. The procedure is as follows: define a representative subsidiary; compute the probability that it is located in the U.S., based on the estimated coefficients; alter one characteristic of the representative subsidiary by a given amount and observe how the calculated probability changes. The representative subsidiary is defined as one founded in 1961 (and hence 10 years old) which sells more than half of

[28]It should be noted that the tendency to stay out of industries in which America has lost comparative advantage is diminishing. Several Japanese textile concerns established factories in the U.S. in 1973 and 1974 in the wake of rising wages in Japan, the devaluation, and Asian revulsion at the wave of Japanese direct investment there.

its output to some firm other than its parent or the parent's affiliate, which does not derive more than 50% of its sales from exports, and which is majority controlled by its parent. The parent of this subsidiary is assumed to manufacture products in 10 different 3-digit SIC's, spend 3% of its sales on R&D, and to report profits as a percentage of net worth at 40%. The industry in which the subsidiary is located is SIC 281, industrial chemicals. The parent of the subsidiary is assumed to be German.

The estimated probability that a firm with these characteristics would be located in the United States is 0.0582. Table 6-4 shows how this probability would change if the parent came from a different country, with the subsidiary continuing to produce in SIC 281. It is instructive to note that the computed probabilities for The Netherlands, Sweden, Switzerland and Belgium are definitely larger than that for Germany, indicating that there is some content to the small country product cycle concept. Of course, the estimated probability for the neighboring Canadian firm is highest. What is surprising is the fact that the calculated probability for the United Kingdom is even lower than that for Germany, especially in view of the fact that Department of Commerce figures on direct investment show the British total in manufacturing in the U.S. to be second in size to that of Canada. This result is not a consequence of the industry chosen, either, since in SIC 281 in our sample the British have even more subsidiaries worldwide than the Germans, 46 to 43. Rather, the low calculated probability reflects the worldwide geographical distribution of U.K. subsidiaries and the much greater direct investment experience of U.K. firms (713 of the subsidiaries in the sample have parents from the U.K.).

Table 6-4

ESTIMATED PROBABILITY THAT THE REPRESENTATIVE SUBSIDIARY IS LOCATED IN THE UNITED STATES FOR DIFFERING HOME COUNTRY OF PARENT

Germany	.0582
France	.0828
Belgium	.1936
Netherlands	.2207
Italy	.1034
Sweden	.0727
Switzerland	.1021
United Kingdom	.0671
Australia	.0716
Japan	.1227
Canada	.2391

Table 6-5 shows how the calculated probability varies across industries, holding all other characteristics of the representative subsidiary constant. The departures from .0582 are not as striking as in the previous table, with the exception of the aircraft industry. The calculated probability here is in part due to the small number of subsidiaries in this industry in our sample (6), one of which happens to be in the U.S. Still, compared to the other nations of the world, it is clear that the U.S. is the home of the aircraft industry, so perhaps this large probability is not too surprising. Other industries for which the calculated probabilities are much higher than that of the representative subsidiary are instruments, fabricated metals, and printing and publishing. Industries where the calculated probabilities are quite low are farm machinery and equipment, motor vehicles, and electrical equipment and appliances (SIC's 361 and 362). These industry results confirm the proposition that direct investment in the United States is an industry specific phenomenon.

Tables 6-6 through 6-9 show the effects of changing the representative subsidiary's age, the diversification of its parent, its parent's expenditure on R&D, and its parent's reported profits. The variables which have the most profound effects on the calculated probabilities are the age of the subsidiary and the degree of diversification of the parent. The parent's rate of profit on net worth affects the calculated probability that a subsidiary is in the U.S. very little.

Finally, Table 6-10 shows the effect of changing the other characteristics of the subsidiary. All the changes made have pronounced effects on

Table 6-5

ESTIMATED PROBABILITY THAT THE REPRESENTATIVE SUBSIDIARY IS LOCATED IN THE UNITED STATES FOR DIFFERING SIC OF SUBSIDIARY

Grain Mill Products	.0160	Stone, Clay and Glass	.0354
Beverages	.0173	Primary Metals	.0670
Other Food Products	.0455	Fabricated Metals	.0913
Tobacco	.0291	Farm Machinery	.0050
Textiles and Apparel	.0093	Industrial Machinery	.0411
Lumber and Wood	.0289	Office Machinery	.0366
Furniture and Fixtures	.0257	Other Non-Electrical Machinery	.0333
Paper and Allied Products	.0792	Household Appliances	.0228
Printing and Publishing	.0824	Electrical Equipment	.0067
Drugs	.0243	Electrical Components	.0641
Soaps and Cosmetics	.0605	Other Electrical Machinery	.0303
Industrial Chemicals	.0582	Motor Vehicles	.0098
Plastics	.0603	Aircraft	.6230
Other Chemicals	.0662	Other Transport Equipment	.0042
Petroleum Refining	.0311	Instruments	.1737
Rubber	.0732	Miscellaneous	.0196

Table 6-6

ESTIMATED PROBABILITY THAT THE REPRESENTATIVE SUBSIDIARY IS LOCATED IN THE UNITED STATES FOR SUBSIDIARIES OF DIFFERENT AGES

Founding Date	Probability
1951	.0409
1961	.0582
1966	.0692

Table 6-7

ESTIMATED PROBABILITY THAT THE REPRESENTATIVE SUBSIDIARY IS LOCATED IN THE UNITED STATES FOR SUBSIDIARIES WHOSE PARENTS EXHIBIT DIFFERENT DEGREES OF PRODUCT DIVERSIFICATION

Number of 3-Digit SIC's In Which Produced	Probability
5	.0433
10	.0582
15	.0779

Table 6-8

ESTIMATED PROBABILITY THAT THE REPRESENTATIVE SUBSIDIARY
IS LOCATED IN THE UNITED STATES FOR SUBSIDIARIES
WHOSE PARENTS SPEND DIFFERENT PERCENTAGES OF TOTAL SALES ON R&D

Percentages	Probability
.01	.0510
.03	.0582
.05	.0664

Table 6-9

ESTIMATED PROBABILITY THAT THE REPRESENTATIVE SUBSIDIARY
IS LOCATED IN THE UNITED STATES FOR SUBSIDIARIES
WHOSE PARENTS REPORT DIFFERENT RATES OF PROFIT ON NET WORTH
RELATIVE TO THE AVERAGE RATE OF PROFIT
IN THE REPRESENTATIVE SUBSIDIARY'S INDUSTRY

Reported Relative Rate	Probability
.30/.071	.0591
.40/.071	.0582
.50/.071	.0573

Table 6-10

ESTIMATED PROBABILITY THAT THE REPRESENTATIVE SUBSIDIARY IS LOCATED IN THE UNITED STATES FOR SUBSIDIARIES WITH OTHER CHARACTERISTICS

Changed Characteristic	Probability
Subsidiary sells more than 50% of total sales to parent or its affiliates	.0997
Subsidiary is minority controlled	.0210
Subsidiary realizes over 50% of sales by exporting from host country	.0066

the calculated probability. The relatively high probability achieved when the subsidiary sells more than 50% of its output to its parents or their affiliates is explained by the Philips case discussed earlier. Minority-controlled subsidiaries are much less likely to be located in the U.S., and those which export more than 50% of their sales from the market in which they are located have almost no probability of being in the U.S.

In summary, it may be said that categorical, discrete effects, such as those embodied in Tables 6-4, 6-5 and 6-10 appear to be more important than continuous effects in altering the probability that the representative subsidiary is in the United States. Further, country effects make the largest change in the calculated probabilities.[29] Finally, because of the unbalanced nature of the sample, none of the calculated probabilities are very high.

Discrimination Analysis

Up to now the principal focus has been on the structure of the calculated posterior probabilities and the implications this structure has for motivations to establish a subsidiary in the U.S. Now consider the discrimination portion of the analysis. Table 6-11 contains the results of classifying each subsidiary in the sample as being located in the U.S. or elsewhere on the basis of the estimated coefficients $\{\alpha_i\}$, according to the discriminant rule given earlier.

---

[29] G.V. G. Stevens found the same to be true for U.S. direct investments abroad in "Fixed Investment Expenditures of Foreign Manufacturing Affiliates of U.S. Firms: Theoretical Models and Empirical Evidence," _Yale Economic Essays_, 9 (Spring 1969), 137-200.

Table 6-11

DISCRIMINATION RESULTS WITH A

RULE BASED ON A POSTERIOR PROBABILITY OF .50

		Actual	
		in U.S.	not in U.S.
Predicted	in U.S.	2	0
	not in U.S.	138	1911

Observations correctly classified: 93.27%

Table 6-12

DISCRIMINATION RESULTS WITH A

RULE BASED ON A POSTERIOR PROBABILITY OF .32

		Actual	
		in U.S.	not in U.S.
Predicted	in U.S.	27	17
	not in U.S.	113	1894

Observations correctly classified: 93.66%

Superficially, the results look excellent—93.27% of the observations are classified correctly. To obtain an accurate barometer of the meaning of this figure, however, it is necessary to compare it with the predictions generated by a naive model. The notion of goodness-of-fit in nonlinear models is not well developed, though some progress has been made in special cases with a limited number of independent variables.[30] Accordingly, it is not obvious what naive model should be chosen. Several will be considered here.

One approach somewhat analogous to the meaning of R^2 in linear models is the naive maximum likelihood method referred to earlier, which involves including only a constant in the vector of characteristics x, then estimating the posterior probabilities and classifying the observations.[31] As indicated, the estimated probability that a subsidiary would be in the U.S. will be the same for every observation and equal to the sample frequency, .0683. Hence every subsidiary would be classified as not being in the U.S.; in an unbalanced sample such as the one used in this study, a "naive" maximum likelihood method is pretty sophisticated. Thus, it is not surprising that inclusion of more elements in the vector x has only a marginal

---

[30]See D.R. Cox and E.J. Snell, "A General Definition of Residuals," Journal of the Royal Statistical Society, B30 (1968), 248-275, and, by the same authors, "On Test Statistics Calculated From Residuals," Biometrika 58 (1971).

[31]In a general specification with a constant and several categorical variables, the estimated posterior probability for this naive model would be the same as the estimated probability for the general specification when all observations fell into the normalized categories of the categorical variables.

effect on the number of observations classified correctly.[32,33]

Of course, part of the reason for this marginal effect is the fact that the posterior probabilities upon which the discriminant rule is based must be estimated using the (unbalanced) sample. Since these probabilities must be estimated, there is no assurance that, in our sample, a discriminant rule which places a subsidiary in the U.S. if its estimated probability of being there is greater than or equal to .50 will maximize the number of correct allocations.

In fact, in our sample the cutoff probability which maximizes the number of correct allocations is .32. Using this figure, Table 6-12 indicates that 93.66% of the observations are correctly classified, a marginal change over the .50 rule. However, 27 U.S. subsidiaries are classified correctly, a strong improvement over the results reported in Table 6-11.

Perhaps a more useful measure of goodness of fit is obtained by focusing on the value of the log-likelihood functions in the naive case (L_n) and the case with more than a constant terms in the x vector (the "sophisticated" case) denoted by (L). The analogy goes to what ordinary squares does in a linear model, which is maximize R^2; obviously, L and L_n are the maximands in this non-linear specification. One obvious idea is to compute the value of the log likelihood function at its maximum in the naive case (which is -510.92) and view it as a constrained estimation under the null hypothesis that the coefficients of the other 25 variables in Table 6-5 are in fact

[32]J.A. Anderson indicates that in balanced samples, the role of the non-constant variables in x in the discrimination problem is much increased ("Separate Sample Logistic Discrimination," Biometrika, 59 (1972), 19-35).

[33]Note that in a sample with 51% of the observations in one category and 49% in another, the naive maximum likelihood approach would still predict that all the observations would be in the former category, leaving much room for improvement.

zero, then perform the standard likelihood-ratio test. When this is done, the null hypothesis is easily rejected at the .005% level of significance.

A similar approach is to measure the increase in the value of the maximized log-likelihood function obtained by expanding the vector of characteristics x to include more than a constant, relative to its maximized value when the vector x includes a constant alone. Define the ratio as

$$R = \frac{L_n - L}{L_n}$$

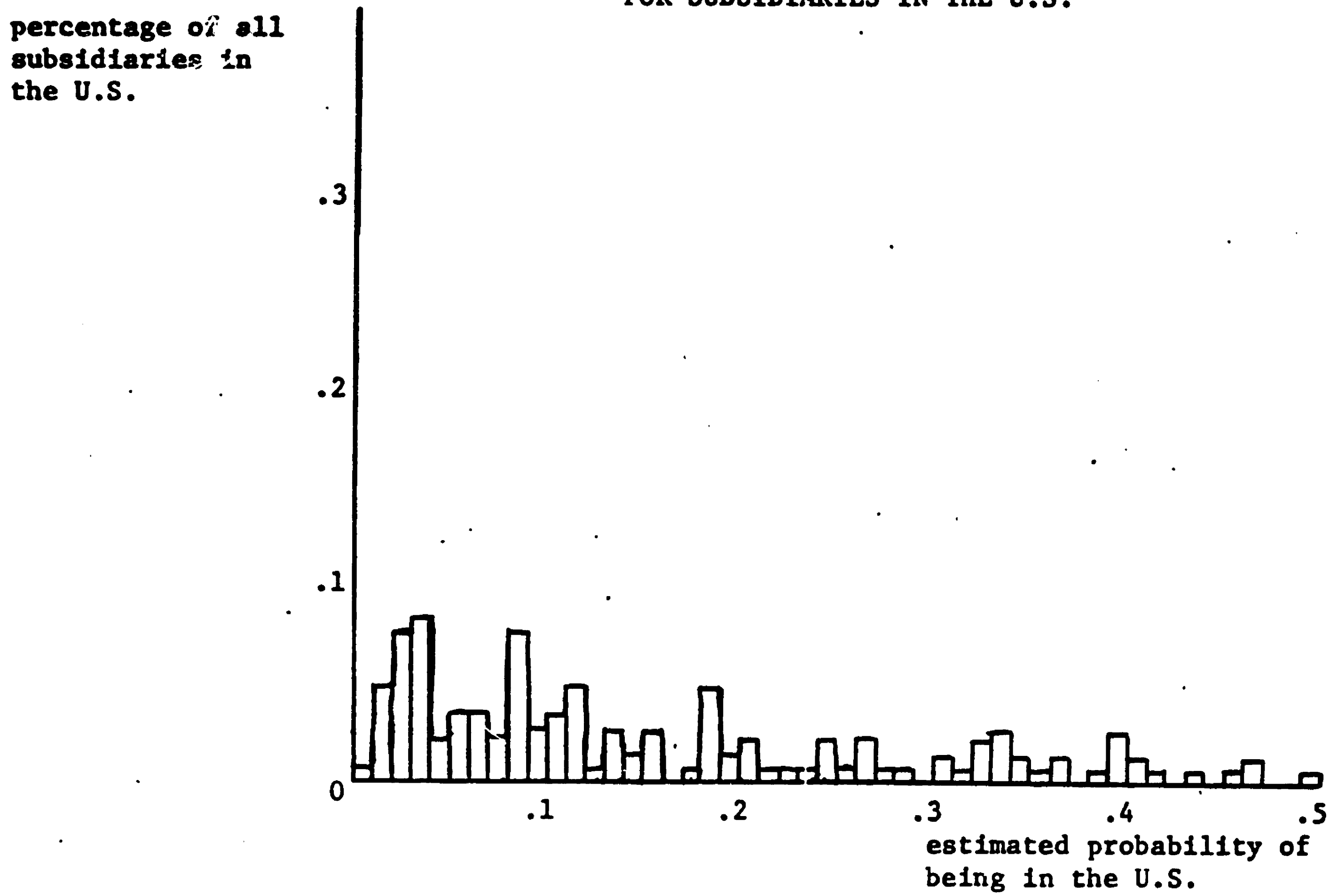
and observe that if $L = L_n$ (the addition of extra variables does not increase the maximized log-likelihood), $R = 0$. And if $L = 0$, so that the likelihood equals 1, $r = 1$.[34] In the case under study here, $R = (-510.95 - (-435.27))/(-510.92) = 75.68/510.92 = .148$ which, though not large, is perhaps adequate for cross-section data.

Though no characteristic of U.S. subsidiaries is sufficiently distinctive to allow the correct classification of more than 20% of them, the discriminant analysis does achieve seom separation of the estimated probabilities in the two cases, as the graphs in Figures 6-1 and 6-2 show. In each graph, the horizontal axis represents the calculated posterior probabilities, from .01 to 1.00, while the vertical axis represents the percentage of subsidiaries in each category that were predicted to have the probability of being in the United States given on the horizontal axis. It is evident that the distribution of predicted probabilities for subsidiaries in fact located in the U.S. is definitely shifted to the right compared to the

[34]Note that just as R^2 is related to the F-statistic for a regression, so is R defined above related to the chi-square statistic used in non-linear situations. Specifically, $-2 \log m = -2RL_n$.

Figure 6-1

FREQUENCY DISTRIBUTION OF ESTIMATED PROBABILITIES
FOR SUBSIDIARIES IN THE U.S.

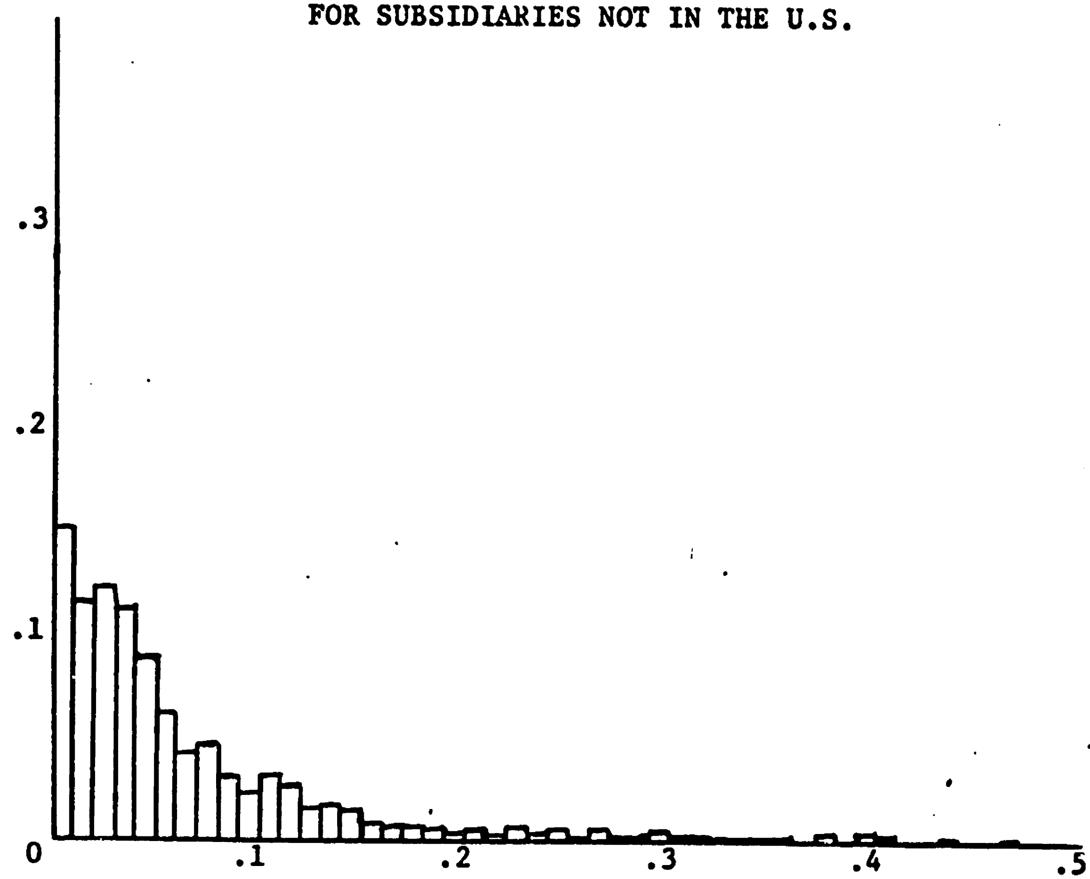


Mean estimated probability = .1666

(2 observations have an estimated probability greater than .50)

Figure 6-2

FREQUENCY DISTRIBUTION OF ESTIMATED PROBABILITIES
FOR SUBSIDIARIES NOT IN THE U.S.



Mean estimated probability = .0610

distribution for subsidiaries not in the U.S. The mean of the former distribution (the average calculated posterior probability of being located in the U.S.) is .1666; the mean of the latter is .0610.

Finally, we may use a graphical technique suggested by Cox and Snell[35] to again measure goodness-of-fit. The horizontal axis in Figure 6-3 represents the estimated probability that a subsidiary is located in the U.S. The vertical axis then indicates the proportion of observations with that estimated probability which are in fact in the U.S. Cox and Snell observe that the relationship should roughly obey a 45° line passing through the origin. In the low range of estimated probabilities, where most of the observations are clustered, the plotted points do roughly obey this behavioral rule.

Summary and Implications for Theories of Direct Investment

In this chapter the empirical analysis of the characteristics distinguishing manufacturing subsidiaries located in the U.S. from those established elsewhere was reported. It was shown that the probability that a subsidiary was located in the U.S. was higher

- the younger the subsidiary;
- if the subsidiary was majority controlled by its parent;
- if the subsidiary produced primarily for the market of the country in which it was located;
- the more the subsidiary's parent was diversified across product lines;
- the more the subsidiary's parent spent on R&D as a percentage of sales;
- the higher the average rate of profit in the U.S. industry in which the subsidiary produced its principal product, compared to the rate of profit on the parent's operations worldwide;

[35] See footnote 30.

295

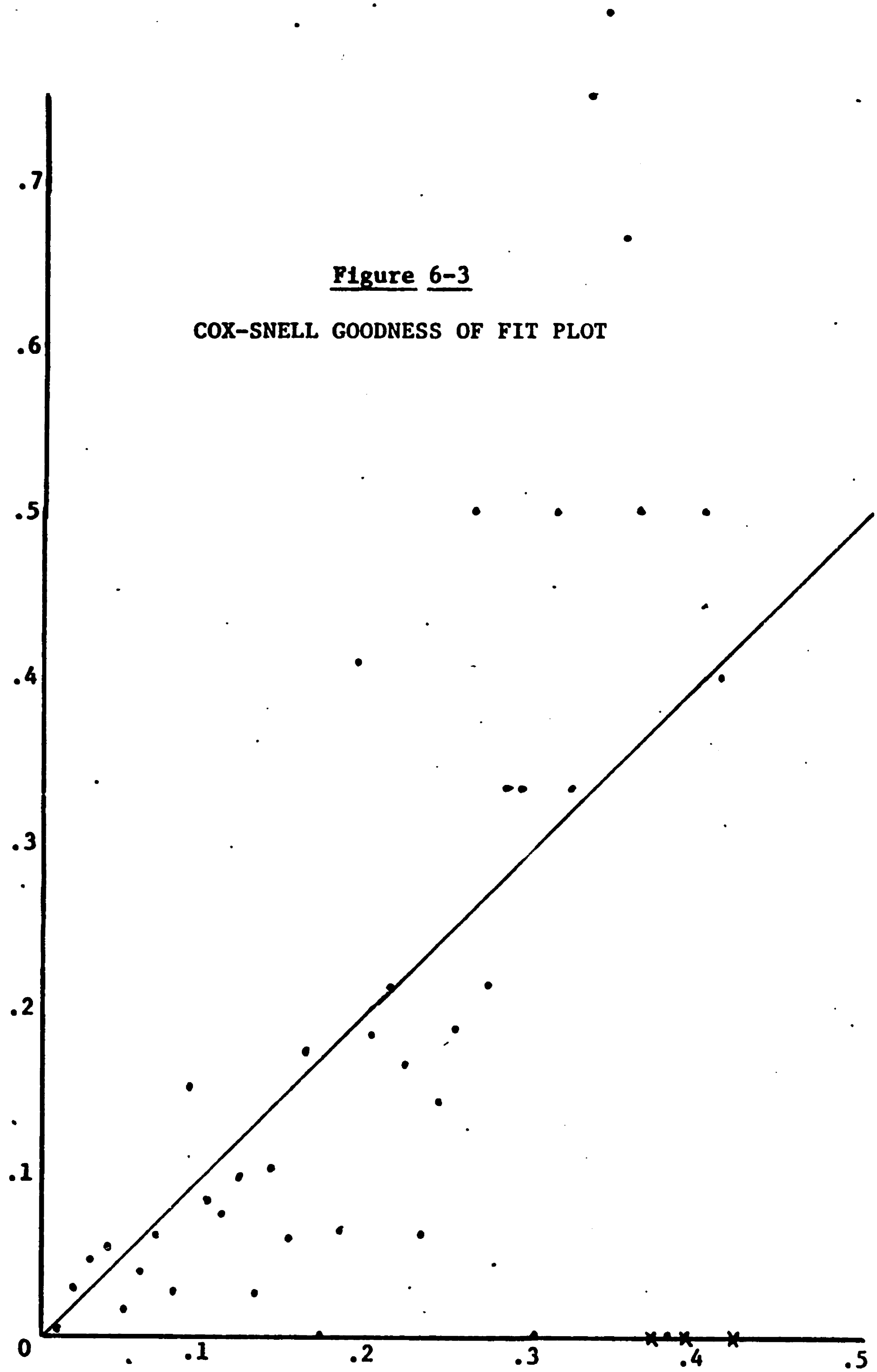


Figure 6-3

COX-SNELL GOODNESS OF FIT PLOT

vertical axis: number of observations in U.S. with probability equal to y divided by total number of observations with probability equal to y.

horizontal axis: estimated probability of being in the U.S., y

x - denominator of fraction was zero

- if the subsidiary did not produce a product in a high technology industry;
- if the subsidiary did not produce in an industry in which U.S. multinationals had made extensive investments abroad, relative to the number of firms in the industry in the U.S.
- the larger was the size of the U.S. market in the industry in which the subsidiary produced its principal product;
- the higher the concentration ratio in the U.S. industry in which the subsidiary produced its principal product;
- the more open the economy of the country of the subsidiary's parent, suggesting the existence of a small country product cycle;
- the faster the rate of growth of output in the country of the subsidiary's parent;
- the slower the rate of growth of unit labor costs in the country of the subsidiary's parent;
- the more dissimilar the per-capita incomes of the U.S. and the country of the subsidiary's parent;
- if the subsidiary was in the chemicals or instruments industry;
- if the subsidiary was not in the textiles industry.

This probability changed more when the qualitative (e.g., country, industry) characteristics of the subsidiary were altered in a comparative statics analysis than when the quantitative (e.g., R&D as a percentage of sales) characteristics were altered. No characteristic of the 140 U.S. subsidiaries was sufficiently marked to allow correct discrimination of more than 20% of these; however, over 93% of all subsidiaries were classified correctly as either U.S. or non-U.S. based on the estimated probabilities.

Factors which did not significantly (in a statistical sense) affect the probability that a subsidiary was located in the U.S. as opposed to elsewhere were

- the size of its parent, as measured by sales;
- whether it was formed <u>de novo</u> or in another fashion;
- whether it had been preceded by a sales subsidiary;
- whether it produced a few or a number of products;
- the amount of its parent's sales outside the parent's home country;
- the amount of its parent's sales derived from exports;
- the size of the decrease in tariffs in the Kennedy Round for the industry in which the subsidiary produced its principal product;
- whether it produced a consumer or a producer good;
- the degree of product differentiation characterizing the U.S. industry in which the subsidiary produced its principal product;
- the rate of growth of the size of the U.S. industry in which the subsidiary produced;
- the scale economies available in the U.S. industry in which the subsidiary produced;
- the capital-labor ratio in the U.S. industry in which the subsidiary produced;
- the level of unit labor costs in the country of the subsidiary's parent;
- the degree of exchange rate disequilibrium between the dollar and the currency of the country of the subsidiary's parent at year end 1970;
- whether the country of the subsidiary's parent was a member of the EEC or EFTA, or not;
- whether or not the subsidiary was established during a clustering of direct investment ventures either by firms in its parent's country or in the industry in which it produced its principal product.

The pictures that emerges from these results has definite implications for theories of direct investment and observations made concerning the motivations for foreign direct investment in the United States. The role of the size of the U.S. market is confirmed, as Franko and Leftwich suggested, and relative profit rates are definitely important, corroborating Prachowny's analysis. Indeed, the strong showing of relative profit rates suggests that learning behavior is much less important in the U.S. environment than is popularly supposed; when one considers the fact that the resources committed to a U.S. operation are often a significant percentage of the parent firm's total assets, one understands the need to realize a profit from the commitment of these resources.[36] The results also suggest that investments in the U.S. exhibit the preference of the parents for majority ownership noted by Franko, Daniels, and Arpan and Ricks, though the evidence does not support the contention that there is a preference for absolute (100%) ownership.

The results do not corroborate the observations of Faith and Hellman that U.S. subsidiaries exploit a "product niche" more than those elsewhere. Nor do they directly support Sametz' contention that European companies waited until they grew to a sufficient size before investing in the U.S., with this growth occurring as a consequence of the development of the E.E.C. To be sure, some of this customs union effect may be picked up by the submatur variable, for U.S. subsidiaries do tend to be younger.[37] But even though the sample is one of subsidiaries of large firms, it is significant that the parents of U.S. subsidiaries tend to be no larger than those of subsidiaries located anywhere else. And as the small country product cycle

---

[36]This observation must be qualified for the case of instruments, noted earlier, where startup costs are low.

[37]This supports Horst's finding ("Firm and Industry Determinants of the Decision to Invest Abroad") that direct investments in one area are "stepping stones" to investments elsewhere.

concept shows, home country size of market is by no means essential for direct investment success.

Finally, the estimations do not suggest that foreign firms have more of a preference for acquisitions in the U.S. than elsewhere. The results do not credit exchange rate disequilibrium with being a significant factor influencing direct investment in the U.S. up to 1970; and they give no evidence that investments in U.S. industries are particularly concentrated in those with certain capital-labor ratios. As one might expect from investments made by parent firms in the major industrialized countries, diversification motives appear to have been more involved in the establishment of subsidiaries outside of the U.S. (where returns are less correlated with the home country) than in it.

In sum, then, the theory of direct investment which the coefficients reported in Table 6-3 most tend to support is the industrial organization approach, with profit-maximizing firms exploiting a technological or goods-market imperfection in the sophisticated U.S. market, and being reluctant to share their know-how. Certainly elements of other theories are involved in the U.S. experience, but as with the case of U.S. direct investment abroad, the industrial organization paradigm seems most powerful.

To be sure, the data base used in reaching this conclusion is not without its shortcomings. As noted earlier, financial data are not available, nor is information on investments that took place in the home market. The sample is confined to the subsidiaries of the largest non-U.S. firms, and covers only direct investments made up to 1970. Hence, the results reported at most can be taken as a fairly accurate description of forces influencing direct investment before 1971. As with any econometric analysis, they are valid for the future only if no structural change is assumed; such was hardly the case in the years after 1970.

Appendix to Chapter 6

DATA DESCRIPTION

As indicated in chapter 6, the data base for this study draws in large part on the on-going efforts of the Harvard Business School Multinational Enterprise Project. It is the purpose of this appendix to describe the manner in which the HBS data were combined with data from other sources to form each of the 2051 observations used in the analysis.

228 multinational firms were selected for use by the HBS MNE Project. These firms were the 200 largest firms, as measured by sales, outside the United States according to Fortune magazine's 1970 listing; 20 manufacturing and trading enterprises which did not appear on the Fortune list but which had sales as large as the companies which did appear on the list; and two German enterprises and six Japanese zaibatsu that were broken up at the end of World War II. The parent firms in the sample are shown in Table 6A-1.

Information was obtained on 15 characteristics of each parent firm and stored on 228 data cards by the Project. The characteristics on which data were obtained are shown in Table 6A-2; asterisks indicate which characteristics were chosen for use in the statistical analysis.

Each parent enterprise was asked to complete the questionnaire shown in Table 6A-3 for each firm (whose primary place of activity was outside the home country) in which the parent held at least a 5% equity interest (directly or through another company in which the

Table 6A-1

CORPORATIONS INCLUDED IN THE HARVARD BUSINESS SCHOOL
FOREIGN MULTINATIONAL ENTERPRISE STUDY

AEG-Telefunken	Ger
Aerospat ıle	Fr
Agfa-Gevaert Group	Ger-Bel
L'Air Liquide	Fr
Akzo	Neth
Alcan Aluminium	Can
Allied Breweries	U.K.
Alusuisse (Swiss Aluminium)	Switz
ARBED	Lux
Asahi Chemical Industry	Jap
Asaño*	Jap
ASEA	Sw
Associated British Foods	U.K.
Ataka Co.#	Jap
Axel Johnson Group#	Sw
BASF	Ger
Bass Charrington	U.K.
Farbenfabriken Bayer	Ger
Beecham Group	U.K.
BHP (Broken Hill Pty.)	Aust.
BMW (Bayerische Motoren Werke)	Ger
Robert Bosch	Ger
Boussois Souchon Neuvesel	Fr
Bowater Paper	U.K.
Bridgestone Tire	Jap
British-American Tobacco	U.K.
British Ins. Callender's Cable	U.K.
British Leyland Motor	U.K.
British Oxygen	U.K.
British Petroleum	U.K.
British Steel	U.K.
Brooke Bond Liebig	U.K.
Brown, Boveri	Switz
Buderus'sche Eisenwerke	Ger
Burmah Oil	U.K.
Cadbury Schweppes	U.K.
Canada Packers	Can
Charbonnages de France	Fr
Ciba-Geigy	Switz
Cie Frances des Pétroles	Fr
Cie Générale d'Electricité	Fr
Citroën	Fr
Coats Patons	U.K.
Cockerill	Bel
Consolidated Gold Fields	U.K.
Consolidated Tin Smelters	U.K.
Continental Gummi-werke	Ger
Courtaulds	U.K.
CSR (Colonial Sugar Refining)	Aust.
Daimler-Benz	Ger
De Beers Consolidated Mines	S. Afr.
Degussa	Ger
Delta Metal	U.K.
Distillers	U.K.
Distillers Corp.-Seagrams	Can
Domtar	Can
DSM	Neth
Dunlop	U.K
ELF (ERAP)	Fr
EMI	U.K.
ENI	Italy
LM Ericsson Telephone	Sw
I. G. Farben*	Ger
Feldmühle-Dynamit Nobel	Ger
Fiat	Italy
Friedrich Flick#	Ger
Fujitsu	Jap
Furukawa Electric	Jap
Gelsenberg	Ger
General Electric	U.K.
Gränges	Sw
Guest, Keen & Nettlefolds	U.K.
Gutehoffnungshütte	Ger
Hawker Siddeley Group	U.K.
Henkel#	Ger
Hindustan Steel	India
Hitachi	Jap
Hitachi Shipbuilding & Eng.	Jap
Farbwerke Hoechst	Ger
Hoesch	Ger
Hoffman-La Roche	Switz
Honda Motors	Jap
Hoogovens	Neth
ICI (Imperial Chemical Ind.)	U.K.
Idemitsu Kosan	Jap
Imperial Tobacco Group	U.K.
Indian Oil	India
International Nickel	Can
IRI#	Italy
ISCOR	S. Afr.
Ishikawajima-Harima	Jap
Isuzu Motors	Jap
Italsider	Italy
C. Itoh & Co.#	Jap
Johnson Matthey	U.K.
Kanegafuchi Spinning	Jap
Kanematsu-Gosho#	Jap
Kawasaki Heavy Industries	Jap
Kawasaki Steel	Jap
Kirin Brewery	Jap
Klöckner-Humboldt-Deutz	Ger
Klöckner-Werke	Ger
Kobe Steel	Jap
Komatsu	Jap
Kooterativa Foreundet#	Sw
Krupp-Konzern	Ger

Kubota	Jap
Librairie Hachette	Fr
Lonrho	U.K.
Joseph Lucas Industries	U.K.
J. Lyons	U.K.
MacMillan Bloedel	Can
Mannesmann	Ger
Marubeni Iida #	Jap
Maruzen Oil	Jap
Massey-Ferguson	Can
Matsushita Electric Industrial	Jap
Metal Box	U.K.
Metallgesellschaft	Ger
Metallurgie Hoboken-Overpelt	Bel
Michelin	Fr
Mitsubishi*	Jap
Mitsubishi Chemical Ind.	Jap
Mitsubishi Corp.#	Jap
Mitsubishi Electric	Jap
Mitsubishi Heavy Industries	Jap
Mitsubishi Metal Mining	Jap
Mitsubishi Oil	Jap
Mitsubishi Rayon	Jap
Mitsui*	Jap
Mitsui & Co.#	Jap
Mitsui Shipbuilding & Eng.	Jap
Montecatini Edison	Italy
Moore	Can
National Coal Board	U.K.
Nchanga Consol. Copper Mines	Zam
Nestlé	Switz
Nichimen Co.#	Jap
Nippon Electric	Jap
Nippon Kokan	Jap
Nippon Mining	Jap
Nippon Steel	Jap
Nissan*	Jap
Nissan Motor	Jap
Nisshin Steel	Jap
Nissho-Iwai#	Jap
Noranda Mines	Can
Norddeutsche Affinerie	Ger
Northern Electric	Can
Olivetti	Italy
Pechiney	Fr
Pemex	Mex
Petrofina	Bel
Petróleo Brasileiro	Brazil
Peugeot	Fr
Philips' Gloeilampenfabrieken	Neth
Pirelli	Italy
Plessey	U.K.
Quandt #	Ger
Ranks Hovis McDougall	U.K.
Reckitt & Colman	U.K.
Reed International	U.K.
Renault	Fr
Rheinstahl	Ger
Rhône-Poulenc	Fr
Rio Tinto-Zinc	U.K.
Roan Consolidated Mines	Zam
Rolls-Royce	U.K.
Royal Dutch/Shell Group	Neth-U.K.
SAAB-Scania	Sw
St. Gobain-Pont-à-Mousson	Fr
Salzgitter	Ger
Sandoz	Switz
Sanyo Electric	Jap
Schlumberger	Neth. Ant.
Schneider	Fr
Sekisui Chemical#	Jap
Sharp	Jap
Showa Denko	Jap
Siemens	Ger
SKF	Sw
Snia Viscosa	Italy
Snow Brand Milk Products	Jap
Société Générale#	Bel
Solvay	Bel
Sony	Jap
Spillers	U.K.
Steel Co. of Canada	Can
Sulzer	Switz
Sumitomo*	Jap
Sumitomo Chemical	Jap
Sumitomo Electric Industries	Jap
Sumitomo Metal Industries	Jap
Sumitomo Shoji#	Jap
Svenska Tändsticks	Sw
Taiyo Fishery	Jap
Takeda Chemical Industries	Jap
Tate & Lyle	U.K.
Teijin	Jap
Thomson-Brandt	Fr
Thorn Electrical Industries	U.K.
Thyssen-Hütte	Ger
Toa Nenryo Kogyo	Jap
Tokyo Shibaura Electric	Jap
Toray Industries	Jap
Toyobo	Jap
Toyo Kogyo	Jap
Toyomenka (Tomen)#	Jap
Toyota Motors	Jap
Tube Investments	U.K.
Ube Industries	Jap
Ugine Kuhlmann	Fr
Unigate	U.K.
Unilever	U.K.-Neth
Union International	U.K.
Unitika	Jap
Usinor	Fr
Vallourec	Fr
Varta	Ger
Veba#	Ger

Vereinigte Stahlwerke*	Ger
Vickers	U.K.
Volkswagenwerk	Ger
Volvo	Sw
Wendel-Sidelor	Fr
Whitbread#	U.K.
Yacimientos Petroliferos	Arg
Yasuda*	Jap

* These are companies which were broken up by the allies after WW II. They ar studied until the date of their dissolution. The fragments of these combines which are also on this list are considered to have begun their 'life' at the time of the original combines dissolution.

\# These are companies which we have decided should be added to the study.

The remainder of the companies are the companies listed in the <u>Fortune Directory</u> - Aug. 1971 of the 200 largest industrials outside of the U.S..

Table 6A-2

HARVARD BUSINESS SCHOOL
FOREIGN MULTINATIONAL ENTERPRISE STUDY
PARENT DATA

3-digit code name*

Sales*

Assets

Net profits*

Net worth*

Number of employees

Number of 3-digit SIC's in which a product is manufactured*

Average wage per worker per year

Total wages paid

R and D expenditures*

Number of R and D workers

Advertising expenditures

Sales outside home country*

Export sales*

Number of employees outside home country

Notes: Data refer to 1970; value data are in millions of dollars; asterisk (*) denotes that characteristic was used in the statistical analysis.

Table 6A-3
MULTINATIONAL ENTERPRISE STUDY
Subsidiary Data

1. Name of system (i.e., ultimate parent):

2. Most recent name of subsidiary:

3. Country in which subsidiary is incorporated:

4. Country in which subsidiary's primary activity is performed, if different from above:

5. Year subsidiary entered system:

6. How subsidiary entered system:

	Check One
1) newly formed	☐
2) formed by merger or break-up of older subsidiaries	☐
3) acquired directly	☐
4) acquired through acquisition of another enterprise	☐

7. If subsidiary was terminated or left the system, year this occurred:

8. If subsidiary was terminated or left the system, how did this occur:

	Check One
1) sold	☐
2) confiscated or expropriated	☐
3) liquidated, function apparently terminated	☐
4) liquidated, function continued by other means	☐

If you check box #4, please write the names of subsidiaries which continued the function below:

Please use the following definitions in answering questions 9, 11 and 13:

the primary activity of the subsidiary is

1) manufacturing if any manufacturing, including packaging and assembling, is performed;
2) sales or service if no manufacturing is performed and the principal activity consists of wholesale or retail selling, warehousing, inventorying, service, repair, or sales financing;
3) extraction if no manufacturing is performed, and the principal activity consists of extracting raw materials through mining, farming, etc.
4) other if no manufacturing is performed and the principal activity consists of something other than sales or extraction; e.g., holding, transportation.
5) inactive if the subsidiary is inactive or exists only to protect a company name.

---

9. Primary activity at entry date:

	Check One
1) manufacturing	☐
2) sales or service (with no manufacturing)	☐
3) extraction (with no manufacturing)	☐
4) other (with no manufacturing)	☐
5) inactive	☐

10. If primary activity changed, year change occurred:

11. If primary activity changed, primary activity after change:

	Check One
1) manufacturing	☐
2) sales or service (with no manufacturing)	☐
3) extraction (with no manufacturing)	☐
4) other (with no manufacturing)	☐
5) inactive	☐

12. If primary activity changed again, year change occurred:

13. If primary activity changed again, primary activity after change:

Check One

1) manufacturing . . . . ☐

2) sales or service (with no manufacturing) . . . . . ☐

3) extraction (with no manufacturing) . . . . ☐

4) other (with no manufacturing) . . . . ☐

5) inactive . . . . ☐

---

14. Location of principal market of sales in 1970 (or, if not available, in 1969 or 1968):

Check One

1) more than 50% of sales are in the country in which subsidiary's primary activity is performed . . . . ☐

2) more than 50% of sales are exported . . . . ☐

---

15. Answer this question as of 1970 for subsidiaries incorporated in a country which was then a member of the EEC or EFTA regional markets:

Check One

1) more than 50% of sales are in the regional market of which subsidiary's country is a member . . . . . ☐

2) more than 50% of sales are exported out of the regional market of which the subsidiary's country is a member . . . . ☐

---

16. Principal purchaser of sales in 1970 (or, if not available, in 1969 or 1968):

Check One

1) more than 50% of sales are purchased by parent or affiliate in system . . . . ☐

2) more than 50% of sales are purchased by customers outside of the system . . . . ☐

Please see product classification list for questions 17 and 19

17. Product(s) manufactured at commencement of manufacture (or earliest year thereafter for which product list is available). Please list principal product first:

    1.
    2.
    3.
    4.
    5.

18. Year for which above product list was obtained:

19. Product(s) manufactured in 1970 (or, if not available, in 1969 or 1968). Please list principal product first:

    1.
    2.
    3.
    4.
    5.

20. Total sales (turnover) of subsidiary in 1970 (or, if not available, in 1969 or 1968). Use local currency equivalents of classification below, e.g., $1 million = D.M. 3.66 million.

	Check One
1) less than $1 million.	☐
2) between $1 million and $10 million	☐
3) between $10 million and $25 million	☐
4) between $25 million and $100 million	☐
5) more than $100 million	☐

21. Nominal share capital of subsidiary in 1970 (or, if not available, in 1969 or 1968). Use local currency equivalents of classification below, e.g., $1 million = D.M. 3.66 million.

	Check One
1) less than $1 million.	☐
2) between $1 million and $10 million	☐
3) between $10 million and $25 million	☐
4) between $25 million and $100 million.	☐
5) more than $100 million	☐

If any other indicators of size (such as gross assets or number of employees) are available, please list them below:

22. Please list names of immediate parents in system at entry date and % of their ownership. If exact % is not available, classify the degree of ownership as follows:

Class I: greater than or equal to 95%

Class II: greater than 50% but less than 95%

Class III: exactly 50%

Class IV: less than 50% but not less than 25%

Class V: less than 25% but more than 5%

Immediate Parent	Ownership % or class number

23. If subsidiary was less than 95% owned by immediate parents in system at entry date, please indicate % ownership of principal owner outside system on that date:

Check One

1) greater than 50% . . . . ☐

2) exactly 50% . . . . ☐

3) less than 50% but not less than 25% . . . . ☐

4) less than 25% but more than 5% . . . . ☐

5) less than or equal to 5% . . . . ☐

24. Principal owner, if any, outside system at entry date was:

Check One

1) a locally-controlled private enterprise. . . . . . . ☐

2) a local state agency or state enterprise . . . . . . ☐

3) a foreign-controlled private enterprise. . . . . . . ☐

4) stock is widely dispersed. . . . . ☐

25. Please list names of immediate parents in system in 1970 (or, if not available, in 1969 or 1968) and % of their ownership. If exact % is not available, classify the degree of ownership as follows:

Class I: greater than or equal to 95%

Class II: greater than 50% but less than 95%

Class III: exactly 50%

Class IV: less than 50% but not less than 25%

Class V: less than 25% but more than 5%

Immediate Parent	Ownership % or class number

---

26. If subsidiary is less than 95% owned by immediate parents in system in 1970 (or 1969 or 1968), please indicate % of ownership of principal owner outside system on that date:

	Check One
1) greater than 50%	☐
2) exactly 50%	☐
3) less than 50% but not less than 25%	☐
4) less than 25% but more than 5%	☐
5) less than or equal to 5%	☐

---

27. Principal owner, if any, outside system in 1970 (or 1969 or 1968) was:

	Check One
1) a locally-controlled private enterprise	☐
2) a local state agency or state enterprise	☐
3) a foreign-controlled private enterprise.	☐
4) stock is widely dispersed.	☐

For Office Use Only

E.C.:

Other Parent Systems:

parent had a 25% interest) during the period prior to January 1, 1971. The information on each questionnaire, amended by data from published sources, is stored on a tape coded EMY2 at the Project.

Each of the 17214 records on the tape represents a direct investment decision made by one of the 228 firms. Some of the records (191 in my sample) represent subsidiaries whose parents include more than one of the 228 firms; in such a case, these were interpreted as independent realizations of separate direct investment decisions.

The sample of 17214 subsidiaries was reduced to 1443 as follows:

- 2772 subsidiaries were no longer in existence in 1970 and were deleted;
- 8489 subsidiaries were not principally engaged in manufacturing activity and were deleted.

Of the remaining 5953 subsidiaries, 483 were deleted because they did not report the 3-digit SIC code of their principal product, and 39 of the remainder were eliminated because their parents failed to report any information on sales, profits, net worth, or assets. 8 were deleted because they did not report their country of location.

5423 subsidiaries were then left in the sample, but the quality of the data reported by their parents varied. In particular, parents of 3207 subsidiaries did not report either their R and D expenditures or total sales outside the home country (and export sales), or both, and were removed from the sample. 773 subsidiaries did not have complete information on all subsidiary variables listed in Table 6-2; after these were deleted from the sample, 1443 observations remained.

After the likelihood ratio test discussed in chapter 6 indicated that the coefficients of parinsls and parexsls were not significantly different from zero, the sample was expanded to 2051 observations. This total was reached from the benchmark of 5423 subsidiaries by deleting 2249 subsidiaries whose parents did not report R and D expenditures and 1123 subsidiaries which did not have complete information about the subsidiary variables listed in Table 6-2.

There is no evidence that the observations which were deleted were systematically subsidiaries located in or out of the U.S.; 7.1% of all manufacturing subsidiaries on the EMY2 tape were located in the U.S., while in our sample, just over 6.8% of the observations were subsidiaries located in the U.S.

Construction of Subsidiary Variables

Submatur: defined as 71 minus the answer to question 5 of Table 6A-3.

Subentry1: defined as one if the subsidiary was formed *de novo*, on the basis of the response to question 6 in Table 6A-3, zero if not.

Subprdcy2: defined as one if the subsidiary had originally been a sales subsidiary on the basis of responses to questions 9-13 in Table 6A-3, zero if not.

Subindep1: defined as one if more than 50% of the subsidiary's sales were to the parent or to other subsidiaries of the parent on the basis of the response to question 16 in Table 6A-3, zero if not.

Subdiver2: defined as one if the subsidiary manufactured products in more than two 3-digit SIC's, based on the responses to question 19 in Table 6A-3, zero if not.

Subcntrl2: defined as one if the subsidiary's parent held a 50%

interest or less in the subsidiary, zero if not. The basis of this classification was an "effective control " variable defined by the HBS MNE Project for each subsidiary. A subsidiary was classified as "absolutely controlled" if it was 95% or more owned by parents which are absolutely controlled (the 228 parents in the sample absolutely control themselves). A subsidiary was classified as "majority controlled" if it was not absolutely controlled, but it was more than 50% owned by parents which were either majority or absolutely controlled. In all other cases, the subsidiary was classified as"other." Those subsidiaries classified as "other" are the same subsidiaries for which subcntrl2 is one.

Submrktx2: defined as one if the subsidiary's exports from the host country or regional market represented more than 50% of its sales, based on responses to questions 14 and 15 of Table 6A-3, zero if not.

Construction of Parent Variables

Using the 3-digit parent code from question 1 of Table 6A-3 and matching it to the 3-digit parent code in Table 6A-2, each subsidiary record was extended by including data on its parent.

Parsizes: defined as total sales in millions of 1970 dollars, based on data in Table 6A-2.

Par3dsic: defined as the number of 3-digit SIC's in which the subsidiary's parent produced, based on data in Table 6A-2.

Parrdsls: defined as parent R and D expenditure in millions of 1970 dollars divided by total sales by the parent in millions of 1970 dollars, both from Table 6A-2.

Parinsls: defined as total parent sales made outside the home country in millions of 1970 dollars divided by total parent sales in millions of 1970 dollars, both from Table 6A-2.

Parexsls: defined as parent sales from exports in millions of 1970 dollars divided by total parent sales in millions of 1970 dollars, both from Table 6A-2.

Parindpf: defined as the ratio of the parent's worldwide rate of profit on net worth to the rate of profit in net worth in the industry (in the U.S.) in which the subsidiary manufactured its principal product. The parent's rate of profit is defined as worldwide parent profits in millions of 1970 dollars divided by parent net worth in millions of 1970 dollars, both from Table 6A-2. The U.S. industry rate of profit is defined as industry net income less total income tax plus investment tax credit, all divided by industry net worth. All industry data were taken from the U.S. Department of the Treasury, Internal Revenue Service, _Statistics of Income, 1969: Corporation Income Tax Returns_ (Washington: U.S. Government Printing Office, 1973). 1969 was the latest year for which data were available.

Construction of Industry Variables

On the basis of the first response to question 19, Table 6A-3 (which response is a 3-digit SIC code), each subsidiary was classified as manufacturing a product in one of 32 industries. Table 6A-4 shows the SIC codes included in each of the 32 industries. Each subsidiary record was extended by including the following characteristics of the industry in which it manufactured.

Table 6A-4

CORRESPONDENCE OF INDUSTRY DEFINITIONS AND SIC CODES;
CONSUMER GOOD AND HIGH-TECHNOLOGY INDUSTRIES

Industry	SIC Codes	Consumer Good	High-Technology
Grain mill products	204	x	
Beverages	208	x	
Other food products	201,202,203,205, 206,207,209	x	
Tobacco	21	x	
Textiles and apparel	22,23	x	
Lumber and wood products	24		
Furniture and fixtures	25	x	
Paper and allied products	26		
Printing and publishing	27	x	
Drugs	283	x	x
Soaps and cosmetics	284	x	
Industrial chemicals	281		x
Plastics	282		
Other chemicals	285,286,287, 288,289		
Petroleum refining	29		
Rubber	30		
Stone, clay, and glass	32		
Primary metals	33		
Fabricated metals	34		
Farm machinery and equipment	352		x

Table 6A-4 (Continued)

Industry	SIC Codes	Consumer Good	High-Technology
Industrial machinery and equipment	353,355,356		
Office machinery and equipment	357		x
Other non-electrical machinery	351,354, 358,359		x
Household appliances	363	x	x
Electrical equipment and apparatus	361,362		x
Electronic components, radio and T.V.	365,366,367		x
Other electrical machinery	364,369		
Motor vehicles	371	x	x
Aircraft	372		x
Other transportation equipment	373,374,375, 376,377,378, 379		x
Instruments	38	x	x
Leather and other manufacturing	31,39	x	

Indgoodsl: defined as one if the subsidiary's principal product was a consumer good, zero if not. Industries which were designated as consumer goods industries are indicated in Table 6A-4. A guide for the designation was the "consumer goods ratio" defined by Gary Hufbauer ("The Impact of National Characteristics and Technology on the Commodity Composition of Trade in Manufactured Goods," in Raymond Vernon, ed., The Technology Factor in International Trade (New York: Columbia University Press and National Bureau of Economic Research, 1970), p. 182), which represents the percentage of total sales appearing as consumer goods directly and indirectly after the first and second rounds of an input-output sales matrix. Hufbauer's SITC-SIC concordance was used as a guide in converting these ratios to a SIC basis.

Indtechnl: one if the subsidiary's principal product is a high-technology product, zero if not. Industries which were high-technology industries are indicated in Table 6A-4. Basis for the classification was industry R and D expenditures as a percentage of industry sales, as found in the National Science Foundation, Research and Development in Industry, 1970 (Washington: U.S. Government Printing Office, 1972).

Indpngre: the "penetration" or world markets by U.S. firms, where penetration is defined as the number of subsidiaries established abroad by U.S. multinationals in the years 1950-1970, divided by the total number of firms in the industry in the U.S. in 1967. The former number comes from a draft of chapter 2 of Monty Graham's doctoral dissertation at the Harvard Business School, and represents calculations made on the HBS MNE Data Bank. The latter number comes from U.S. Bureau of the

Census, Annual Survey of Manufactures, 1971 (Washington: U.S. Government Printing Office, 1973), and was taken for the most recent year for which data were available.

Indeftaf: the industry's effective tariff rate, including non-tariff barriers, in 1970. This was computed from data in Robert E. Baldwin, Nontariff Distortions in International Trade (Washington: The Brookings Institution, 1970), pp. 163-164. After collapsing Baldwin's industry categorization into the one described in Table 6A-4 (the collapsing was done by simple averaging, and whenever a collapsed category contained only two of Baldwin's categories, one of which represented only one 3-digit SIC, no averaging was done and that one category was omitted), his figures for 1964 (actual) and 1972 (estimated) were interpolated to give figures for 1970. The effective rate concept used by Baldwin treated non-traded inputs like traded inputs and excluded them from value added.

Indconcn: The 8-firm concentration ratio for each industry was obtained from the U.S. Bureau of the Census, Annual Survey of Manufactures, 1971. Four-digit SIC ratios were summed arithmetically to yield 3-digit SIC ratios. The ratios refer to 1967, the latest year for which data were available.

Indprddf: The index for product differentiation was obtained from R.A. Cornell, "Trade of Multinational Firms and Nations' Comparative Advantage," paper presented at the Conference on Multinational Corporations and Governments at the University of California at Los Angeles, November 14-17, 1973. Cornell's index is based on that computed by Gary Hufbauer (see the source for indgoods1), who measures product differentiation by the coefficient of variation of unit values of 1965 U.S. exports to different countries; differentiated goods have higher coefficients of variation. The datum for SIC 29 was computed from Hufbauer's original work.

Indklrat: The industry capital-labor ratio is also taken from Cornell, who obtained it from the Census Bureau's Annual Survey of Manufactures, 1971, previously noted. The variable is book value of assets per employee, refers to calendar year 1968, and is in thousands of dollars.

Indscalc: This variable too was taken from Cornell, and as before it is based on Hufbauer. Scale economies in Hufbauer's work are equated with the estimated exponent from the logarithmic transformation of the equation $v=kn^a$, where v is the ratio of value added in plants employing n persons to average value added for the industry, and k is a constant. The limitations of this measure and its relation to other measures of scale economies are discussed by Hufbauer. Cornell used 1967 Census of Manufactures data to re-estimate Hufbauer's concept.

Indgrow2: The rate of growth in industry value added, over the period 1958-1970, as given in Cornell, who obtained the data from the Annual Survey of Manufactures, 1971.

Indmktsz: The value added in the industry in 1970 in billions of dollars, obtained from the Annual Survey of Manufactures, 1970.

Indfollw: One if foreign firms in this industry were markedly clustered in the timing of their investments abroad, and if the subsidiary was established during the middle or latter portion of the time of clustering; zero if not. An industry was determined to possess firms which were "markedly clustered" if the industry's entry concentration index (ECI) was above the average of all industries in the study. The ECI was computed in a manner analogous to that employed by F.T. Knickerbocker in Oligopolistic Reaction and Multinational Enterprise(Boston: Graduate School of Business Administration, Harvard University, 1973). Using Table 5.17.1 in James W. Vaupel and Joan Curhan, The World's Multinational Enterprises(Boston: Graduate School of Business Administration, Harvard University, 1973), the total number of subsidiaries established abroad in the years 1900-1970 in each of the industries was determined. This number was then divided into the number of subsidiaries established abroad in the 3-year period in which the greatest number of foreign subsidiaries had been established. The resulting quotient was the ECI. The average ECI for the 32 industries was .32.

Inddeltf: The change in effective tariff rates between 1964 and 1972, defined for subsidiaries established before 1968 when the Kennedy Round cuts went into effect (defined as zero for subsidiaries established in 1968,1969, and 1970). The source was Baldwin, op. cit., pp. 163-164. See indeftaf for details of industry aggregation.

Indforgn: See Table 6-2.

Construction of Nation Variables

On the basis of the answer to question 1, Table 6A-3 (which answer is a 3-digit parent code), and the country of parent given in Table 6A-1, each subsidiary was identified as having a parent in one of the 11 industrialized countries indicated in chapter 6. The subsidiary's record was then extended by addition of the following variables representing the characteristics of the subsidiary's parent's home country.

Natxopen: The openness of the parent's home economy, as measured by trade as a percentage of GDP in 1970. Trade is defined as exports plus imports; all data are from OECD, National Accounts 1960-1971 (Paris, OECD,1973).

Natrlgdd: The ratio of the annual average rate of growth of GDP in the U.S. to a similar datum for the parent firm's country for the years 1960-1970. Obtained from the OECD, op.cit.

Natrlulc: The ratio of unit labor costs in the U.S. to unit labor costs in the parent firm's country for the year 1970. Unit labor costs were computed as follows. First, the product of civilian employment in manufacturing and mining, average hours per week in manufacturing, and 52 was taken to yield civilian person-hours in manufacturing and mining in 1970. Next, GDP in dollars was multiplied by the percentage of it that came from manufacturing and mining, to yield output in manufacturing and mining. Then output per civilian person-hour in manufacturing and mining was computed by dividing output by civilian person-hours. Finally, the average hourly earnings in dollars in manufacturing were computed by multiplying average hourly earning in local currency by the $/local currency exchange rate, and unit labor cost was computed by dividing average hourly earnings by output per civilian person-hour. Availability of data dictated the need to include the mining sector in the output per person-hour computation. Civilian employment data were taken from OECD Labor Force Statistics 1960-1971 (Paris, OECD, 1973). Average hours per week in manufacturing was taken from the U.S. Bureau of Labor Statistics, Handbook of Labor Statistics, 1973 (Washington: U.S. Government Printing Office, 1974). GDP in dollars came from the OECD, National Accounts, 1960-1971. The percentage of output in manufacturing and mining came from the United Nations, Yearbook of National Accounts Statistics, 1972, volume III (New York: United Nations, 1974). Average hourly earnings in local currency came from the Bureau of Labor Statistics, op. cit. Exchange rates came from the International Monetary Fund, International Financial Statistics. Australian average hours per week and average hourly earnings came from the International Labor Office, Yearbook of Labor Statistics, 1973 (Geneva; ILO, 1973).

Natrluld: The average annual rate of change of natrlulc from 1965 to 1970.

Natxrate: The percentage difference between the exchange rate at year-end 1970 and its value in May, 1973, between the parent country's currency and the dollar. Again the IMF was the source for the data.

Natfollw: One if the parent firms in this country were unusually clustered in the timing of their investments abroad and if the subsidiary was established during this time of clustering. This variable was defined analogously to indfollw; Table 21.17.1 of Vaupel and Curhan, *op.cit.* was used. The average country ECI was .37.

Natrlpcp: The ratio of U.S. per-capita GDP to the per-capita GDP of the subsidiary's parent's country. Data come from the OECD, *National Accounts, 1960-1971*.

Nateecef2: One if a parent firm's home country was *not* a member of EEC or EFTA; also one for subsidiaries established before 1958. Zero otherwise.

Natstock: The correlation of the stock market index in the parent firm's country with the U.S. index for the period 1959-1972. These correlations were furnished by Professor Donald Lassard of the Sloan School of Management at M.I.T., and came from Capital International, S.A., Geneva.

Natrlgdm: The ratio of the gross domestic product in manufacturing in the U.S. in 1970 to the same datum for the parent firm's country. Source for both was the OECD, *National Accounts, 1960-1971*.

Sample Statistics for Variables Employed in Reported Estimation

Sample means and correlations for the variables employed in the estimation reported in chapter 6 are given in Tables 6A-5 and 6A-6. Table 6A-7 shows the industry distribution of subsidiaries by state of the underlying Markov decision process.

Table 6A-5

SAMPLE MEANS OF VARIABLES INCLUDED IN CONSTRAINED ESTIMATION

Variable	Mean	
constant	1.000	
submatur	10.696	years
subindepl	0.098	
subcntrl2	0.403	
submrktx2	0.059	
par3dsic	9.941	SIC's
parrdsls	0.029	
parindpf	17.196	
indtechnl	0.349	
indpngre	0.033	
indconcn	0.577	
indmktsz	11.276	billions of dollars
natxopen	0.487	
natrlgdd	0.951	
natrlpcp	1.986	
natrluld	0.910	
indforgn1	0.088	
indforgn2	0.056	
indforgn3	0.025	
indforgn4	0.267	
indforgn5	0.082	

Table 6A-5 (Continued)

Variable	Mean
indforgn6	0.096
indforgn7	0.134
indforgn8	0.169
indforgn9	0.046
indforgn10	0.016

Table 6A-6

SAMPLE CORRELATIONS OF VARIABLES INCLUDED IN CONSTRAINED ESTIMATION

	constant	submatur	subindepl	subcntrl2	submrktx2	par3dsic	parrdsls
constant	1.00						
submatur	0.00*	1.00					
subindepl	0.00*	0.02	1.00				
subcntrl2	0.00*	-0.18	-0.02	1.00			
submrktx2	0.00*	0.02	0.20	0.07	1.00		
par3dsic	0.00*	0.09	-0.10	-0.11	-0.10	1.00	
parrdsls	0.00*	-0.00*	-0.03	-0.14	-0.05	0.21	1.00
parindpf	0.00*	0.01	0.03	-0.04	-0.02	0.04	0.07
indtechnl	0.00*	-0.01	-0.06	-0.13	-0.05	0.14	0.37
indconcn	0.00*	0.00*	0.02	-0.07	-0.04	0.13	0.28
indmktsz	0.00*	0.03	0.00*	0.08	0.11	-0.16	-0.27
indpngre	0.00*	-0.02	-0.03	-0.08	-0.07	0.06	0.22
natxopen	0.00*	0.16	0.04	-0.21	-0.08	0.27	0.05
natrlgdd	0.00*	0.10	-0.01	-0.32	-0.11	0.17	0.14
natrluld	0.00*	0.08	0.07	-0.10	-0.03	-0.13	-0.18
natrlpcp	0.00*	-0.08	-0.05	0.10	0.11	-0.25	-0.27
indforgn1	0.00*	0.05	0.08	-0.12	0.05	-0.31	-0.19
indforgn2	0.00*	-0.08	0.03	0.20	0.17	-0.16	-0.07
indforgn3	0.00*	-0.05	0.03	0.00*	0.00*	0.12	-0.09
indforgn4	0.00*	-0.08	-0.08	-0.04	-0.10	0.08	0.17
indforgn5	0.00*	0.14	0.09	0.03	0.03	0.01	-0.08
indforgn6	0.00*	0.02	0.06	0.08	0.07	-0.04	-0.19
indforgn7	0.00*	0.03	-0.04	0.01	-0.07	-0.01	-0.14
indforgn8	0.00*	0.03	-0.04	-0.07	-0.02	0.24	0.36
indforgn9	0.00*	-0.03	-0.04	0.04	-0.02	-0.03	-0.01
indforgn10	0.00*	-0.04	0.01	-0.04	0.02	0.00*	0.12

* - rounded to zero

Table 6A-6 (Continued)

	parindpf	indtechnl	indconcn	indmktsz	indpngre	natxopen	natrlgdd
constant							
submatur							
subindepl							
subcntrl2							
submrktx2							
par3dsic							
parrdsls							
parindpf	1.00						
indtechnl	0.06	1.00					
indconcn	0.01	0.45	1.00				
indmktsz	-0.00*	-0.26	-0.56	1.00			
indpngre	-0.04	0.43	0.56	-0.46	1.00		
natxopen	-0.03	0.07	0.12	-0.22	0.20	1.00	
natrlgdd	0.06	-0.01	0.07	-0.03	0.01	0.07	1.00
natrluld	0.18	-0.11	-0.18	0.21	-0.23	0.12	0.47
natrlpcp	-0.05	-0.13	-0.05	0.15	-0.09	-0.30	0.09
indforgnl	-0.04	-0.23	-0.16	0.18	-0.18	-0.07	0.30
indforgn2	-0.03	-0.18	-0.34	0.33	-0.20	-0.21	-0.31
indforgn3	-0.02	-0.12	-0.26	0.02	-0.12	0.08	-0.02
indforgn4	-0.08	0.16	0.31	-0.48	0.65	0.14	-0.03
indforgn5	-0.03	-0.22	0.02	-0.21	0.06	0.20	-0.03
indforgn6	0.04	-0.24	0.01	0.47	-0.18	-0.07	0.06
indforgn7	0.00*	0.00*	-0.35	0.24	-0.20	-0.10	-0.06
indforgn8	0.16	0.31	0.39	-0.20	-0.14	0.05	0.00*
indforgn9	-0.03	0.31	0.02	0.04	0.03	-0.11	0.02
indforgnl0	-0.02	0.18	0.01	-0.06	-0.05	0.02	-0.01

Table 6A-6 (Continued)

	natrluld	natrlpcp	indforgn1	indforgn2	indforgn3	indforgn4
constant						
submatur						
subindep1						
subcntrl2						
submrktx2						
par3dsic						
parrdsls						
parindpf						
indtechnl						
indconcn						
indmktsz						
indpngre						
natxopen						
natrlgdd						
natrluld	1.00					
natrlpcp	-0.10	1.00				
indforgn1	0.16	0.16	1.00			
indforgn2	-0.14	0.25	-0.08	1.00		
indforgn3	0.07	-0.06	-0.05	-0.04	1.00	
indforgn4	-0.27	-0.17	-0.19	-0.14	-0.10	1.00
indforgn5	-0.05	0.07	-0.09	-0.07	-0.05	-0.18
indforgn6	0.18	0.01	-0.10	-0.08	-0.05	-0.20
indforgn7	0.26	-0.05	-0.12	-0.10	-0.06	-0.24
indforgn8	-0.06	-0.07	-0.14	-0.11	-0.07	-0.27
indforgn9	0.02	0.07	-0.07	-0.05	-0.04	-0.13
indforgn10	-0.06	-0.07	-0.04	-0.03	-0.02	-0.08

Table 6A-6 (Continued)

	indforgn5	indforgn6	indforgn7	indforgn8	indforgn9	indforgn10
constant						
submatur						
subindepl						
subcntrl2						
submrktx2						
par3dsic						
Parrdsls						
parindpf						
indtechnJ						
indconcn						
indmktsz						
indpngre						
natxopen						
natrlgdd						
natrluld						
natrlpcp						
indforgn1						
indforgn2						
indforgn3						
indforgn4						
indforgn5	1.00					
indforgn6	-0.10	1.00				
indforgn7	-0.12	-0.13	1.00			
indforgn8	-0.14	-0.15	-0.18	1.00		
indforgn9	-0.06	-0.07	-0.09	-0.10	1.00	
indforgn10	-0.04	-0.04	-0.05	-0.06	-0.03	1.00

Table 6A-7

INDUSTRY DISTRIBUTION OF SUBSIDIARIES IN THE SAMPLE
BY STATE OF THE MARKOV DECISION PROCESS

Industry	In U.S.	Not in U.S.
Grain mill products	0	23
Beverages	1	49
Other food products	4	101
Tobacco	0	2
Textiles and apparel	1	114
Lumber and wood	0	4
Furniture and fixtures	0	9
Paper and allied products	1	15
Printing and publishing	8	14
Drugs	6	122
Soaps and cosmetics	1	21
Industrial chemicals	12	118
Plastics	6	58
Other chemicals	20	183
Petroleum refining	6	111
Rubber	4	47
Stone, clay, and glass	1	26
Primary metals	12	185
Fabricated metals	16	143
Farm machinery	2	24
Industrial machinery	0	20

Table 6A-7 (Continued)

Industry	In U.S.	Not in U.S.
Office machinery	2	20
Other non-electrical machinery	2	46
Household appliances	1	30
Electrical equipment	4	76
Electrical components	14	109
Other electrical machinery	6	107
Motor vehicles	0	71
Aircraft	1	6
Other transportation equipment	0	16
Instruments	8	25
Leather and miscellaneous	1	16

Chapter 7

MACROECONOMETRIC ANALYSIS

In this chapter, the flows of foreign direct investment into the United States from the major country sources during the period 1952-1971 are analyzed using standard regression techniques. After a description of the data base, the econometric specification to be used, introduced in chapter 5, is reviewed and associated estimation issues are discussed. Then the concepts used in the econometric specification are related to various theories of direct investment, and to the quasi-historical issue of whether a "demand model" or a "supply model" characterized foreign direct investment in the United States during the postwar period.[1] Finally, the estimation results are reported, their implication for the validity of various theories of direct investment is discussed, and their relevance to the demand model-supply model issue is explored.

Data Characteristics

The United States Department of Commerce has published an annual series on the book value of foreign direct investment in the United States for the years 1950-1972, though the data for the last year are not available in sufficiently disaggregated detail to be used in this study.

Foreign direct investment includes net capital inflows to incorporated U.S. subsidiaries and branches, valuation adjustments in the

1 These concepts will be introduced and discussed later in the chapter.

foreign share of assets held by the U.S. subsidiaries and branches, and the foreign share of reinvested earnings of incorporated U.S. subsidiaries of foreign corporations. Net capital inflows are the sum of new investments, liquidations, and changes in intercompany accounts. The data are broken down by major industry into manufacturing (excluding petroleum refining), petroleum (including extraction and refining), insurance and other finance, trade, and other. The annual series is based on a sample of 400 of the larger foreign-owned U.S. firms, matched against a 1959 benchmark universe of foreign direct investments in the U.S. Foreign-owned U.S. firms include all U.S. firms in which a foreign person or organization holds 25% or more of the voting stock or equivalent interest.

One of the deficiencies of the series is that reinvested earnings of branches are not included. In the balance of payments accounts, with whose conventions these data are consistent, all earnings of branches are treated as if they were remitted to the parent as income and any actual reinvestment in the U.S. is treated as an offsetting capital inflow. Accordingly, the cash flow component of the liquidity variable, to be discussed, has been adjusted upward to reflect this fact, where necessary (the precise adjustment made and descriptions of all data series used are in appendix 1 to this chapter).

The benchmark date of 1959, while in the middle of the sample, is out of date when viewed from 1974. However, the survey is continually updated from the sample of the 400 largest firms existing in 1959. The true universe of firms is undoubtedly larger than the benchmark universe.

However, the fact that this study is done in value terms means that the understatement may not be serious, since the 400 largest firms are likely to have grown during the succeeding decade and a half. I will assume that such growth has been sufficient to keep the benchmark universe the same proportion of the true universe as it was in 1959. Equivalently, it may be assumed that any error in the measurement of what will be the dependent variable in the analysis is in the disturbance term.

Another deficiency of this series, as of many investment series, is that it is in book values rather than market values. However, the flows of foreign direct investment, represented by changes in the value of the stocks, should be rather close to market values. Of course, capital gains on existing assets would introduce some distortion.

The lack of a distinction between current and fixed assets poses a difficult problem for analysis in terms of the neoclassical theory of optimal capital accumulation, as proposed in chapter 5, since the latter refers principally to investment in fixed assets. To handle this issue, I have relied on data concerning the detailed industry composition of foreign direct investment in the U.S. as published in the 1959 benchmark survey, and on Federal Trade Commission data concerning the industry-by-industry breakdown of total assets of all companies in U.S. manufacturing into current and fixed assets. By assuming that the industry composition of foreign direct investment in the U.S. within manufacturing was unchanged over the duration of the sample, and by assuming that within each industry foreign companies operating in the U.S.

have the same yearly current asset-fixed asset ratio as all U.S. firms in the same industry, I have been able to derive a series for foreign direct investment in fixed assets in the U.S. Details are in appendix 1.

As in chapter 6, I have only estimated investment relationships for the manufacturing sector. Insurance regulations concerning reserves that must be held make valuation of foreign assets in the U.S. in insurance and finance a most uncertain matter. In addition, as in the trade sector, it is unlikely that fixed capital accumulation was the motive for investment in these sectors. I have omitted the petroleum sector from consideration because the series is too lumpy and discontinuous, with a few specific investments (e.g., British Petroleum purchasing an interest in Sohio) dominating the series. Clearly these investments are best studied at the level of the firm.

The data on foreign direct investment refer only to the foreign share of companies incorporated in the U.S. (where that share exceeds 25%) plus foreign branches, where of course the ownership is 100%. It might be argued that the investment theory posited in chapter 5 must take into account the possibility that only part of the assets of the firms under discussion are foreign-controlled. Fortunately, this possibility is not a reality, for over 95% of all foreign subsidiaries are 100% owned by their foreign parents, according to the Department of Commerce.

In analyzing U.S. direct investment abroad, Stevens[2] found country

---

[2] Guy Stevens, "Fixed Investment Expenditures of Foreign Manufacturing Affiliates of U.S. Firms: Theoretical Models and Empirical Evidence," Yale Economic Essays 9 (Spring, 1969), 137-200.

effects to be important. Accordingly, I have adopted a country-by-country approach here. I have applied the two-country analysis outlined in chapter 5 to investment in the United States by firms in the United Kingdom and Canada. The former represented the source for 23.9% of the value of the stock of direct investment in manufacturing in 1971, while the latter accounted for 30.0% of the value of such investments. Both of these countries had the common characteristic that it was relatively easy to obtain capital stock data for them. Further, their data series were sufficiently large in magnitude to prevent discrete investments by a few firms from dominating the series.[3]

Econometrics of Direct Investment

From chapter 5, the system of equations to be estimated for an arbitrary country is

$$\begin{aligned} K_1(t)-K_1(t-1) &= f_{11}(K_1^*(t)-K_1(t-1)) + g_{11}(C_1(t-1)-d_1K_1(t-1)) \\ &\quad + f_{12}(K_2^*(t)-K_2(t-1)) + g_{12}(C_2(t-1)-d_2K_2(t-1)) \\ &\quad + u_1(t) \qquad (1) \end{aligned}$$

$$\begin{aligned} K_2(t)-K_2(t-1) &= f_{21}(K_1^*(t)-K_1(t-1)) + g_{21}(C_1(t-1)-d_1K_1(t-1)) \\ &\quad + f_{22}(K_2^*(t)-K_2(t-1)) + g_{22}(C_2(t-1)-d_2K_2(t-1)) \\ &\quad + u_2(t) \qquad (2) \end{aligned}$$

where country 1 is the home country and country 2 is the host country (in our case, the U.S.). To review, $K_i(t)$ is the level of fixed

[3] Investment series for other countries were not analyzed in this framework, partly because of data limitations, but also owing to their lumpy and discontinuous nature which results from the dominance of the series by the investment decisions of a few firms. For more details on these problems, see appendix 1.

capital services (assumed proportional to the capital stock) in location i, i=1,2, at time t; $K_i^*(t)$ is the optimal capital stock in location i at time t; $C_i(t)$ is the cash flow (retained earnings plus depreciation(in an accounting sense)) in location i at time t; d_i is the instantaneous rate of depreciation in location i; and $u_i(t)$ is a stochastic disturbance term for the ith equation at time t. The liquidity variable, $C_i(t-1)-d_iK_i(t-1)$ represents cash flow available for new investment at the beginning of period t, while of course $K_i^*(t)-K_i(t-1)$ is the difference between the desired stock of capital in period t and the actual stock in period t-1 in location i.

The derivation of the specification for $K_i^*(t)$ in appendix 2 to this chapter assumes that the representative firm has CES production functions in each location i, and is designed to incorporate tax considerations and tariff-jumping motivations for direct investment behavior. The expressions obtained there are

$$K_1^*(t) = a_1^{s_1}[(kp_1(t) + (1-k)(1-T)p_2(t)x_2(t))/c_1(t)]^{s_1} Q_1(t) \quad (3)$$

$$K_2^*(t) = a_2^{s_2}[p_2(t)/c_2(t)]^{s_2} Q_2(t) \quad (4)$$

where $p_i(t)$ is the price of output, $Q_i(t)$ the quantity of output, $c_i(t)$ the user cost of capital, all of country i at time t, and $x_2(t)$ is the exchange rate of country 2's currency into that of country 1. 1-k is the proportion of home country output exported to the host country, while T is the ad valorem tariff imposed on those exports by the host country. a_i is the distribution parameter from the CES production function in location i, while s_i is the elasticity of substitution.

Because tax laws differ in the two home countries, the user costs of capital differ. For the U.K.

$$c_1(t) = q_1(t)[((1-u_1v_1)/(1-u_1))d_1+r-(\dot{q}_1(t)/q_1(t))] \quad (5)$$

$$c_2(t) = q_2(t)[((1-u_2v_2)/(1-u_2))d_2+r-(\dot{q}_2(t)/q_2(t)) - (\dot{x}_2(t)/x_2(t))] \quad (6)$$

while for Canada

$$c_1(t) = q_1(t)[((1-u_1v_1)/(1-u_1))d_1+r-(1/(1-u_1))(\dot{q}_1(t)/q_1(t))] \quad (5')$$

while $c_2(t)$ is unchanged.

In equations (1) and (2), $K_1^*(t)$ and $K_2^*(t)$, as defined by (3), (4) (5) or (5'), and (6), as well as $C_1(t-1)$ and $C_2(t-1)$ will be taken as predetermined (i.e., they are uncorrelated with $u_i(t)$, i=1,2, in the probability limit). Fisher[4] notes that output variables cannot be assumed to be exogenous in investment equations for three reasons:

1) Output and desired capital stock are part of the same optimizing decision;

2) The same random shocks that cause output to deviate from plans also affect investment;

3) Investment expenditures by one firm directly and indirectly generate orders and sales for other firms.

Fisher focuses on 1) and 2) as the sources of the true econometric objection to inserting output exogenously into the investment function at the level of the firm, but states, "... I have some doubts as to whether this is of much quantitative importance."[5,6] 3) is the chief

---

[4] F.M. Fisher, "Discussion," in G. Fromm, ed., Tax Incentives and Capital Spending (Washington: The Brookings Institution, 1971).

[5] Ibid., p. 254.

[6] (1) can be handled by interpreting the optimal capital stocks as factor demands derived from a cost function which is minimized subject to (i.e., conditional on) a given value of output as specified by a CES production function. Of course, if the firm actually does select optimal values of output and capital stock simultaneously, it is misleading to characterize it otherwise.

source of concern, especially for investment decisions dealing with major aggregates. But in the situation being studied in this paper, output markets are relatively separated in different countries and foreign firms have a very small presence in the U.S. market. Accordingly, such interdependencies are likely to be rather small, especially in equation (2), which represents foreign direct investment in the U.S. At a minimum, it may be said that taking output-related variables to be predetermined is more justified in this situation than in the usual studies of investment behavior.

Estimation of (1) and (2) separately by ordinary least squares will yield consistent estimates if the disturbance terms $u_i(t)$ have mean zero and variance-covariance matrix $\sigma_i^2 I$, though the presence of a lagged value of (part of) the dependent variable on the right hand side will cause a small sample bias (downward) in the estimated coefficients. The disturbance terms are likely to be contemporaneously correlated, but this will not affect the properties of OLS if the $u_i(t)$ have the properties specified above.

However, if the $u_i(t)$ are autocorrelated, as is quite likely in time series models, OLS will yield inconsistent estimates. Very general models of autocorrelation are difficult to treat in a satisfactory fashion, especially with a limited sample, so I have settled for the standard first-order assumption

$$u_i(t) = r_i u_i(t-1) + v_i(t) \qquad i=1,2 \qquad (7)$$

where $v_i(t)$ is assumed to have expectation zero and variance-covariance matrix σ_i^2 I.

Equations (1) and (2) have coefficients in common, namely the elasticity of substitution and distribution parameters. Because of the volatility of the direct investment series to be analyzed, it was decided to avoid estimating the parameters of the production function along with the adjustment coefficients. Accordingly, the a_i and s_i were specified a priori, and the cross-equation constraints were thus automatically satisfied.

A great deal of uncertainty surrounds the true values of these parameters, especially the value of the elasticity of substitution. Nerlove's survey article[7] indicates that in the United States, where perhaps data are best, econometric research only has been able to produce the rough conclusion that the elasticity of substitution is somewhat less than one. As described by Edwin Mansfield, "His major finding is the diversity of the results; small differences in period and concept seem to produce markedly different estimates."[8] In the case of the United Kingdom, research has tended to corroborate this conclusion, and a recent study concluded that the value of the elasticity of substitution in the U.K. was "somewhere" in the interval (.40,.70).[9] A three-article study of aggregate production

---

[7] Marc Nerlove, "Recent Empirical Studies of the CES and Related Production Functions," in Murray Brown, ed., <u>The Theory and Empirical Analysis of Production</u> (New York: National Bureau of Economic Research, 1967), pp. 55-122

[8] Edwin Mansfield, "Comment," in Murray Brown, <u>op.cit</u>, p. 122.

[9] B.D. Boatwright and J.R. Eaton, "The Estimation of Investment Functions for Manufacturing Industry in the United Kingdom," <u>Economica</u> N.S. 39 (November, 1972), 403-418.

functions in Canada obtained widely differing values of the elasticity of substitution (ranging from .3 to .8), depending on the data base used for the estimating equations, though all estimates were significantly different from zero and one.[10]

In view of the variation in these estimates, values of s_i and a_i were initially set at .6 and .35, for $i=1,2$, then allowed to vary both within and across locations. The range for s_i was .4 to .8, and for a_i .3 to .4. None of the qualitative results reported below, with the parameters set at their initial values, were changed by these variations.

Given these assumptions, estimates of r_i and the other parameters in each equation may be chosen to minimize the sum of squares of $v_i(t)$, $i=1,2$. This procedure yields a consistent estimator, and if $v_i(t)$ is normally distributed, it is also maximum likelihood and asymptotic standard errors can be computed.[11]

It should be noted that separate estimation of each equation hinges

---

[10] Yehuda Kotowitz, "On the Estimation of a Non-Neutral CES Production Function," Canadian Journal of Economics 1 (May, 1968), 429-439; "Capital-Labor Substitution in Canadian Manufacturing 1926-1939 and 1946-1961," Canadian Journal of Economics 1 (August, 1968), 619-632; "Technical Progress, Factor Substitution and Income Distribution in Canadian Manufacturing 1926-1939 and 1946-1961," Canadian Journal of Economics 2 (February, 1969), 106-114.

[11] The values of r_i and the other coefficients were estimated jointly for each equation using the nonlinear least squares subroutine of the Time Series Processor computer software package. See R.E. Hall and B.H. Hall, "Time Series Processor," Technical Report #12, Harvard Institute of Economic Research, May, 1973.

on the assumption that $u_i(t)$ is <u>not</u> correlated with $u_j(t-1)$ for $i \neq j$. Relaxing this assumptionmakes the system of equations (1) and (2) truly simultaneous, via the presence of $K_j(t-1)$ in equation i, for $i \neq j$. Such general assumptions are more difficult to handle. What would be involved would be estimation of each equation using exogenous and lagged exogenous variables as instruments, then using the consistently-estimated residuals to re-estimate the system via three-stage least squares.

<u>Tests of Theories of Direct Investment</u>

It is not surprising that direct investment, a phenomenon with so many diverse characteristics at the microeconomic level, is difficult to analyze in a macroeconomic context. In particular, some of the theories mentioned in chapter 4--the growth of markets theory, Vernon's product cycle, learning theories, portfolio approaches, behavioral viewpoints--are not well-represented in this aggregate formulation, nor in the aggregate empirical approaches reviewed in chapter 4.[12]

However, several theories are testable and were tested in this framework. Theories focusing on market size have implicit representation here via the output variables used. A host of theories can be captured in the ratio of output price and the user cost of capital. Equations (5), (5') and (6) indicate that inflationary and exchange-rate expectations and tax considerations all have representation in the user cost of capital, though exchange rate levels are not represented here since they are cancelled out in the ratio of output price to user cost of capital. Tariff-jumping motivations are easily incorporated into output price.

[12] Of course, Prachowny does handle portfolio motives well in his model.

As these considerations are represented in the optimal capital stocks derived via the neoclassical theory of optimal capital accumulation, they will be referred to as neoclassical theories. Tests of their importance will refer to whether the f_{2j} coefficients are significantly different from zero in equation (2).

The gambler's hypothesis of Barlow and Wender and Penrose's closely related concept of the independence of subsidiary operations from those of the parent firm are testable via the examination of the cross-adjustment coefficients f_{21} and g_{21}, in equation (2). If U.S. subsidiaries are in fact independent of home country operations, one would expect both coefficients to be indistinguishable from zero.

In chapter 6, it was indicated that one reason for using a macroeconomic approach to direct investment in the United States was that, given the available microeconomic data only in this way could theories relating to financial variables be tested. In particular, the importance of cash flow in both locations is tested via the g_{2j} coefficients. Since retained earnings in the host country are increasingly used for investment when the home country imposes exchange and capital market controls, the coefficient of g_{22} should also indicate whether these controls had a substantial effect.

The econometric specification of (1) and (2) is also ideally suited for analysis of the quasi-historical issue of whether a "demand model" or a "supply model" characterized direct investment in the United States over the sample period. The definition of these models is in Professor Kindleberger's discussion of United States direct investment:

> ...does it, that is, respond positively or negatively to an upswing in domestic (U.S.) prosperity? In a demand model, a given supply of corporate cash flow...is allocated between domestic and overseas used depending on relative profitability .... In a supply model, on the other hand, there is a fixed profit margin in favor of overseas investment...and how much is invested abroad depends on the size of the cash flow....[13]

Dwight Jaffee has shown in an unpublished paper that a supply model characterized U.S. direct investment abroad from 1952-1965.[14]

If the supply model is correct, we would expect cash flow considerations in both the home and host countries to be important. Accordingly, g_{21} and g_{22} should both be positive and significantly different from zero.

If it is the demand model which is appropriate, when output falls (or fails to grow on trend) in the home country, direct investment in the United States should increase. Similarly, if the user cost of capital in the home country should rise, one would expect entrepreneurs to look abroad and increase their investments in the United States. In both situations, of course, the optimal stock of capital in country 1, the home country, would fall and the value of $K_1^*(t)-K_1(t-1)$ would diminish. If the flow of foreign direct investment into the U.S. were to increase in such situations, the value of f_{21} should be negative and significantly different from zero.

An econometric analysis of such a political topic as direct investment would be remiss if it did not attempt to incorporate government policy measures (aside from taxes and tariffs) into the equation to

---

[13] Charles P. Kindleberger, American Business Abroad (New Haven: Yale University Press, 1969), p. 61.

[14] Ibid.

be estimated. As noted in chapter 2, Canada's policy toward outward direct investment in the postwar period has been benign, and the estimated equation reported for Canada below does not incorporate any Canadian policy measures.

Also in chapter 2, it was indicated that current British policy is quite different, with a well-developed regime of direct investment and exchange controls. Indeed, British policy has been restrictive in one fashion or another in the greater part of the postwar period, as indicated by Sir Alec Cairncross in his recent monograph on the subject.[15] After the second world war foreign exchange was provided at the official rate for all non-sterling area direct investments that complied with official requirements, which were that the investment had to benefit sterling area exports and control over the investment had to remain in the U.K. By 1956, almost no project was refused. In 1961, the only approved non-sterling area direct investments were those that promised clear and commensurate benefits to United Kingdom export earnings and to the balance of payments within two or three years. After May, 1962, companies not meeting the criteria were allowed to buy investment currency freely to finance their investments.[16] In July, 1965, the controls were further tightened and all non-sterling area direct investment had to be financed abroad or out of the investment currency market. In January,

---

[15] Sir Alec Cairncross, Control of Long-Term International Capital Movements (Washington: The Brookings Institution, 1973).

[16] Since World War II no official exchange has been provided for portfolio investment outside the sterling area. British residents have been allowed, however, to dispose of their foreign assets and to sell the foreign currency in a separate market for "investment dollars," to be used for the purchase of foreign issues.

1968, a minor relaxation was made which brought the system to the current situation described in chapter 2. Projects satisfying the "super-criterion" (i.e., benefits to exports and the balance of payments within 18 months) were allowed to receive official exchange for a maximum of 50,000 pounds (later 250000) or 50% of the total cost of the investment.

The effect of these restrictions was to increase the user cost of capital in the U.S. and the value of U.S. subsidiary cash flow to U.K. parent firms, since investment dollars were, of course, quoted at a premium over the official exchange rate. Accordingly, an estimation of (2) was performed with

$$K_2^*(t) = a_2{}^{s}2[(x_2(t)p_2(t))/(x_2'(t)c_2(t))]^{s}2\ Q_2(t)$$

where $x_2(t)$ is the official sterling/dollar exchange rate and $x_2'(t)$ is the sterling/dollar exchange rate for investment dollars. Further, $C_2(t-1)-d_2K_2(t-1)$ and $K_2(t)-K_2(t-1)$ were converted into sterling at the latter rate. For the years prior to 1962, when direct investment projects were allowed to use official exchange, of course $x_2(t)=x_2'(t)$. In other words, it is assumed that the U.K. parent values output in the U.S. at the official rate of exchange, but values cash flow and fixed assets at the investment dollar rate.

Of course, as Cairncross notes, very little direct investment in non-sterling areas was in fact financed via the investment currency market after 1965. No doubt this reflects the paucity of projects meeting the normal criteria. Nevertheless, the market's very existence meant that the user cost of capital had to be higher, since a

U.K. firm could always sell its U.S. assets, both current and fixed, and sell the dollars received in the investment currency market at a premium.

It is true that the firms and investment projects permitted to use the investment currency market changed as controls tightened. Since it is not known what proportion of U.K. investments in the U.S. met the normal criteria, and hence were allowed to use the investment currency market after 1966 (and to receive official exchange before mid-1965), and since it is not known how many firms used the investment currency market in 1962-1965, when such use was optional, I have assumed as a first approximation that all projects either used the market or treated the price of investment dollars quoted there as the opportunity cost for their dollar assets from 1962 to the end of the sample period.

Two developments stemming from the overhaul of the British tax system are not analyzed here. In that year, the Overseas Trade Corporation scheme, which granted exemption from U.K. taxation on retained profits earned by overseas <u>branches</u>, was rescinded; as noted in appendix 1 the overwhelming majority of direct investments in the U.S. occur via the establishment of subsidiaries, rather than branches. Further, measures were enacted which made it more attractive from a tax viewpoint to borrow abroad; since data are not available for the full sample period on the proportion of U.K. investment in the U.S. financed by borrowing, this feature is not analyzed here.

The U.S. system of capital controls that proliferated in the 1960's also affected foreign borrowing in the U.S. In 1964, the Interest Equalization Tax was enacted and made retroactive to 1963. The tax was a graduated tax on foreign debt maturing in three years or more and on foreign equity, as originally enacted, and was amended to cover loans of one to three years in 1965. In the same year, loans of less than one year to foreigners were also regulated by the Federal Reserve's voluntary credit restraint program. The tax rates charged and the degree of regulation of short-term credit fluctuated somewhat through 1971, but both the IET and the voluntary credit restraint program were still in force at the end of the sample period (though they were terminated in January, 1974). It was estimated that the combined effect of the programs has been to raise the cost of borrowing funds in the U.S. for foreigners by 1%.[17] Accordingly, the estimations described above were redone with the cost of capital in the U.S. increased by 1% for 1963-1971 for U.K. firms(Canada was exempted from the tax). Of course, to the extent that foreign subsidiaries in the United States finance their own capital accumulation through issues of securities, these regulations should have no effect. As indicated earlier, the data are not available to permit discerning how much financing was done by parents and how much by subsidiaries.

To explicitly determine the role of aggregate tariff rates in direct investment behavior, an estimation of equation (2) has been performed for both the United States and Canada with the value of the aggregate tariff rate T set equal to zero, and the results compared

---

[17] Eli Shapiro, et al., Money and Banking, 5th edition (New York: Holt, Rinehart, and Winston, 1968), pp. 628-629.

to an estimation where T is not zero.

Finally, as noted in chapter 4, several authors believe the surge of direct investment emanating from European countries in the late 1960's derives from the development of companies of sufficient size and the associated managerial techniques. To attempt to capture the effects of this European merger boom, I have included a variable MERGE, defined as zero through 1965 and as one from 1966-1971, in an estimation of equation (2) for the U.K. Of course, this is not the most precise measure, but its imprecision highlights the shortcomings of analyzing direct investment in the aggregate. In particular, MERGE could also be picking up the effects of the growth of the Eurobond market, as well as the consequences of the 1967 SEC ruling which allowed foreign-owned firms' accounting practices to differ somewhat from those employed by U.S. firms in order to mesh better with those of their parents. A less restrictive interpretation of MERGE would have it represent this host of institutional changes that occurred in the late 1960's.

<u>Estimation Results</u>

United Kingdom Investment in the United States

Table 7-1 displays the results of estimation of the various forms of equation (2) for United Kingdom investment in the United States. As noted above, the basic relation (without T=0, the IET or capital controls considerations, or the MERGE variable)with the autocorrelation assumption of equation (7) was estimated after the standard autoregressive transformation by nonlinear least squares for the period

Table 7-1

UNITED KINGDOM DIRECT INVESTMENT

IN THE UNITED STATES, 1952-1971

1. Basic relation

$$K_2(t)-K_2(t-1) = \underset{\substack{(.001)\\(-2.51)}}{-.002}(K_1^*(t)-K_1(t-1)) - \underset{\substack{(.005)\\(-.429)}}{.002}(C_1(t-1)-d_1K_1(t-1))$$

$$\bar{R}^2=.7761 \qquad +\underset{\substack{(.095)\\(2.39)}}{.226}(K_2^*(t)-K_2(t-1)) + \underset{\substack{(.045)\\(4.46)}}{.201}(C_2(t-1)-d_2K_2(t-1))$$

2. Interest Equalization Tax

$$K_2(t)-K_2(t-1) = \underset{\substack{(.001)\\(-2.48)}}{-.002}(K_1^*(t)-K_1(t-1)) \underset{\substack{(.005)\\(-.382)}}{-.002}(C_1(t-1)-d_1K_1(t-1))$$

$$\bar{R}^2=.7742 \qquad + \underset{\substack{(.098)\\(2.35)}}{.230}(K_2^*(t)-K_2(t-1)) + \underset{\substack{(.046)\\(4.42)}}{.203}(C_2(t-1)-d_2K_2(t-1))$$

3. Capital controls

$$K_2(t)-K_2(t-1) = \underset{\substack{(.001)\\(-1.45)}}{-.001}(K_1^*(t)-K_1(t-1)) \underset{\substack{(.007)\\(-.771)}}{-.005}(C_1(t-1)-d_1K_1(t-1))$$

$$\bar{R}^2=.7947 \qquad +\underset{\substack{(.058)\\(1.18)}}{.068}(K_2^*(t)-K_2(t-1)) +\underset{\substack{(.040)\\(3.94)}}{.158}(C_2(t-1)-d_2K_2(t-1))$$

4. MERGE

$$K_2(t)-K_2(t-1) = \underset{\substack{(.001)\\(-2.81)}}{-.002}(K_1^*(t)-K_1(t-1)) +\underset{\substack{(.005)\\(.840)}}{.004}(C_1(t-1)-d_1K_1(t-1))$$

$$\bar{R}^2=.8344 \qquad +\underset{\substack{(.085)\\(3.41)}}{.290}(K_2^*(t)-K_2(t-1)) +\underset{\substack{(.039)\\(5.39)}}{.209}(C_2(t-1)-d_2K_2(t-1))$$

$$+\underset{\substack{(3.16)\\(2.57)}}{8.14}\text{MERGE}$$

Table 7-1 (Continued)

5. Capital controls and MERGE

$$
\begin{aligned}
K_2(t)-K_2(t-1) = {} & -.002(K_1^*(t)-K_1(t-1)) && -.0005(C_1(t-1)-d_1K_1(t-1)) \\
& \quad (.001) && \quad (.005) \\
& \quad (-2.22) && \quad (-.088) \\
& +.162(K_2^*(t)-K_2(t-1)) && +.161(C_2(t-1)-d_2K_2(t-1)) \\
\bar{R}^2=.8787 \qquad & \quad (.052) && \quad (.031) \\
& \quad (3.11) && \quad (5.22) \\
& +13.84\,MERGE && \\
& \quad (3.99) && \\
& \quad (3.47) &&
\end{aligned}
$$

Note: country 1 is the United Kingdom, country 2 is the United States.

1952-1971. Then the serial correlation coefficient r_2 was constrained to zero, and a likelihood ratio test was performed; the null hypothesis of no autocorrelation could not be rejected by this asymptotic test even at the .90 level of significance. Accordingly, all reported equations in Table 7-1 reflect the constraint $r_2=0$. (Of course, failing to reject a hypothesis is not the same as accepting it, and it is not always best to do the latter when the consequences of a mistaken decision are inconsistent estimators. Fortunately, the null hypothesis could not even be rejected at the .90 level of significance. Further, none of the qualitative results are changed in any of the equations to be reported in this chapter where r_1 or r_2 are constrained to be zero, if r_1 or r_2 are allowed to vary from zero.) In Table 7-1, as in the other estimating equations to be reported, the first row of figures in parentheses beneath the estimated coefficients are the standard errors of the corresponding estimated coefficients. The figures in the second row of parentheses are the ratios of the estimated coefficients to their standard errors.

The first equation of Table 7-1 provides definite information on the relevance of several theories of direct investment to the U.K. experience in the U.S. In this basic relationship, both f_{21} and f_{22}, the coefficients of $K_1^*(t)-K_1(t-1)$ and $K_2^*(t)-K_2(t-1)$, are significantly different from zero according to the standard t-test with a 5% level of significance, thus suggesting the importance of neoclassical theories of direct investment. The positive sign of f_{22} suggests that U.S. market size, as represented by $Q_2(t)$ in $K_2^*(t)$, is an important motivation for direct investment in the U.S. The fact that g_{21}, the coefficient of the parent cash flow variable $C_1(t-1)-d_1K_1(t-1)$, is not indistinguishable from zero indicates that, financially at least, U.S. subsidiaries of U.K. firms are substantially independent of their parents. But the statistically significant f_{21} suggests that the flow of direct investment into the U.S. has not been wholly independent of U.K. economic conditions.

The positive and statistically significant g_{22}, the coefficient of $C_2(t-1)-d_2K_2(t-1)$, indicates that subsidiary financial considerations are important for U.K. investment in the U.S.; as noted earlier, the reason for this importance may have been the proliferation of U.K. capital controls.

Equation 1 of Table 7-1 also represents the results of the estimation performed with T=0, for the estimated coefficients and standard errors changed only slightly, in the fourth decimal place. This failure of the aggregate tariff rate to influence the flow of direct investment into the U.S. is not too surprising, since the rate varied little over the sample period and direct investment is an industry-specific phenomenon.

Equation 2 of Table 7-1 represents the incorporation of the Interest Equalization Tax considerations into the specification. Again the estimated coefficients have changed little from those reported in equation 1, suggesting that the IET had a limited effect on U.K. investment flows into the U.S. This result suggests that U.S. subsidiaries financed their own expansion via borrowing or retained earnings and U.K. parents financed new and expansion investment by borrowing outside the U.S.

Equation 3 of Table 7-1 represents the incorporation of capital controls considerations into the specification, as described above. Not unexpectedly, cash flow in the U.S. overshadows all other variables in the significance of its influence on direct investment flows in this situation. Indeed, when capital controls are explicitly incorporated into the model, the strong showing made earlier by the neoclassical variables no longer occurs, and the hypothesis of subsidiary independence is more definitely confirmed, since f_{21} is indistinguishable from zero. Further, the speeds of adjustment are reduced in the presence of the controls.

In equation4, the capital controls have been removed from the specification and the dummy variable MERGE has been included. Again the results suggested by equation 1 occur here, and the fit of the equation[18] is improved somewhat. In addition, the coefficient of MERGE is positive and significantly different fromzero, suggesting that the previously mentioned institutional changes which occurred in the late 1960's had a positive impact on direct investment flows into the United States. The coefficients of the U.K. stock adjustment variable and the U.S. variables are also in sharper focus, suggesting that before the introdcution of MERGE, these variables were being made to represent both economic and institutional considerations.

---

[18] As measured by $\bar{R}^2$, where $\bar{R}^2$ is R^2 adjusted for degrees of freedom.

Finally, in equation 5, capital controls and MERGE are both included, and the goodness-of-fit improves still more. The results are similar to those of equation 4 though again the speeds of adjustment are reduced and the t-statistics are lower for the stock adjustment and cash flow variables, as they were when equation3 was compared with equation 1. The ratio of the coefficient of MERGE to its standard error, however, is larger than in equation 4, and the value of the coefficient is larger, perhaps suggesting that the controls were less effective in the last half of the 1960's as the institutional environment changed.

Equation 5 also suggest a resolution of the demand model-supply model issue. So far as U.K. economic conditions are concerned it appears that it was the demand side which was important for U.K. investments in the U.S. during the postwar period in manufacturing. The coefficient f_{21}, while small, is significantly different from zero and negative, suggesting that the demand model was operating.

But as already noted, liquidity considerations were important as well, since the coefficient of the cash flow variable in the U.S., g_{22}, is positive and significantly different from zero. The resolution of the evidence on both sides of the question is not difficult. When U.K. economic activity began to lag and/or capital costs rose, U.K. investors looked abroad to the U.S. for investment opportunities. Once they were in the U.S., the spate of capital controls which was in place for much of the sample period forced U.K. investors to depend on the funds generated in the U.S. to expand their investments there. Institutional developments enable the British entrepreneur to make more new direct investments by borrowing in the Eurobond market. Hence it is suggested that a demand model at the beginning of the period turned toward a supply model near the end. Data are not available on the proportion of U.K. direct investments in the U.S. which have represented additions to existing capacity and the proportion which represented new investment; if such data were available, this outline could be subjected to a more rigorous test.

United Kingdom Investment at Home

Table 7-2 represents estimations 1 through 5 performed on equation (1) for U.K. investment in the U.K. Again, the hypothesis $r_1=0$ could not be rejected, even at the .75 level of significance. As expected, the MERGE variable contributes little to the estimation of domestic investment flows in the U.K. The third equation in Table 7-2 reflects the capital controls specification for U.S.-related variables, and is the estimation which shouldbe viewed in concert with equation 5 of Table 7-1 as the preferred results.

Just as U.S. subsidiary cash flow was positively and significantly related to the flow of direct investment in equation 5 of Table 7-1, so is U.K. cash flow's coefficient significantly different from zero and positive in equation 3 of Table 7-2, suggesting the appropriateness of making speeds of adjustment variable, depending on the cash flow available for new investment. Further, the coefficient f_{12} of $K_2^*(t)-K_2(t-1)$ is negative and significantly different from zero. Not only does this add further credence to the demand model in the U.K. case, but it means

Table 7-2

UNITED KINGDOM INVESTMENT IN THE UNITED KINGDOM

1952-1971

1. Basic relation

$$
\begin{array}{lll}
K_1(t)-K_1(t-1) = & .035(K_1^*(t)-K_1(t-1)) & +.280(C_1(t-1)-d_1K_1(t-1)) \\
 & (.023) & (.127) \\
 & (1.55) & (2.21) \\
\bar{R}^2=.6605 & -6.58(K_2^*(t)-K_2(t-1)) & -.017(C_2(t-1)-d_2K_2(t-1)) \\
 & (2.58) & (1.23) \\
 & (-2.55) & (-.014)
\end{array}
$$

2. Interest Equalization Tax

$$
\begin{array}{lll}
K_1(t)-K_1(t-1) = & .039(K_1^*(t)-K_1(t-1)) & +.274(C_1(t-1)-d_1K_1(t-1)) \\
 & (.023) & (.124) \\
 & (1.72) & (2.22) \\
\bar{R}^2=.6749 & -7.13(K_2^*(t)-K_2(t-1)) & -.209(C_2(t-1)-d_2K_2(t-1)) \\
 & (2.60) & (1.22) \\
 & (-2.74) & (-.171)
\end{array}
$$

3. Capital controls

$$
\begin{array}{lll}
K_1(t)-K_1(t-1) = & .028(K_1^*(t)-K_1(t-1)) & +.472(C_1(t-1)-d_1K_1(t-1)) \\
 & (.018) & (.143) \\
 & (1.53) & (3.31) \\
\bar{R}^2=.6894 & -3.18(K_2^*(t)-K_2(t-1)) & +.969(C_2(t-1)-d_2K_2(t-1)) \\
 & (1.21) & (.836) \\
 & (-2.63) & (1.16)
\end{array}
$$

4. MERGE

$$
\begin{array}{lll}
K_1(t)-K_1(t-1) = & .035(K_1^*(t)-K_1(t-1)) & +.282(C_1(t-1)-d_1K_1(t-1)) \\
 & (.024) & (.150) \\
 & (1.50) & (1.87) \\
 & -6.56(K_2^*(t)-K_2(t-1)) & -.014(C_2(t-1)-d_2K_2(t-1)) \\
 & (2.79) & (1.27) \\
\bar{R}^2=.6339 & (-2.35) & (-.011) \\
 & +3.18\,MERGE & \\
 & (103.5) & \\
 & (.031) &
\end{array}
$$

Table 7-2 (Continued)

5. Capital controls and MERGE

$$\begin{array}{lll}
K_1(t)-K_1(t-1) = & .030(K_1^*(t)-K_1(t-1)) & +.440(C_1(t-1)-d_1K_1(t-1)) \\
 & (.019) & (.149) \\
 & (1.59) & (2.96) \\
 & -3.80(K_2^*(t)-K_2(t-1)) & +.947(C_2(t-1)-d_2K_2(t-1)) \\
 & (1.42) & (.844) \\
\bar{R}^2=.6838 & (-2.67) & (1.12) \\
 & -91.78MERGE & \\
 & (109.1) & \\
 & (-.842) &
\end{array}$$

Note: country 1 is the United Kingdom, country 2 is the United States.

the cross-adjustment coefficients in both equations (1) and (2) were significantly different from zero, suggesting the validity of this general disequilibrium approach, for the U.K. at least.

Canadian Investment

As with the United Kingdom, Canadian investment equations, transformed in accordance with the autocorrelation assumption, were estimated by nonlinear least squares; then the serial correlation coefficient was constrained to zero and the equation re-estimated. For Canadian investment in the U.S., the null hypothesis of no autocorrelation could not be rejected at the .75 level of significance via the usual likelihood ratio test. However, for Canadian investment in Canada, the null hypothesis was rejected at the 5% level of significance.

The following is the estimated equation for Canadian direct investment in the U.S. for the period 1952-1971:

$$\begin{array}{llll} K_2(t)-K_2(t-1) = & \underset{\substack{(.009)\\(-1.17)}}{-.010}(K_1^*(t)-K_1(t-1)) & + & \underset{\substack{(.059)\\(2.09)}}{.123}(C_1(t-1)-d_1K_1(t-1)) \\ \bar{R}^2=.4264 & \underset{\substack{(.112)\\(1.52)}}{+.172}(K_2^*(t)-K_2(t-1)) & + & \underset{\substack{(.195)\\(1.49)}}{.290}(C_2(t-1)-d_2K_2(t-1)) \end{array}$$

Cash flow variables clearly have been the most important determinants of direct investment flows into the United States from Canada. The statistical significance of the coefficient of Canadian cash flow, g_{21}, suggests that financially, U.S. subsidiaries have not been independent of their parent Canadian firms. The evidence on the importance of neoclassical motivations is less strong, with neither of the coefficients

(f_{21} and f_{22}) being statistically significant.

With regard to the demand model-supply model issue, the evidence suggests that supply model considerations predominate, though the negative sign of f_{21} indicates traces of a demand model. The uncertainty surrounding the evidence presented derives from the fact that U.S. and Canadian economic variables exhibit a tendency to be fairly highly correlated. The general disequilibrium framework itself is not to blame, as the estimation results reported for Canadian investment indicate:

$$
\begin{array}{lll}
K_1(t)-K_1(t-1) = & .220(K_1^*(t)-K_1(t-1)) & + \; 1.12(C_1(t-1)-d_1K_1(t-1)) \\
 & (.053) & (.275) \\
r_1 = .723 & (4.16) & (4.09) \\
\quad (.166) & & \\
\quad (4.36) & -2.17(K_2^*(t)-K_2(t-1)) & - \; 2.00(C_2(t-1)-d_2K_2(t-1)) \\
\bar{R}^2 = .8309 & (.629) & (.873) \\
 & (-3.45) & (-2.28)
\end{array}
$$

Both U.S. and Canadian neoclassical and cash flow variables have coefficients which are positive and significantly different from zero. U.S. neoclassical variables possess a coefficient which is significantly different from zero and negative, providing further indirect evidence of a demand-model trade-off between investing in the U.S. and in Canada.

In an effort to increase the efficiency of the estimation procedure, equations (1) and (2) were treated as "seemingly unrelated" equations, stacked, and estimated by Zellner's minimum-distance estimator. Of course, the only fact which makes a gain in efficiency possible is the nonlinearity introduced by the fact that r_1 is not equal to zero. If it were zero, no efficiency gain would be possible, since the same variables are on the right hand side of each equation. The results of this procedure were that a slight efficiency gain was achieved, but none of the variables which were not twice their (asymptotic) standard errors earlier were twice their asymptotic errors in the equations estimated by Zellner's procedure.

An equation was estimated for Canadian investment in the U.S. with the rate of the tariff set to zero, but as with the U.K. case, the estimated coefficients were influenced hardly at all. As mentioned previously, no equations were estimated for the IET, since Canada was exempt, for external capital controls, since Canada has and had none, or for MERGE, since the institutional arrangements mentioned earlier primarily related to Europe.

It must be said that it is surprising that a supply model characterizes Canadian investment in the U.S. Such a model is usually associated with a horizon-shift on the part of investors; it is quite unlikely that Canadian investors experienced such a change in perspective in the postwar years. Probably the answer lies in the fact that both demand and supply considerations are important, but the higher correlation of Canadian and U.S. output variables prevented demand effects from being significant. Certainly both stock adjustment coefficients have the appropriate signs for a demand model, and both are larger than their standard errors.

Summary and Conclusions

In this chapter, aggregate direct investment flows into the U.S. in manufacturing have been estimated for the postwar period for the United Kingdom and Canada. For both the issue of the validity of theories of direct investment and the question of a demand model verses a supply model, country effects have been shown to be important.

In the case of the United Kingdom, neoclassical variables were shown to be important determinants of the flow of direct investment into the U.S. In particular, U.S. output as part of $K_2^*(t)$ was shown to be positively related to the flow of direct investment into the U.S., confirming the findings of Leftwich in his aggregate analysis mentioned in chapter 4. The failure of the U.S. aggregate tariff level to influence the results also agrees with Leftwich's findings. The importance of neoclassical variables in the United Kingdom situation is also consistent with Prachowny's finding reported in chapter 4 that relative rates of return influence the flow of direct investment into the U.S. The significant coefficient of the U.K. stock adjustment variable indicates that the flow of direct investment into the U.S. was certainly not independent of U.K. economic conditions. U.S. subsidiary cash flow was also quite important, however, in this period of capital controls. The significant coefficient of the MERGE variable suggests that Sametz and Franko were right in their comments noted in chapter 4 that institutional changes in the environment of international business in Europe in the late 1960's had important consequences for the flow of direct investments into the U.S.

In contrast, neoclassical variables were not significant determinants of Canadian investment flows to the U.S. Rather, the cash flow variable in both locations were of the greatest importance. This influence of cash flow considerations in both the U.K. and Canada suggests that capital market imperfections have characterized the environment in which direct investment in the U.S. occurred. Also common to both countries was the fact that home country economic variables influence investment abroad. This corroborates the findings of Herring and Willett[19] for U.S. direct investment abroad, and suggests that U.S. subsidiaries are not independent of their foreign parents.

With regard to the demand model-supply model issue, it was concluded that a demand model characterized U.K. direct investment for much of the period, though toward the end of the 1960's evidence of a supply model emerged. Canadian investment followed a supply model, on the other hand, in that only cash flow variables were important determinants of the flow of direct investment to the U.S.

Finally, the estimation results reported here suggest that a general disequilibrium framework is a fruitful specification for the aggregate analysis of direct investment flows. It allows for the inclusion of real and financial effects, when variable adjustment speeds are incorporated, and explicitly models the interrelationships of a firm's decisions to invest at home or abroad.

However, it must also be said that the results reported here highlight the shortcomings of an aggregate analysis of direct investment.

---

[19] R. Herring and T.D. Willett, "The Relationship Between United States Direct Investment at Home and Abroad," Rivista Internazionale di Scienze Economiche e Commerciali 20(1973), 73-82.

Aggregate data only allow the testing of a very few theories of direct investment behavior and inadequately represent industry factors influencing investment decisions. Nevertheless, the approach used here should prove useful, since for most countries direct investment data are only available on an aggregate basis.

Appendix 1 to Chapter 7

DATA AND THEIR SOURCES

United States-related series

$Q_2(t)$: The output variable represents U.S. gross value added at factor cost in manufacturing(less petroleum refining), divided by the U.S. GNP deflator and adjusted for the fact that it is unrealistic to expect the target capital stock of foreign firms in the U.S. to depend on the whole of the value of output in manufacturing(less petroleum refining). Accordingly, gross value added at factor cost in manufacturing (less petroleum refining) was taken to be

> (gross product originating in manufacturing less indirect business taxes in manufacturing) times (1 minus the ratio of national income originating in petroleum refining to national income originating in manufacturing).

All data used in this computation were in current dollars and were from various issues of the _Survey of Current Business_. Especially useful was Jack J. Gottsegen's "Revised Estimates of GNP by Major Industries," _Survey of Current Business_ 47 (April, 1967), 18-34.

This quantity was then adjusted for each country by multiplying by the proportion that that country's fixed investment in the U.S. in manufacturing was of the total investment in manufacturing in the U.S., when averaged over the sample period. The values of the adjustment coefficients were .0020 for the United Kingdom and .0012 for Canada. The series for foreign investment in fixed assets in the U.S. by each country was derived as discussed below. Total investment in the U.S. in manufacturing was based on the U.S. Office of Business Economics Capital Goods Study of

1966, as reported in Robert J. Gordon, "Problems in the Measurement of Real Investment in the U.S. Private Economy," (Ph.D. thesis, Department of Economics, M.I.T., 1967). Since the latter data were only available through 1965, the average of the proportion was taken over the time period 1950-1965. An average was used to reflect a measure of long-term expected market share.

$p_2(t)$: The GNP deflator, taken from the _Survey of Current Business_, various issues. 1970 was taken as the base year.

$c_2(t)$: The rate of return on capital, r, was taken to be the same as prevailing in the home country. The income tax rate, u_2, was set at .52 through 1964 and at .48 for 1964 onward. The depreciation allowance present value, v_2, was computed according to the double declining balance method. Asset lifetime was assumed to be 15 years. Exchange rates between home and host country were obtained from the International Monetary Fund, _International Financial Statistics_, various issues. Exchange rate expectations and capital goods price expectations were assumed to be adaptive over the previous three years in addition to the current year, with weights .4,.3,.2,and.1. The rate of depreciation d_2 was set at .027, the value estimated by Dale W. Jorgenson and J. Stephenson in "Investment Behavior in United States Manufacturing, 1947-1960," _Econometrica_ 35 (1967), 169-220. The price of investment goods, $q_2(t)$, was taken to be a weighted average of price indices of producer's durables and of non-residential structures. The former series was taken to be the implicit deflator for producer's durables reported in the national accounts in various issues of the _Survey of Current Business_.

The price index for structures was taken to be the structures index used by the U.S. Federal Highway Administration (formerly the Bureau of Public Roads) and reported in Price Trends for Federal Aid Highway Construction, 1973:2. The weights were the propotion of investment in non-residential structures and in producer's durables in each year, as reported in the Survey of Current Business. The weights were variable from year to year. The base year of the index used was 1970.

$C_2(t)$: The cash flow variable is defined as retained earnings plus depreciation in the foreign country's (country 1) incorporated U.S. affiliates and branches. U.S. affiliate retained earnings were taken from the U.S. Office of Business Economics, Foreign Business Investments in the United States (Washington: U.S. Government Printing Office, 1962), and from Robert Leftwich, "Foreign Direct Investments in the United States, 1962-1971," Survey of Current Business 53 (February, 1973), 29-40, the two basic sources for statistics on foreign direct investment in the United States. As discussed in the chapter, branch retained earnings are not included in this figure. To gauge the size of the omission, the value of foreign direct investments in branches as a percentage of the value of total foreign direct investment in manufacturing according to the 1959 benchmark survey were calculated for each country. The annual figures for retained earnings of U.S. affiliates were then increased by this percentage. Only U.K. subsidiary retained earnings required adjustment, since the percentages by country were United Kingdom, 7.5%, and Canada, 0.0%. Depreciation figures are not reported for foreign investors in the U.S. Again, to rectify this it was assumed that foreign investors in the U.S. behave substantially as do their U.S. counterparts as far as charging depreciation for accounting purposes. The ratio of corporate consumption allowances to retained earnings for U.S. corporations in manufacturing was calculated from national income data in various issues of the Survey of Current Business for each year of the sample period. This ratio was applied year by year to the adjusted retained earnings variable described above to obtain a figure for depreciation charges for each country. The adjusted retained earnings figure and the depreciation figure were then summed to yield a cash flow series for subsidiaries and branches of firms from each foreign country located in the U.S. This figure was deflated by $q_2(t)$ to obtain cash flow in constant dollars. $q_2(t)$ was used since the rationale for the cash flow variable is that it represents funds available for investment in capital stock, which is measured in constant dollars using the same deflator in the equations estimated.

$K_2(t)$: As mentioned in the chapter, the data on foreign direct investment in the U.S. in manufacturing by country include the value of both current and fixed assets. To reduce this figure to a fixed asset total, it was assumed that, within each sub-industry, foreign firms operating in the U.S. would have a capital structure similar to that of the U.S. firms in that sub-industry. Combining this assumption with the assumption that the distribution of the value of foreign direct investment by sub-industry in 1959 was the same for all years of the sample provided a method for obtaining fixed asset totals for foreign direct investment in the U.S. by country. Specifically, an annual series of the ratio of fixed assets to total assets in each two-digit SIC (excluding petroleum refining) in the manufacturing sector was obtained from various issues of the U.S. Federal Trade Commission's Quarterly Financial Reports of U.S. Manufacturing Corporations. These ratios were used to calculate the ratio of fixed assets to total assets on an annual basis in six major sub-industry groupings within the manufacturing sector--food, chemicals, electrical machinery, other machinery, primary and fabricated metalworking, and other manufacturing. Using these calculated ratios, and the proportion of the value of foreign direct investment in manufacturing in each of the six major sub-industry groupings in 1959, obtained from Foreign Business Investments in the United States, an annual series of the proportion of fixed assets to total assets in foreign direct investment in U.S. manufacturing was computed. These proportions were then multiplied times the annual figures for the value of foreign direct investment in manufacturing by country to obtain foreign direct investment in fixed assets in manufacturing by country in current dollars. This figure was then deflated by $q_2(t)$ to convert this series to constant dollars.

T: The aggregate U.S. tariff rate was taken to be the ratio of import duties paid to total imports and was obtained from John Cheh, "United States Trade Policy and Short-Run Adjustment Costs," (Ph.D. thesis, Department of Economics, M.I.T.,1974).

United Kingdom-related series

$Q_1(t)$: Gross domestic prodcut originating in manufacturing in current pounds was multiplied by 1 less the ratio of taxes on expenditure less subsidies to gross domestic product at factor cost to arrive at a measure of gross value added at factor cost. All series were found in the U.K. Central Statistical Office's _National Income and Expenditure_, various issues. This measure was then corrected to remove petroleum refining from the manufacturing sector by multiplying by 1 less the percentage of manufacturing sector economic activity represented by petroleum refining. This percentage was computed from weights found in the U.K. C.S.O.'s _The Index of Industrial Production and Other Output Measures_. Finally, this quantity was divided by the consumer price index in the U.K. to yield an output index.

$p_1(t)$: This was taken to be the British consumer price index, from the U.K.C.S.O.'s _National Income and Expenditure_, various issues. 1970 was the base year.

1-k: The ratio of exports to GNP, from the IMF, _International Financial Statistics_.

$c_1(t)$: The rate of return r was taken to be a weighted average of equity and debt rates. The equity rate was the industrial ordinary equity yield, while the debt rate was the debenture yield. Both rates were taken from the _Monthly Digest of Statistics_. The equal weights used were those employed by Jerry Hausman, in "A Theoretical and Empirical Study of Investment in the United Kingdom," (Ph.D. thesis, Oxford, 1973). The depreciation allowance present value, v_1, was computed under the same assumptions governing the calculating of v_2 for the U.S. The depreciation rate d_1 was calculated as a by-product of the generation of the capital stock series, described below. The tax rate u_1 through

1965 was taken from J.C.R. Rowley, "Time Series for the Post-War British Economy," Institute for Economic Research Discussion Paper #9, Queen's University, Kingston, Ontario, October, 1969. After that date, the rate was computed using Rowley's technique and the information on the Corporation Tax found in T. Stark, "The Corporation Tax and Incentives," Manchester School (1966), in B.D. Boatwright and J.R. Eaton, "The Estimation of Investment Functions for U.K. Manufacturing Industry," Economic Forecasting Unit mimeo, London Graduate School of Business Studies, December, 1971, and in Company Tax Systems in OECD Countries. Basically, Rowley telescopes the differential tax rates on retained earnings and dividends into one effective rate by employing the percentage of earnings retained and distributed. The price of investment goods, $q_1(t)$, was the fixed asset price index from National Income and Expenditure; the base year was 1970. The expected rate of change of capital goods prices was derived in a manner analogous to that used for the U.S.

$C_1(t)$: Retained earnings plus depreciation figures for U.K. corporations in manufacturing were not available. To infer such a series, undistributed income after taxes but before providing for depreciation for all U.K. companies was obtained from National Income and Expenditure. This was then multiplied by the proportion of total gross profits of U.K. companies represented by U.K. companies in manufacturing (excluding petroleum refining) to arrive at a figure for cash flow of U.K. companies in manufacturing (excluding petroleum refining). The series on the proportion was obtained from _National Income and Expenditure_. The cash flow series in current pounds was deflated by $q_1(t)$.

$I_1(t)$: This series, used in the estimation of capital stock and depreciation, was gross domestic fixed capital formation for all manufacturing (excluding petroleum refining), and was obtained from _National Income and Expenditure_. For some years the deletion of petroleum refining was accomplished by using the relative importance of petroleum refining in the industrial group coal, petroleum products and chemicals, as determined by weights given in _The Index of Industrial Production and Other Output Measures_.

$K_1(t)$: A perpetual inventory formulation was used:

$$K_1(t) = (1-d_1)K_1(t-1) + I_1(t)$$

where the single real root d_1 was calculated using net capital stock data in 1970 prices for 1948 and 1960, with $q_1(t)$ as the deflator. d_1 was calculated at .0540. Initial and terminal capital stocks were formulated to reflect the absence of petroleum refining from the manufacturing sector. The unavailability of net capital stock data at the sub-industry level for years later than 1960 prevented using a later terminal capital stock. Two series are available for capital stock by sub-industry. G. Dean ("The Stock of Fixed Capital in the United Kingdom in 1961," _Journal of the Royal Statistical Society_, A127 (1964), 327-358) reports gross capital stock by sub-industry. The Department of Applied Economics at Cambridge has compiled net capital stock data by sub-industry ("Capital, Output, and Employment, 1948-1960," volume 4 in R. Stone, ed., _A Programme for Growth_ (London: Chapman and Hall, 1964)), as well as gross stock estimates. The Cambridge estimates are based on those of Redfern ("Net Investment in Fixed Assets in British Manufacturing Industry in 1955," _Journal of the Royal Statistical Society_, A118(1955), 141-182), made in 1955 with much less information than that available to Dean. Dean's estimates are generally larger than those of the Cambridge group, and agree with the census estimates of T. Barna ("The Replacement Cost of Fixed Assets in British Manufacturing Industry in 1955," _Journal of the Royal Statistical Society_ A120 (1957), 1-36) at the gross level. The Cambridge estimates were used because they were the only net stock estimates available in sufficient sub-industry detail to allow the exclusion of petroleum refining from manufacturing. However, they were corrected to agree more nearly with Dean's results at the gross level. Specifically, the Cambridge net capital stock figures for manufacturing in 1948 and 1960 were corrected to exclude capital stock in petroleum refining. Then the 1948 figure was increased by 40%, the percentage by which Dean's gross stock estimate in that year exceeded the Cambridge gross figure for manufacturing and construction excluding textiles. The 1960 figure was increased by 18% for the same reason. Using relationships about gross stocks to infer relationships about net stocks assumes that capital consumption estimates from the two sources are roughly similar, which was true in manufacturing, as reported by Dean in comparing his and Redefern's estimates, on which the Cambridge estimates were based. The d_1 computed is lower than Hausman's .0967, partly, of course, because the time period covered in his estimation, which was not just for manufacturing, was 1954-1970 and more of the new structures and equipment put into place after World War II had been replaced. However, the sectors analyzed by Hausman included distribution and trade, where depreciation is fairly rapid. Using d_1, $K_1(t)$ in 1970 prices was computed by the perpetual inventory method described above.

$x_1'(t)$: The investment dollar exchange rate was obtained from Sir Alec Cairncross, Control of Long-Term International Capital Movements (Washington: The Brookings Institution, 1974).

Canadian-related series

$Q_1(t)$: Gross domestic product at factor cost in manufacturing in current dollars was obtained for 1950-1960 from Historical Statistics of Canada, then deflated by the wholesale price index (1961=100). The resulting series was applied to a volume index of real domestic product in manufacturing for the whole sample period in 1961 prices, with 1957 as the volume base year, obtained from the Canadian Statistical Review: Historical Summary 1970. The resulting series was reconverted into current dollars and multiplied by 1-.0295=.9705, where .0295 is the proportion of total output in manufacturing contributed by the petroleum and coal products industry, according to the 1960 weights in the index of real domestic product, found in Indexes of Real Domestic Product by Industry. Finally, the resulting series was deflated by the GNP deflator.

$p_1(t)$: The GNP deflator, base year 1970, from the Canadian Statistical Review: Historical Summary, 1970.

1-k: As treated with the U.K., i.e., exports as a percentage of GNP, from International Financial Statistics.

$c_1(t)$: Again, an adaptive expectations framework was assumed. r was taken to be the rate of return used in the TRACE econometric model of the Canadian economy, i.e., the rate on government bonds maturing in 14 years or longer. It was obtained from Historical Statistics of Canada and various issues of the Bank of Canada Statistical Summary Supplement. u_1 was taken to be .52 throughout the period. The depreciation rate d_1 was calculated as a by-product of the generation of the capital stock series, described below. v_1 was computed under the same assumption made for the U.K. and the U.S. The price of investment goods, $q_1(t)$, was a weighted average of structures and machinery-equipment price indices found in Canadian Statistical Review: Historical Summary 1970. The weights were economy-wide investment in structures and machinery-equipment, from the same source. The base year was 1970.

$C_1(t)$: Undistributed corporate profits were obtained from the Canadian Statistical Review: Historical Summary, 1970, while corporate capital consumption allowances were obtained from National Income and Expenditure 1926-1968. The sum of these series was multiplied by the percentage that corporate profits in manufacturing were of total corporate profits in each year to give an estimate of cash flow in manufacturing. This series was then multiplied by .9705 to eliminate petroleum refining, and then deflated by $q_1(t)$.

$I_1(t)$: This series, used in the estimate of capital stock and depreciation, was gross domestic fixed capital formation in manufacturing less petroleum refining obtained from the Bank of Canada Statistical Summary

Supplement, and deflated by $q_1(t)$ reindexed to the base year 1957.

$K_1'(t)$: Again the perpetual inventory formulation was used, with d_1 calculated at .0785. The initial net capital stock was for 1946, while the terminal stock was for 1960; both were expressed in 1957 prices, and both were formulated to exclude petroleum refining. They were obtained from Fixed Capital Flows and Stocks in Manufacturing, Canada, 1926-1960. Again, the absence of later data at the sub-industry level necessitated the use of 1960 as the terminal capital stock date. Using d_1,$K_1(t)$ in 1957 prices was computed via the perpetual inventory method, and the the series $K_1(t)$ was re-expressed in 1970 prices.

Production Function Parameters

Owing to substantial disagreement in the literature over the values of the distribution and elasticity of substitution parameters in a CES production function, I have preset their respective values at .35 and .6. When the values were allowed to vary from .30 to .40 and .4 to .8 respectively, none of the qualitative results were changed.

Data for Other Countries

The other countries accounting for a fairly large percentage of the stock of foreign direct investments in the United States in manufacturing are Switzerland (16.4%) and the Netherlands (10.5%).

Equations were not estimated for Switzerland because of the extreme difficulty in obtaining output and capital stock data for the Swiss manufacturing sector. The OECD volume Historical Statistics: National Accounts 1960-1971 has nothing but blank pages for sectoral information on Swiss capital formation. Further, it is not clear which country's effects would be represented by the Swiss totals, as tax considerations often influence non-Swiss managed companies to incorporate in Switzerland.

The Netherlands was also omitted from consideration, partly because of data difficulties, but primarily because of the dominance of the series by the investments of a handful of companies. Of course, the Dutch keep excellent records; yet a manufacturing capital stock seems not to have been published in English. Further, the most recent econometric model of the Dutch economy, prepared under the auspices of the Central Planning Bureau, does not use a capital stock in any of its equations "...because capital stock data are lacking in the Netherlands." (W. Driehuis, _Fluctuations and Growth in a Near Full Employment Economy_ (Rotterdam: Rotterdam University Press, 1972), p. 36). Of course, by repeated substitution in the expression $K(t)=I(t)-dK(t-1)$, one can obtain an expression for the capital stock at any moment in time as a function of a capital stock at time zero ($K(0)$) and the intervening flows of gross fixed investment($I(t)$), if one assumes a depreciation rate, d. If an initial capital stock is not available, then this expression can be substituted into the equation to be estimated, and the constant term's coefficient can provide an estimate of the initial stock of capital (times any coefficient of $K(t)$ in the equation. Unfortunately, gross fixed capital formation data are not available for the Netherlands in a consistent series before 1950. Since the sample period analyzed began in 1952, it seemed inappropriate to rely on an investment series only two periods long to approximate the capital stock for the first observation.

A more important reason for not analyzing Netherlands investment flows is the fact, noted also in chapter 6, that Philips N.V. has over 30 subsidiaries in the U.S. Of the other 21 Dutch firms with subsidiaries in the U.S., as cited by the U.S. Bureau of International Commerce in Foreign Direct Investors in the United States, three are Unilever (50% British-owned), Royal Dutch-Shell (40% British) and AKZO. The first two of these are the largest corporations outside the U.S., while the third was #30 on Fortune's 1971 list. It is quite probable that the vast majority of the value of investment in the U.S. in manufacturing from the Netherlands represents the decisions of these four companies; hence the lumpy and discontinuous nature of the flow series of Netherlands direct investment in manufacturing. Clearly in this situation a microeconomic analysis, as performed in chapter 6, is the appropriate vehicle.

Appendix 2 to Chapter 7

DERIVATION OF OPTIMAL CAPITAL STOCKS

In this appendix, we specialize the forms of the net revenue before taxes functions $R_i(t)$ and the net taxes paid functions $D_i(t)$, $i=1,2$, introduced in chapter 5. The specialization involves incorporation of tax and tariff-jumping considerations, and assumes a CES production function.

United Kingdom

Our representative firm in this country is assumed to maximize the present value of all future net revenues on a worldwide scale:

$$\int_0^{\infty} e^{-rt}(\quad (R_i(t)-D_i(t)))\ dt \tag{1}$$

The firm is constrained by

$$Q_i(t) = F_i(K_i(t),L_i(t)) \qquad i=1,2$$

$$\dot{K}_i(t) = I_i(t)-d_iK_i(t) \qquad i=1,2$$

where F_i is a standard neoclassical production function in country i, d_i is the instantaneous rate of depreciation in that location, and $Q_i(t)$, $I_i(t)$, $K_i(t)$ and $L_i(t)$ are, respectively, output, investment, the stock of capital and the amount of the variable input in location i at time t. The dot (˙) represents the time derivative. Note that we assume output in each location is only produced with factors from that location; data are not available to justify using a more complex formulation.

Remembering that the home country is country 1 and the host country (the U.S.) is country 2, consider the specification of $R_2(t)$ and $D_2(t)$. Assuming that all output produced in the U.S. is sold there, our U.K.

firm would receive gross revenue (in sterling) $x_2(t)p_2(t)Q_2(t)$, where $x_2(t)$ is the pound/dollar exchange rate and $p_2(t)$ is the price of output in the U.S. (all prices are taken as known to the firm for all t). Costs would be $x_2(t)w_2(t)L_2(t) + x_2(t)q_2(t)I_2(t)$, where $w_2(t)$ is the wage rate and $q_2(t)$ the price of capital goods in the U.S. at time t. Substituting for $Q_2(t)$ and $I_2(t)$ from the constraints, we have the net revenue before taxes function

$$R_2(t) = x_2(t)[p_2(t)F_2(K_2(t),L_2(t)) - w_2(t)L_2(t) - q_2(t)(\dot{K}_2(t) + d_2K_2(t))] \qquad (2)$$

Specification of the function for net taxes paid depends on which taxes we wish to consider; here we shall focus on the U.S. corporate income tax and the withholding tax on dividends remitted to foreign individuals or corporations by corporations incorporated in the United States. Thus we assume that the U.K. corporation undertakes production in the U.S. via a subsidiary, rather than a branch. As noted in the text of chapter 7, the overwhelming majority of foreign business entities in the U.S. are subsidiaries.

Defining u_2 as the corporate tax rate and v_2 as the proportion of depreciation chargeable against income for tax purposes, and remembering that interest payments are deductible expenses, corporate taxes will be

$$u_2[\ x_2(t)\ [p_2(t)F_2(K_2(t),L_2(t)) - w_2(t)L_2(t) - v_2d_2q_2(t)K_2(t) - rq_2(t)K_2(t) + \dot{q}_2(t)K_2(t) + (\dot{x}_2(t)/x_2(t))q_2(t)K_2(t)]\ ]$$

Next, assume that the subsidiary remits some proportion m of net revenues after corporate taxes to its parent as dividends, which are subject to a withholding tax at the source at rate t_2. Then total taxes paid by the subsidiary will be[1]

$$\begin{aligned} D_2(t) = u_2[\ & x_2(t)[p_2(t)F_2(K_2(t),L_2(t)) - w_2(t)L_2(t) \\ & -v_2d_2q_2(t)K_2(t)-rq_2(t)K_2(t) \\ & +\dot{q}_2(t)K_2(t) + (\dot{x}_2(t)/x_2(t))q_2(t)K_2(t)]\ ] \\ & +t_2m[\ x_2(t)[p_2(t)F_2(K_2(t),L_2(t))-w_2(t)L_2(t) \\ & -q_2(t)(\dot{K}_2(t)+d_2K_2(t))] \\ & -u_2[\ x_2(t)[p_2(t)F_2(K_2(t),L_2(t))-w_2(t)L_2(t) \\ & -v_2d_2q_2(t)K_2(t)-rq_2(t)K_2(t)+\dot{q}_2(t)K_2(t) \\ & +(\dot{x}_2(t)/x_2(t))q_2(t)K_2(t)]\ ]\ ] \end{aligned} \tag{3}$$

In the United Kingdom, corporations are taxed on their worldwide income, with credit for foreign taxes paid given up to the maximum amount of U.K. taxes on the foreign income. Income received after withholding in a foreign country must be "grossed up" for purposes of U.K. tax computation. Non-resident corporations (e.g., subsidiaries incorporated in the United States) are taxed only on their income derived fromtrading with the U.K.; since in our situation all production in the U.S. is sold in the U.S., none of the income generated is taxed until it is remitted to the U.K.[2]

In what follows, we assume that a proportion k of output produced

---

[1] This use of a fixed proportion m is consistent with the stable payout hypothesis of Lintner (John Lintner, "Distribution of Incomes of Corporations Among Dividends, Retained Earnings, and Taxes," American Economic Review 46 (May, 1956), 97-113).

[2] Principal sources of U.K. and Canadian tax information were: OECD, Company Tax Systems in OECD Member Countries (Paris: OECD,1973); Business International, Investing, Licensing and Trading Conditions (New York: Business International, 1973); and U.S. Senate, Committee on Finance, Subcommittee on International Trade, 93rd Congress, 1st session, Multinational Corporations (Washington: U.S. Government Printing Office, 1973), 32-65.

in the U.K. is sold there, and a proportion 1-k is exported to the U.S. where it is subject to an ad valorem tariff at rate T.[3] Then U.K. net revenue before taxes is (suppressing the time subscript)

$$\begin{aligned} R_1 = {} & kp_1F_1(K_1,L_1) + (1-k)(1-T)p_2F_1(K_1,L_1)x_2 - w_1L_1 \\ & -q_1(\dot{K}_1+d_1K_1) + (1-t_2)m[\ x_2[p_2F_2(K_2,L_2)-w_2L_2-q_2(\dot{K}_2+d_2K_2)] \\ & \qquad -u_2[\ x_2[p_2F_2(K_2,L_2)-w_2L_2-v_2d_2q_2K_2 \\ & \qquad -rq_2K_2+\dot{q}_2K_2+(\dot{x}_2/x_2)q_2K_2]\ ]\ ] \end{aligned} \tag{4}$$

Net taxes paid will be

$$\begin{aligned} D_1 = {} & u_1[\ [kp_1F_1(K_1,L_1)+(1-k)(1-T)p_2F_1(K_1,L_1)-w_1L_1-v_1d_1q_1K_1 \\ & -rq_1K_1+\dot{q}_1K_1] \\ & +m[x_2[p_2F_2(K_2,L_2)-w_2L_2-q_2(\dot{K}_2+d_2K_2)] \\ & \quad -u_2[x_2[p_2F_2(K_2,L_2)-w_2L_2-v_2d_2q_2K_2-rq_2K_2+\dot{q}_2K_2 \\ & \quad +(\dot{x}_2/x_2)q_2K_2]]\ ]\ \ ] \\ & -t_2m[x_2[p_2F_2(K_2,L_2)-w_2L_2-q_2(\dot{K}_2+d_2K_2)] \\ & \quad -u_2[x_2[p_2F_2(K_2,L_2)-w_2L_2-v_2d_2q_2K_2-rq_2K_2+\dot{q}_2K_2 \\ & \quad +(\dot{x}_2/x_2)q_2K_2]]\ ] \end{aligned} \tag{5}$$

where u_1 and v_1 are defined by analogy with u_2 and v_2.[4]

We assume that each F_i is a CES production function, with constant returns to scale:

---

[3] Of course, it is quite unlikely that an individual firm would both export to and produce in the U.S. But by incorporating this behavior into an aggregate model, it is hoped that tariff-jumping motivations can be captured.

[4] For a part of the sample period, the U.K. had differential tax rates on retained earnings and dividends, as well as an income tax and a separate profits tax. The series used for u_1 incorporates these complications into a single rate.

$$Q_i = (a_i K_i^{-b_i} + (1-a_i) L_i^{-b_i})^{-1/b_i} \qquad i=1,2 \qquad (6)$$

where a_1 is the distribution parameter for country 1 and $s_1 = 1/(1+b_1)$ is the elasticity of substitution for country 1, and similarly for country 2.

Maximization of (1) with R_1, R_2, D_1 and D_2 specified by (2)-(5) and F_i, i=1,2 prescribed by (6) yields optimal capital stocks in each location as a by-product of the first order conditions in this calculus of variations problem. They are

$$K_1^* = a_1^{s_1}[(kp_1+(1-k)(1-T)p_2x_2)/ q_1(((1-u_1v_1)/(1-u_1))d_1+r-(\dot{q}_1/q_1))]^{s_1} Q_1 \qquad (7)$$

$$K_2^* = a_2^{s_2}[(p_2)/ q_2(((1-u_2v_2)/(1-u_2))d_2+r-(\dot{x}_2/x_2)-(\dot{q}_2/q_2))]^{s_2} Q_2 \qquad (8)$$

The independence of the optimal stocks in one location from the values of variables in the other location(except for the appearance of p_2 in (7)) is simply a reflection of the assumption of perfect markets, embodied particularly in the uniform discount rate r, which allows the separation of real and financial decisions. If r was allowed to differ across locations so that $r_1 \neq r_2$, then this separation would not hold. Unfortunately, the optimal capital stocks $K_i^*(t)$ would then also depend on t in a fundamental way, rather than in the trivial way of (7) and (8), where $p_i(t), q_i(t)$, etc. are assumed known.[5] In any event, it

[5]Since our representative firm is multinational in character, it is unlikely that it will be constrained in its investment decisions by existing capital market imperfections; hence there is no need to make discount rates differ in the aggregate to incorporate these considerations. However, it is true that a case could be made for differing rates on the basis of non-profit-maximizing considerations, such as establishing a presence in a competitor's market, or satisfying host country non-economic objectives.

is much more plausible that our firm will have a single discount rate.[6]

Canada

The major difference in Canada's tax laws compared to those of the U.K. are that the dividends of foreign subsidiaries of Canadian corporations, when said subsidiaries are 25% or more owned by said corporations, are not taxed, and that during the sample period (but not today) capital gains were not taxed. These changes do not affect the specification of R_2 or D_2. R_1 is redefined as

$$\begin{aligned} R_1 = {} & kp_1F_1(K_1,L_1)+(1-k)(1-T)p_2F_1(K_1,L_1)-w_1L_1-q_1(\dot{K}_1+d_1K_1) \\ & +m[x_2[p_2F_2(K_2,L_2)-w_2L_2-q_2(\dot{K}_2+d_2K_2)] \\ & -u_2[x_2[p_2F_2(K_2,L_2)-w_2L_2-v_2d_2q_2K_2-rq_2K_2+\dot{q}_2K_2 \\ & +(\dot{x}_2/x_2)q_2K_2]]\ \ ] \end{aligned} \qquad (9)$$

while D_1 becomes

$$\begin{aligned} D_1 = {} & u_1[kp_1F_1(K_1,L_1)+(1-k)(1-T)p_2F_1(K_1,L_1)-w_1L_1 \\ & -v_1d_1q_1K_1-rq_1K_1] \end{aligned} \qquad (10)$$

Again maximizing (1), with R_1, D_1, R_2 and D_2 given respectively by (9),(10),(2) and (3) yields

$$\begin{aligned} K_1^* = {} & a_1{}^{s}1[(kp_1+(1-k)(1-T)p_2x_2)/ \\ & q_1(((1-u_1v_1)/(1-u_1))d_1+r-(1/(1-u_1))(\dot{q}_1/q_1))]^{s}1\ Q_1 \end{aligned}$$

and

---

[6] One point should be made concerning the inclusion of the expected rates of change of exchange rates and capital goods prices in the specification of the optimal capital stocks. Gould has shown that the flexible accelerator-related general disequilibrium framework used in the chapter is a less satisfactory approximation to the adjustment path when price expectations are not static (J.P. Gould, "Adjustment Costs in the Theory of Investment of the Firm," Review of Economic Studies 35(January, 1968),47-55). Nevertheless,it is retained here.

$$K_2^* = a_2^{s_2}[(p_2)/$$

$$q_2(((1-u_2v_2)/(1-u_2))d_2+r-(\dot{x}_2/x_2)-(\dot{q}_2/q_2))]^{s_2}\ Q_2$$

Chapter 8

CONCLUSION: DIRECT INVESTMENT AS A PHENOMENON WITH INTERNATIONAL SOURCES

The descriptive, theoretical, and empirical parts of this thesis have all shown that the exclusive postwar focus on the American character of direct investment was misleading. In chapter 1, it was shown that historically, foreign investment, especially but not exclusively long-term portfolio investment, was a European phenomenon long before Americans became actively involved in international business early in the 20th century, and made a marked contribution to the development of U.S. resources. Indeed, "Le Defi Americain" was made possible in large part by two world wars which partially destroyed European productive capacity and forced the liquidation or confiscation of the properties of European firms overseas. As their economies were rebuilt, European firms too migrated abroad, first to neighboring countries, then in the late 1960's to the developing nations and the United States.

Just as the incursion of American multinational firms into foreign economies caused foreign governments to re-evaluate their policies toward foreign investment, so the surge of foreign direct investments in the United States in the early 1970's led American authorities to review their traditionally benign attitude toward foreign investment in the United States, as indicated in chapter 2.

Chapter 3 discussed in detail the character of the foreign investment decision process of four European firms in two industries. The conclusion

reached there was that in a broad sense the same consideration which led to American direct investment abroad--some countervailing advantage to offset the disadvantage of doing business at a distance--was a necessary but not a sufficient condition for the establishment of a subsidiary in the U.S. Some prior foreign investment experience was also required before venturing into the U.S. market.

Theoretical and Methodological Conclusions

A survey of the existing descriptive and empirical literature on foreign direct investment in the United States in chapter 4 disclosed that, while all standard theories of direct investment have been applied in a descriptive fashion to the phenomenon, almost no empirical work has been done. In particular, no statistical analysis of microeconomic data has been performed; only three econometric studies at the macroeconomic level have been done.

The appropriate theoretical frameworks for the analysis of direct investment behavior at both the macroeconomic and microeconomic levels were presented in chapter 5. It was concluded that, at the level of the individual firm, the pluralistic and qualitative phenomenon of a direct investment decision could be well-represented by the very general concept of a Markov decision process. In this context, direct investments are simply transitions between states in such a process; quantitative aspects of direct investment can be treated simply by proliferating the states. In the absence of complete information on firms, probabilities of transition can be estimated and used to predict transitions.

Viewing direct investment in this fashion suggests that the proper study of direct investment behavior requires a longitudinal sample, ideally of investments which have and have not been made. In the absence of such samples, cross-sections can be used, if they contain retrospective data to capture the dynamic aspects of the direct investment decision process.

To treat direct investment in an aggregate context, this Markov decision process framework can be specialized to meet the constraints of limited data at the aggregate level. The specialization suggested in chapter 5 led to a general disequilibrium variant of the neoclassical theory of optimal capital accumulation, in which adjustments to optimal stocks by a firm operating in more than one country were made interdependent, with the speeds of adjustment variable, depending on the financial resources available to the firm.

Empirical Findings

An analysis of 2051 foreign investment decisions taken as of January 1, 1971 (i.e., subsidiaries established prior to that time) by 114 non-U.S. multinational corporations in chapter 6 disclosed that the probability that a subsidiary was located in the U.S. was higher

- the younger the subsidiary;
- if the subsidiary was majority controlled by its parent;
- if the subsidiary produced primarily for the market of the country in which it was located;
- the more the subsidiary's parent was diversified across product lines;
- the more the subsidiary's parent spent on R and D as a percentage of sales;
- the higher the average rate of profit in the U.S. industry in

which the subsidiary produced its principal product, compared to the rate of profit on the parent's operations worldwide;

- if the subsidiary did not produce a product in a high technology industry;
- if the subsidiary did not produce in an industry in which U.S. multinationals had made extensive investments abroad, relative to the number of firms in the industry in the U.S.
- the larger the size of the U.S. market in the industry in which the subsidiary produced its principal product;
- the higher the concentration ratio in the U.S. industry in which the subsidiary produced its principal product;
- the more open the economy of the country of the subsidiary's parent, suggesting the existence of a small-country product cycle;
- the faster the rate of growth of output in the country of the subsidiary's parent;
- the slower the rate of growth of unit labor costs in the country of the subsidiary's parent;
- the more dissimilar the per-capita incomes of the U.S. and the country of the subsidiary's parent;
- if the subsidiary was in the chemicals or instruments industry;
- if the subsidiary was not in the textiles industry.

This probability changed more when the qualitative(e.g., country, industry) characteristics of the subsidiary were altered in a comparative statics analysis than when the quantitative (e.g. R and D as a percentage of sales) characteristics were altered. No characteristic of the 140 U.S. subsidiaries was sufficiently marked to allow correct discrimination of more than 20% of these in this unbalanced sample; however, over 93% of all subsidiaries were classified correctly as either U.S. or non-U.S. based on the estimated probabilities.

Factors which did not significantly (in a statistical sense) affect the probability that a subsidiary was located in the U.S. as opposed to elsewhere were

- the size of its parent, as measured by sales;
- whether it was formed de novo, or in another fashion;
- whether it had been preceded by a sales subsidiary;
- whether it produced a few or a number of products;
- the amount of its parent's sales made outside the parent's home country;
- the amount of its parent's sales derived from exports;
- the size of the decrease in tariffs in the Kennedy Round for the industry in which the subsidiary produced its principal product;
- whether it produced a consumer or a producer good;
- the degree of product differentiation characterizing the U.S. industry in which the subsidiary produced its principal product;
- the rate of growth of the size of the U.S. industry in which the subsidiary produced;
- the scale economies available in the U.S. industry in which the subsidiary produced;
- the capital-labor ratio in the U.S. industry in which the subsidiary produced;
- the level of unit labor costs in the country of the subsidiary's parent;
- the degree of exchange rate disequilibrium between the dollar and the currency of the country of the subsidiary's parent at year-end 1970;
- whether the country of the subsidiary's parent was a member of the EEC or EFTA, or not;
- whether or not the subsidiary was established during a clustering of direct investment ventures either by firms in its parent's country or in the industry in which it produced.

A complementary analysis of foreign direct investment in the U.S. in the aggregate by firms from the United Kingdom and Canada during the period 1952-1971, undertaken in chapter 7, reaffirmed the role of profit-maximizing considerations, indicated that aggregate flows were influenced by financial considerations and capital market imperfections, suggested that there was interdependence between investments undertaken at home and abroad, rejected tariff-jumping motivations, and confirmed country-specific effects.

In combination, these two empirical studies lend support to the industrial organization paradigm which traces the ability to make direct investments to the existence of market imperfections. To be sure, other approaches in this heterogeneous area are not without some validity, but the industrial organization view has the most general applicability.

Implications for Policy; Suggestions for Further Research

The historical, case-study, and empirical analyses of foreign direct investment in the United States have indicated the varied and qualitative nature of this phenomenon. One corollary of the conclusion that such investment falls under the industrial organization umbrella is the fact that issues concerning foreign direct investments should be handled on a case-by-case basis.

The implication for public policy is straightforward. Given the insignificant role of foreign direct investment in the U.S. economy (recall the comparison of the flow of foreign direct investment with the flow of U.S. domestic investment in chapter 2), the most effective manner for dealing with issues raised by the operation of foreign corporations in the United States is through existing administrative structures. We have seen in chapter 2 that several government agencies have been and are continuing to scrutinize aggresively foreign investors' activities which fall within their jurisdictions. The current dimensions of foreign investment in the United States do not warrant the creation of any registration commissions, control boards, or review agencies. Establishment of these groups on an economy-wide basis not only would confuse jurisdictional issues within the government, but also would risk deterring foreign corporations from bringing more employment opportunities to this country and more competition to its industries.

For the present, then, treatment of foreign corporations on a par with their U.S. counterparts should be continued. In the future, however, it is conceivable that foreign concerns could acquire sufficient interests in strategic industries (e.g., agriculture, energy) to become capable of taking actions inimical to certain non-economic national objectives (e.g., Project Independence). Accordingly, the Inouye bill funding a new benchmark study of foreign portfolio and direct investment is timely. However, the theoretical portion of this thesis suggests that this survey must be updated frequently and its results analyzed (perhaps in conjunction with the survey conducted by the Harvard Business School and others of its kind) with the statistical techniques suggested in chapter 5 if changes in the motivations behind foreign direct investments in the United States are to be detected.

Finally, in preparation for the possibility that foreign investment becomes so large as to make a significant impact on the country's balance of payments, a framework should be developed to measure its impact thereon. Such a study should not be undertaken with a view toward imposing capital controls should remittances to parent firms become large; experience with such instruments in the 1960's should convince governments of the folly of trying to stem the flow of the most fungible of all commodities, money. Rather, the aim of such a study should be to focus on the impact of traditional macroeconomic policies on foreign investment in the U.S. and thus on the balance of payments.

The Future of Foreign Direct Investment in the United States

Just as the formation of the Common Market had a horizon-shifting effect which led American firms to expand dramatically their European operations in the following ten years, so the currency realignments of 1971-1973 appear to have made non-American corporations more aware of the possibilities in the U.S. market, with the probable result that their investments here should continue to grow at a rapid rate through the 1970's. This inflow of foreign capital will be stimulated in part by the desire to obtain access to U.S. raw materials and agricultural output. In the manufacturing sector, however, the motivation is likely to be partly political. Rolf Magener, finance director of BASF, has stated, "The U.S. is the only big country left where free enterprise is absolutely safe."[1] Andre Jacomet, vice-president of Pechiney Ugine Kuhlmann, has commented, "The U.S. market is the only place we feel it

---

[1] "BASF Seeks to Boost U.S. Volume Without Major Acquisitions," Wall Street Journal, May 21, 1974.

is sensible for us to expand abroad today. Foreign investment is still welcomed there."[2]

It remains to be seen how long the welcome mat will stay out. The answer lies in part in the resolution of the contradictory forces of increasing discontent on the part of the American electorate with corporate actions which diverge from social goals and the dependence of society on these same corporations as the only viable institutions which can mobilize sufficient capital to meet social needs. If American corporations continue to lose political power (as seems probable), their foreign brethren cannot expect the continued existence of an "absolutely safe" environment.

Another source of concern for foreign multinationals must be the United States' return, since August, 1971, to the status of just one of a number of principal countries in the world economy, rather than its leader. The concomitant rise of nationalistic sentiment in this country, as represented by the bills introduced by Representatives Dent and Roe, of course bodes ill for the further expansion of foreign direct investment here. If in the wake of the oil embargo, the United States reasserts its leadership in the potentially unstable international economy, then the free inflow of foreign capital will continue. But should the United States fail to exercise leadership, as it did in the 1930's,[3] the export of capital to this country will be the least of the worries of foreign multinationals.

---

[2] Business Week, July 13, 1974.

[3] See Charles P. Kindleberger, The World in Depression 1929-1939 (Berkeley, Calif.: University of California Press, 1973).

SELECTED BIBLIOGRAPHY

Dorothy R. Adler, British Investment in American Railways, 1834-1898 (Charlottesville,Va.: University of Virginia Press, 1970).

J.H. Adler, ed., Capital Movements and Economic Development (New York: St. Martin's, 1967).

Yair Aharoni, The Foreign Investment Decision Process (Boston: Graduate School of Business Administration, Harvard University, 1966).

Jeffrey S. Arpan, International Intracorporate Pricing: Non-American Systems and Views (New York: Praeger, 1972).

E.R. Barlow and J.T. Wender, Foreign Investment and Taxation (Englewood Cliffs, N.J.: Prentice-Hall, 1955).

William Baumol, Business Behavior, Value and Growth (New York: The Macmillan Company, 1959).

T. Cacoullos, ed., Discriminant Analysis and Applications (New York: Academic Press, 1973).

V.S. Cameron, ed., Private Investors Abroad--Problems and Solutions in International Business in 1971, symposium of the International and Comparative Law Center, Southwestern Legal Foundation, Dallas, Texas (New York: Matthew Bender, 1971).

C.E. Carrington, The British Overseas (Cambridge: Cambridge University Press, 1968).

V.S. Clark, History of Manufactures in the United States, three volumes (New York: McGraw-Hill, 1929).

Philip Colebrook, Going International: A Handbook of British Direct Investment Overseas (New York: John Wiley and Sons, 1973).

Jacob E. Cooke, ed., The Reports of Alexander Hamilton (New York: Harper and Row, 1964).

D.R. Cox, The Analysis of Binary Data (London: Methuen, 1970).

John D. Daniels, Recent Foreign Direct Manufacturing Investment in the United States: An Interview Study of the Decision Process (New York: Praeger, 1971).

J.S. Davis, Essays in the Earlier History of American Corporations, two volumes, (Cambridge: Harvard University Press, 1917).

John H. Dunning, Studies in International Investment (London: Allen and Unwin, 1970).

John H. Dunning, The Multinational Firm and Economic Analysis, forthcoming.

Nicholas Faith, The Infiltrators, (London: Hamish Hamilton, 1971).

Franklin M. Fisher, The Identification Problem in Econometrics (New York: McGraw-Hill, 1966).

Lawrence G. Franko, The Other Multinationals: The International Firms of Continental Europe, 1870-1970, forthcoming.

Gary Fromm, ed., Tax Incentives and Capital Spending (Washington: The Brookings Institution, 1971).

Louis M. Hacker, The Course of American Economic Growth and Development (New York: John Wiley and Sons, 1970).

Rainer Hellman, The Challenge to U.S. Domination of the International Corporation, translated by Peter Ruof (New York: Dunellen, 1970).

C.K. Hobson, The Export of Capital (London: Constable, 1914).

Y.S. Hu, The Impact of U.S. Investment in Europe (New York: Praeger, 1973).

Institute for International and Foreign Trade Law, Legal Environment for Foreign Direct Investment in the United States (Washington: Georgetown University, 1972).

Institute for International and Foreign Trade Law, Proceedings of the Conference on Foreign Direct Investment in the United States (Washington: Georgetown University, 1970).

W. Turrentine Jackson, The Enterprising Scot: Investors in the American West After 1873 (Edinburgh: Edinburgh University Press, 1968).

Leland H. Jenks, The Migration of British Capital to 1875 (New York: Alfred A. Knopf, 1927).

J. Johnston, Econometric Methods, second edition (New York: McGraw-Hill, 1972).

Charles P. Kindleberger, American Business Abroad (New Haven: Yale University Press, 1969).

Charles P. Kindleberger, ed., The International Corporation (Cambridge: M.I.T. Press, 1970).

Charles P. Kindleberger, The World in Depression, 1929-1939 (Berkeley, Calif.: University of California Press, 1973).

F.T. Knickerbocker, Oligopolistic Reaction and Multinational Enterprise (Boston: Graduate School of Business Administration, Harvard University, 1973).

Cleona Lewis, America's Stake in International Investments (Washington: The Brookings Institution, 1938).

Fritz Machlup, et al., eds., International Mobility and Movement of Capital (New York: National Bureau of Economic Research, 1972).

H. Mine and S. Osaki, Markovian Decision Processes (New York: American Elsevier, 1970).

M. Ishaq Nadiri and Sherwin Rosen, A Disequilibrium Model of Demand for Factors of Production (New York: National Bureau of Economic Research, 1974).

Walter Henry Nelson, Small Wonder (Boston: Little, Brown and Company,1965).

Edith Penrose, The Theory of the Growth of the Firm (New York: John Wiley and Sons, 1959).

Sidney E. Rolfe and Walter Damm, eds., The Multinational Corporation in the World Economy: Direct Investment in Perspective (New York: Praeger, 1970).

Emma Rothschild, Paradise Lost: The Decline of the Auto-Industrial Age (New York: Random House, 1973).

D.G. Rhys, The Motor Industry: An Economic Survey (London: Butterworth's, 1972).

F.M. Scherer, Industrial Market Structure and Economic Performance (New York: Rand McNally, 1971).

Jean-Jacques Servan-Schreiber, The American Challenge (New York: Atheneum, 1968).

H.A. Simon, Models of Men (New York: John Wiley and Sons, 1957).

Bruno Solnik, European Capital Markets (Lexington, Mass.: D.C. Heath and Company, 1973).

Clark C. Spence, British Investments and the American Mining Frontier (Ithaca, N.Y.: Cornell University Press, 1958).

Eugene Staley, War and the Private Investor (Chicago: University of Chicago Press, 1935).

Henri Theil, Principles of Econometrics (New York: John Wiley and Sons, 1971).

John E. Tilton, International Diffusion of Technology: The Case of Semiconductors (Washington: The Brookings Institution, 1971).

Christopher Tugendhat, The Multinationals (New York: Random House, 1972).

U.S. Bureau of the Census, Historical Statistics of the United States Colonial Times to 1957 (Washington: U.S. Government Printing Office, 1960).

James W. Vaupel and Joan P. Curhan, The World's Multinational Enterprises (Boston: Graduate School of Business Administration, Harvard University, 1973).

Raymond Vernon, ed., Big Business and the State (Cambridge: Harvard University Press, 1974).

Raymond Vernon, Sovereignty at Bay (New York: Basic Books, 1972).

Raymond Vernon, ed., The Technology Factor in International Trade (New York: National Bureau of Economic Research, 1970).

Benjamin Ward, What's Wrong With Economics (New York: Basic Books, 1972).

Lawrence J. White, The Automobile Industry Since 1945 (Cambridge: Harvard University Press, 1971).

Mira Wilkins, The Emergence of Multinational Enterprise: American Business Abroad from the Colonial Era to 1914 (Cambridge: Harvard University Press, 1970).

Yamaichi International (America) Inc., Investing in America (New York: de Hellerman, 1973).

Articles from Journals, Newspapers, and Magazines

Automotive News, various issues.

Robert Ball, "Volkswagen Gets a Much-Needed Tune-Up," Fortune (March, 1972), 82 ff.

David Bauer, "Foreign Direct Investment in the United States," The Conference Board Record (February, 1974), 23-26.

B.D. Boatwright and J.R. Eaton, "The Estimation of Investment Functions for Manufacturing Industry in the United Kingdom," Economica N.S. 39 (November, 1972),403-418.

Business Week, various issues.

Richard Caves, "International Corporations: The Industrial Economics of Foreign Investment," Economica N.S. 38 (February, 1971), 1-27.

D.R. Cox, "Some Procedures Associated with the Logistic Qualitative Response Curve," in F.N. David, ed., Research Papers in Statistics: Festschrift for J. Neyman (London: John Wiley and Sons, 1966).

N.E. Day and D.F. Kerridge, "A General Maximum Likelihood Discriminant," Biometrics 23 (1967), 313-323.

P.E.H. Durston, "Five European Companies in America," European Business 27 (Autumn, 1970), 31-51.

The Economist, various issues.

R. Eisner and R. Strotz, "Determinants of Business Investment," in Commission on Money and Credit, Impact of Monetary Policy (Englewood Cliffs, N.J.: Prentice-Hall, 1963).

Electronic News, various issues.

Frank V. Fowlkes, "Direct Foreign Investments Increase/Administration and Industry Endorse Trend," National Journal Reports, November 24, 1973, 1756.

"From Victor-Nixdorf to Nixdorf," Modern Data (February, 1973), 52-56.

"German Firm Set for Big Push in U.S. Computer Market," Business International, December 29, 1972, 411.

Zvi Griliches, "Distributed Lags: A Survey," Econometrica 35 (1967), 16-49.

R. Herring and T.D. Willett, "The Relationship Between United States Direct Investment at Home and Abroad," Rivista Internazionale di Scienze Economische e Commerciali 20 (1973), 73-82.

Thomas Horst, "Firm and Industry Determinants of the Decision to Invest Abroad: An Empirical Study," Review of Economics and Statistics 54 (August, 1972), 258-266.

"'Jetzt nicht nervos werden'," Wirtschaftwoche, April 26, 1974.

Dale W. Jorgenson, "Anticipations and Investment Behavior," American Economic Review 53 (May, 1963), 247-259.

Franz M. Joseph and Richard U. Koppel, "Foreign Investors Tax Act," Taxes 45 (February, 1967), 113-134.

The Journal of Commerce, various, issues.

Charles P. Kindleberger, "Foreign Trade and Economic Growth: Lessons from Britain and France, 1850-1913," *Economic History Review* 14 (December, 1961), 289-305.

Yehuda Kotowitz, "Capital-Labor Substitution in Canadian Manufacturing, 1926-1939 and 1946-1961," *Canadian Journal of Economics* 1 (August, 1968), 619-632.

Lawrence B. Krause, "Evolution of Foreign Direct Investment: The United States and Japan," in Jerome B. Cohen, ed., *Pacific Partnership: United States-Japan Trade--Prospects and Recommendations for the Seventies* (Lexington, Mass.: D.C. Heath and Company, 1972).

Robert B. Leftwich, "Foreign Direct Investments in the United States, 1962-1971," *Survey of Current Business* (February, 1973), 29-40.

Robert B. Leftwich and Robert Boyke, "Foreign Direct Investments in the United States in 1972," *Survey of Current Business* (August, 1973), 50-51.

Haim Levy and Marshall Sarnat, "International Diversification of Investment Portfolios," *American Economic Review* 60 (September, 1970), 668-675.

R.E. Lucas, "Optimal Investment Policy and the Flexible Accelerator," *International Economic Review* 8 (February, 1967), 78-8[illegible].

Robert R. Miller and Dale R. Weigel, "The Motivation for Foreign Direct Investment," *Journal of International Business Studies* (December, 1972), 67-79.

Richard Nelson and Sidney Winter, "Toward an Evolutionary Theory of Economic Capabilities," *American Economic Review* 63 (May, 1973), 440-449.

Marc Nerlove, "Lags in Economic Behavior," *Econometrica* 40 (1972), 221-252.

Marc Nerlove, "Recent Empirical Studies of the CES and Related Production Functions," in Murray Brown, ed., *The Theory and Empirical Analysis of Production* (New York: National Bureau of Economic Research, 1967), pp. 55-122.

"Nixdorf Entry to U.S. Worth Watching," *Datamation* (February, 1973), 106-113.

Edith Penrose, "Foreign Investment and the Growth of the Firm," *Economic Journal* 66 (June, 1956), 220-235.

Frederick Pryor, "An International Comparison of Concentration Ratios," Review of Economics and Statistics 54 (1972), 130-140.

Georgio Ragazzi, "Theories of the Determinants of Direct Foreign Investment," IMF Staff Papers 20 (July, 1973), 471-498.

J. David Richardson, "On 'Going Abroad': The Firm's Initial Foreign Investment Decision," Quarterly Review of Economics and Business 11 (Winter, 1971), 7-22.

J. David Richardson, "Theoretical Considerations in the Analysis of Foreign Direct Investment," Western Economic Journal 9 (March, 1971), 87-89.

Jean-Luc Rocour, "Management of European Subsidiaries in the United States," Management International 6 (February, 1966), 13-27.

Edouard Seidler, "Report from Europe: An Interview with Pehr Gyllenhammar," Automotive News, April 29, 1974.

"Sprung uber den Atlantik," Wirtschaftswoche, November 11, 1973.

Guy Stevens, "Fixed Investment Expenditures of Foreign Manufacturing Affiliates of United States Firms: Theoretical Models and Empirical Evidence," Yale Economic Essays 9 (Spring, 1969),137-200.

"Sweden: Volvo Shifts Gears to the U.S.," Business Week, September 15, 1973.

James Tobin and William Brainard, "Pitfalls in Financial Model Building," American Economic Review 58 (May, 1968), 99-122.

Yoshi Tsurumi, "Japanese Multinational Firms," Journal of World Trade Law (January-February, 1973), 74-90.

Raymond Vernon, "International Investment and International Trade in the Product Cycle," Quarterly Journal of Economics 80 (May, 1966), 190-207.

"Volkswagen: To America," The Economist, May 18, 1974.

"Volvo Grows Up," The Economist, July 10, 1971.

"Volvo Steers Course Around Auto Giants," Business Week, September 21, 1968.

The Wall Street Journal, various issues.

"West Germany: U.S. Suitors Woo a Hard-to-Get VW," Business Week, June 23, 1973.

J.H. Williamson, "Growth, Sales, and Profit Maximization," Economica N.S. 33 (February, 1966), 1-16.

Sidney Winter, "Satisficing, Selection, and the Innovating Remnant," Quarterly Journal of Economics 85 (May, 1971), 237-261.

Bulletins, Reports, and Monographs

N.A. Barr and Robert Hall, "The Probability of Dependence on Public Assistance," M.I.T. Department of Economics Working Paper #131, May, 1974.

Jack N. Behrman, "Some Patterns in the Rise of Multinational Enterprise," Graduate School of Business Administration Research Paper #18, University of North Carolina, 1969.

J. Bisignano, "Adjustment and Equilibrium Costs and the Estimated Brainard-Tobin Model," Special Studies Paper #62, Board of Governors of the Federal Reserve System, July, 1971.

Sir Alec Cairncross, Control of Long-Term International Capital Movements(Washington: The Brookings Institution, 1973).

The Conference Board, "Announcements of Foreign Investment in U.S. Manufacturing Industry," First Quarter, 1974.

Euroeconomics, Prospects for the European Computer Industry (Paris: Euroeconomics, 1973).

Lawrence G. Franko, European Business Strategies in the United States (Geneva: Business International S.A., 1971).

R.E. Hall and B.H. Hall, "Time Series Processor," Technical Paper #12, Harvard Institute of Economic Research, May, 1973.

International Data Corporation, The European Marketplace (Newtonville, Mass.: International Data Corporation, 1973).

John H. Makin, "Capital Flows and Exchange Rate Flexibility in the Post-Bretton Woods Era," Essays in International Finance #103 (Princeton: Princeton University Press, 1974).

Daniel McFadden, "A Disaggregated Model of Urban Travel Demand," (Cambridge, Mass.: Charles River Associates, 1972).

Daniel McFadden, "The Revealed Preferences of a Government Bureaucracy," Technical Report #17, Institute of International Studies, University of California (Berkeley), November, 1968.

Marc Nerlove and S. James Press, "Univariate and Multivariate Log-Linear and Logistic Models," Rand Corporation Study R-1306-EDA/NIH, December, 1973.

Philips Gloeilampenfabriken N.V., *Annual Report*, various issues.

Arnold W. Sametz, "The Foreign Multinational Company in the U.S.," Working Paper #9, Salomon Brothers Center for the Study of Financial Institutions, New York University, October, 1973.

Oscar Schisgall, "The Enemy Property Issue," Public Affairs Pamphlet #246, The Public Affairs Committee, New York, 1957.

Guy Stevens, "The Multinational Firm and the Determinants of Investment," International Finance Discussion Paper #29, Board of Governors of the Federal Reserve System, May 23, 1973.

U.S. Bureau of Foreign and Domestic Commerce, *Foreign Investments in the United States* (Washington: U.S. Government Printing Office, 1937).

U.S. Bureau of Foreign and Domestic Commerce, *Foreign Long-Term Investments in the United States, 1937-1939* (Washington: U.S. Government Printing Office, 1940).

U.S. Bureau of International Commerce, *Foreign Direct Investment in the United States* (Washington: U.S. Government Printing Office, 1973).

U.S. Congress, *War Claims Act of 1948, As Amended*. Public Law 896, 80th Congress (Washington: U.S. Government Printing Office, 1954).

U.S. Department of the Treasury, *Census of Foreign-Owned Assets in the United States* (Washington: U.S. Government Printing Office, 1945).

U.S. Department of Justice, Office of Alien Property, *Annual Report, Fiscal Year 1970* (Washington: U.S. Government Printing Office, 197[illegible]).

U.S. House of Representatives, Committee on Foreign Affairs, Subcommittee on Foreign Economic Policy, 93rd Congress, 2nd session, *Foreign Investment in the United States* (Washington: U.S. Government Printing Office, 1974).

U.S. Office of the Alien Property Custodian, *Alien Property Custodian Report* (Washington: U.S. Government Printing Office, 1919).

U.S. Office of Business Economics, *Foreign Business Investments in the United States* (Washington: U.S. Government Printing Office, 1962).

U.S. President, *International Economic Report of the President, 1973* (Washington: U.S. Government Printing Office, 1974).

U.S. Senate, Committee on Banking, Housing, and Urban Affairs, Subcommittee on International Finance, 93rd Congress, 2nd session, Foreign Investment in the United States (Washington: U.S. Government Printing Office, 1974).

Volkswagenwerke A.G., Annual Report, various issues.

Volvo A.B., Annual Report, various issues.

Unpublished Materials

C. Michael Aho, "The Effects of Disequilibrium Exchange Rates on Foreign Investment Decisions," paper presented at the International Economics Workshop at M.I.T., March 24, 1974.

Jeffrey Arpan and David Ricks, "Foreign Direct Investments in the United States in Manufacturing, Mining, and Petroleum," paper read at the New York meetings of the Academy of International Business, December 28, 1973.

Jacques Bojin, "French Investments in the United States," (Master's thesis: Alfred P. Sloan School of Management, M.I.T., 1964).

Lawrence G. Franko, "The Growth, Organizational Structure, and Allocative Efficiency of European Multinational Firms: Some Emerging Hypotheses," paper prepared at the Centre d'Etudes Industrielles, Geneva, November, 1972.

Monty Graham, doctoral dissertation in progress, Graduate School of Business Administration, Harvard University.

Martin Holmer, doctoral dissertation in progress, Department of Economics, M.I.T.

Stephen A. Hymer, "The International Operations of National Firms: A Study of Foreign Direct Investment," (Ph.D. thesis, Department of Economics, M.I.T., 1960).

"Incentives and Promotional Efforts to Attract Foreign Investment," Council on International Economic Policy memo, October 25, 1973.

Jan Johanson and Finn Wiedersheim-Paul, "The Internationalization of the Firm--Four Swedish Cases," Working Paper #1974-01-16, Department of Business Administration, University of Uppsala, Sweden.

Nicholas Jequier, "Government Policies and the European Computer Industry," paper prepared for the Conference on Government and Business in Western Europe, Center for International Affairs, Harvard University, January 18-20, 1973.

Meir G. Kohn, "Computer Programs for Cross-Section Data," version 2, June, 1972.

Meir G. Kohn, "Sequential Decisionmaking and the Theory of the Firm," (Ph.D. thesis, Department of Economics, M.I.T., 1973).

Donald Lassard, "World, National and Industry Factors in Equity Returns," paper delivered to the New York meetings of the American Finance Association, December 29, 1973.

Charles Manski, "The Analysis of Qualitative Choice," (Ph.D. thesis, Department of Economics, M.I.T., 1973).

"Securities and Exchange Commission Regulations," Council on International Economic Policy memo, October 25, 1973.

Steven M. Shavell, "Essays in Economic Theory," (Ph. D. thesis, Department of Economics, M.I.T., 1973).

Milton D. Stewart, "Foreign Direct Investments in the United States," (Ph.D. thesis, University of Texas, 1972).

John Stopford, "The Evolution of U.K.-Based Multinational Enterprises," paper presented at the Graduate School of Business Administration, Harvard University, December, 1972.

Masataka Tamura, "Japanese Direct Investment in the United States: Opportunities for Future Growth," (Master's thesis: Alfred P. Sloan School of Management, M.I.T., 1973).

Piero Telesio di Toritto, "The Experience of European Direct Investment In the United States," (Master's thesis, Alfred P. Sloan School of Management, M.I.T., 1970).

Raymond Vernon, "Some Tentative Hypotheses on the Behavior of European-Based and Japanese-Based Multinational Enterprises," paper prepared at the Graduate School of Business Administration, Harvard University, October 15, 1971.

Simon Webley, "Foreign Direct Investment in the United States--Trends and Impediments," paper presented to the British-North American Committee in Washington, December 7-9, 1973.

Louis T. Wells, Jr., "National Policies in an International Industry: The Europeans and the Automobile," paper prepared at the Graduate School of Business Administration, Harvard University, May 7, 1973.

Bernard M. Wolf, "Underutilized Resources, Domestic Industrial Diversification, and Internationalization," paper presented at the Econometric Society Winter Meetings, New York, December, 1973.

Takeshi Yano and Dominique Hardy, "The Acquisition as a Form of Foreign Direct Investment in the USA," (Master's thesis, Alfred P. Sloan School of Management, M.I.T., 1974).

BIOGRAPHICAL NOTE

The author was born November 11, 1946 in St. Joseph, Missouri, the son of Stanley R. and V. Mabel McClain. After graduation from St. Joseph Central High School he drove cattle for the St. Joseph Stock Yards, then attended the University of Kansas in Lawrence, Kansas. There he received the B.A. degree summa cum laude in 1968, with a double major in economics and mathematics. He was elected to Phi Beta Kappa and received a Woodrow Wilson Fellowship and a National Science Foundation Graduate Fellowship. Accepted for admission to the graduate program of the M.I.T. Department of Economics in 1968, the author was drafted into the U.S. Army in the summer of that year. He enrolled in the Army's Officer Candidate School and was commissioned a second lieutenant on July 3, 1969; he served one year at Fort Devens, Mass. and one year in Danang, South Vietnam. From September, 1971 to September, 1974 he was a graduate student in the Department of Economics at M.I.T.

He currently resides with his wife, Gayla, and daughter, Molly, in Lincoln, Mass., and is employed as a Senior Economist at Data Resources, Inc., Lexington, Mass. In the spring of 1975, the author will be a Visiting Assistant Professor at the Alfred P. Sloan School of Management at M.I.T.