Foreign-Market Entry Strategies in the European Union

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This study utilized intra-firm, socio-cultural, geographical-proximity, and political-stability variables to explain bimodal foreign direct investment (FDI) patterns by agri-food and beverage multinational companies into and within the European Union. A logit framework incorporated a unique-count database of firm-level investment patterns from 1987–1998. The results showed the 1992 structural changes under the Maastricht Treaty increased the probability of wholly owned FDI modes such as greenfields and buyouts. The model also found that past modal strategies of firms, language barriers, and exchange-rate volatility all correctly explained modal investment patterns. The results provide important contributions toward understanding modal investment strategies including the role of macroeconomic changes within a custom union.

A popular way for a firm to secure a business presence in a foreign nation is through foreign direct investment (FDI) in production, marketing, and/or distribution facilities. Formally defined, FDI is an investment in which a multinational enterprise (MNE) acquires a substantial controlling interest in a foreign firm or in some other manner establishes fixed assets on foreign soil. Prior to 1970, multinational operations were often characterized as an exclusively American institution (Erdilek 1985). However, during the 1970s the U.S. shifted from being the largest "home" country to being the largest "host" country. Indeed, post-1960s FDI activities had quickly become far less centralized, with an active exchange of capital assets moving within the "Triad" group (United States, European Union, Japan). Table 1 contains the share of FDI monetary inflows to various regions around the world. The average share of inflow into the EU was over 32% from 1995–1998. The EU region was the first major recipient of FDI, and the unification of the European countries around a single currency appears to have accelerated this expansion. At the same time, the collapse of the Soviet Union and the opening of Eastern Bloc countries to the global economy represent potential business opportunities for multinational companies, which may use the EU as a base from which to serve the rest of the continent.

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In one sense, FDI is simply trade in capital. However, unlike pure trade, FDI usually involves long-term irreversible commitments, which imply greater risks. It also challenges classical economic thinking by suggesting that the optimal firm-level strategy differs greatly from the one that organizes economic activity through efficient market coordination. One essential function of FDI is to bring business units from different nations under a common ownership structure. This allows firms to replace arms-length transactions with a hierarchical internal structure that controls transaction prices, information, outputs, networks of business partners, and other resources.

The empirical literature on FDI is broadly classified into two groups: analysis of FDI flows and analysis to explain modal strategies in FDI. A vast literature exists within the former group. Recent additions include Chakrabarti (2003), new theory; Sethiet al. (2003), new theory; Belderbos and Sleuwaegan (1998), tariff jumping; Hooker and Caswell (1996), nontariff barriers; and Head, Mayer, and Ries (2002), FDI and oligopoly. Earlier research includes Buckley and Casson (1976); Daniels and Radebaugh (1994); Eiteman, Stonehill, and Moffet (1998); Hymer (1976); Kindleberger (1969); and Korbin (1982). Numerous theories have been proposed to explain FDI levels, including gaining access to scarce raw materials, lowering production costs, penetrating local markets, changes in markets due to the liberalization of trade, the deregulation of investment and capital markets, tax differences across nations, and fiercer competition brought about by globalization and technological changes. Under these conditions, expanding firm size and managing a portfolio of locational assets becomes

Table 1. Regional Shares of FDI Inflows (1995–1998).

	FDI inflows			
	1995	1996	1997	1998
Developed countries	63.30	58.90	58.90	71.50
European Union	35.10	30.40	27.20	35.70
Other Western Europe	1.80	1.80	1.90	1.20
United States	17.90	21.30	23.50	30.00
Japan	-	0.10	0.70	0.50
Other developed countries	8.50	5.30	5.60	4.10
Developing countries	36.70	41.10	41.10	28.50
Africa	1.30	1.60	1.60	1.20
Latin America & Caribbean	10.00	12.70	14.70	11.10
Asia	20.70	22.90	20.60	13.20
Pacific	0.20	0.10	-	-
Central & Eastern Europe	4.50	3.80	4.20	3.00
World	100	100	100	100

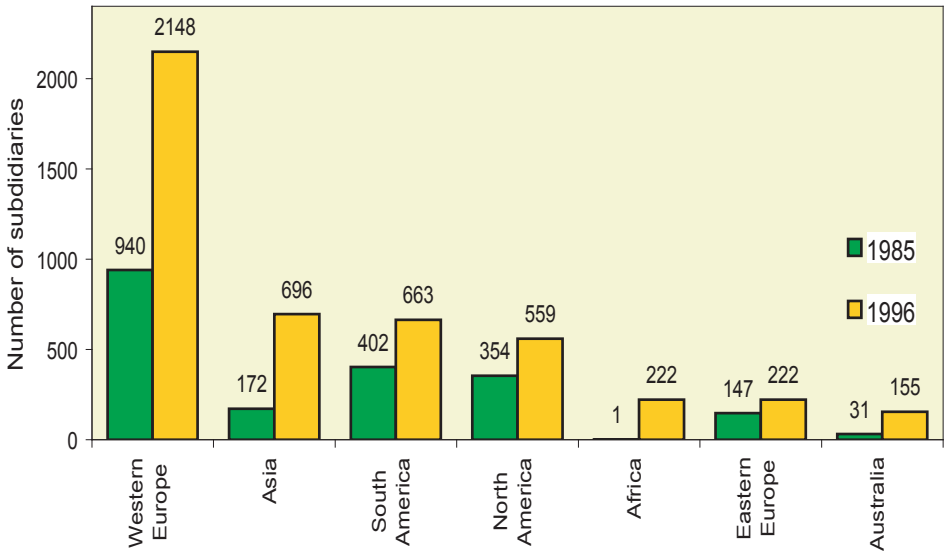
Source: UNCTAD, World Investment Report 1999.

more important for MNEs, as this enables them to take advantage of resources and markets worldwide. The research for FDI flows is also driven by the search for financial, managerial, and operational synergies as well as by economies of scale and subsequent market power. Finally, developing an extensive global network may allow MNEs first-mover advantages in developing and offering new technologies in various locations.

Theories explaining modal FDI choice began as an outcropping from the early literature trying to explain why firms replace trade with FDI (Hymer 1976). Buckley and Casson (1976) extended the literature on modal choice by including contracting as an additional option for trade and FDI. Additional work has shed light on narrower questions including greenfields versus acquisition (Hennert and Park 1993), transactions costs (Erramilli and Rao 1993), and equity versus non-equity FDI (Schaan 1998; Shane 1996a, 1996b). Buckley and Casson (1998) represent the first and only attempt at synthesizing modal behavior in a single model with twelve possible entry strategies across an array of possible market conditions. The results provided a useful platform for understanding the basic incentives underlying many complex modal questions.

The research presented in this paper analyzed bi-modal FDI (wholly owned versus partially owned) decisions both into and within the EU. A limited-dependent-variable model was constructed to test hypotheses using FDI modal data of activity into and/or within the EU from the 100 largest food and beverage multinational enterprises.[1] Figure 1

[1] The database covers the world's 100 largest food and beverage companies, and was produced through 1998 by the Institut Agronomique de Montpellier (France). Its sources are the Moody's Industrial Manual, the Fortune Directory of the 500 largest corporations, the "Dossier 5000" of the largest European companies published by "Le Nouvel Economiste," Dun & Bradstreet International, the annual reports of the enterprises, and others. AGRODATA includes information at the firm level on sales value, number of employees, assets, profit, cash flow, equity, debt, type of firm (public, cooperative, etc.), year of creation, home country, number and name of host countries to which the firm has spread, and number of affiliates. At the affiliation level, it includes information on host country, percentage control of the parent, and UN-ISIC code.



(source: Agrodata)

Figure 1. Subsidiaries of the 100 Largest Multinational Food and Beverage Firms.

compares the number of food and beverage FDI subsidiaries present in each region of the world in 1985 and 1996. The compiled data shows a clear preference for FDI into the EU both in terms of number of subsidiaries and in the change in activity from 1985 to 1996. Agribusiness MNEs appeared to have aggressively invested into the EU, followed by a relatively even flow into Asia, South America, and North America.

Many factors, both advantageous and constraining, are associated with the various modes of investment. A basic tenet of good business practices is assumed here: firms will carefully consider the alternatives. A primary method of developing a foreign business presence involves greenfield operations—investing in a new manufacturing plant or establishing a new division in another country. Other wholly owned subsidiaries may be established through stock purchases, mergers, and acquisitions. The decision to select full-investment modes usually occurs when the firm's set of intrinsic strengths favor a go-it-alone strategy, and when those strengths dovetail with the host nation's characteristics (i.e. familiarity with the local market, customs, laws, and other factors associated with operating in a foreign country).

On the other hand, the construction of overseas facilities is often constrained, difficult, or simply implausible. Though not generally the case in the EU, in some regions host governments may erect significant barriers to such activities or may simply apply political pressure to force a different strategy. Often firms find it in their best interest to work with a business partner who knows the market, has contacts in government, is familiar with the culture and customs, or may own specific assets such as local distribution networks that are difficult to copy. In some scenarios, high political risks combined with unfamiliarity with the foreign market may make shared ownership structures more attractive than wholly owned ownership structures. This is especially true for smaller companies, which are more apt to lack international experience and to be constrained financially, and which may not possess the resources to gain the critical market knowledge that is so vital for a successful wholly owned overseas operation.

One advantage of shared FDI, for example, includes risk-sharing and the ability to combine the strengths of different value chains. For example, a company with considerable knowledge of technology, manufacturing, and process application may

seek a partner that possesses knowledge of and distribution assets within the appropriate market. Companies with limited capital resources might also seek partners able to jointly finance a project. Finally, partnering with a host nation firm may be the best way to overcome political, legal, and social barriers.

The challenges to partially owned structures can be significant, and include finding ways to equitably share rewards and risks alike. In this global expansion strategy, a company incurs significant costs associated with control and coordination issues. Potentially costly and destructive conflicts can arise from incomplete contracts or unforeseen or unpredictable factors that arise over time. Cultural differences between nations and between management styles of firms can present challenges as well.

One focus of this study was to evaluate the potential role of the Maastricht Treaty in reshaping FDI modal behavior. In 1992, the EU set in motion an ambitious program within the terms of the Maastricht Treaty, which envisaged some form of economic and monetary union (EMU) by the end of the decade. Dent (1997) discussed and identified five principal consequences of the Treaty: scaled economies from expanded markets across the EU, thereby leading to a reduction in both private- and public-sector costs; greater levels of competition through industrial reorganization across borders and a drive toward greater efficiency; increased competition in emerging markets and industries; increased research and technical innovation looking to capture markets and reduce costs; and a less-restrictive investment environment for firms looking to invest in the EU. In sum, one major purpose of the European integration was to improve its members' competitive position within the emerging global economy by reducing investment barriers and capturing scale economies.

The balance of this paper is organized as follows: the next section presents an overview of the EU food and beverage industry and briefly incorporates the points from the Maastricht Treaty salient to this study. The third section contains the conceptual framework and the logit model of modal investment. The results are discussed in the fourth section, the fifth and final section offers some concluding comments.

Food and Beverage Industry and the EU

Food and beverage MNEs have invested abroad a variety of mergers, acquisitions, greenfield investments, joint ventures, and other types of partnerships (Agrodata 1998). These large MNEs control the lion's share of overall revenue within the food and beverage industry worldwide (OECD 2006). For example, in 2002, the 10 largest agribusiness MNEs generated 12% of the income, and the 600 largest firms controlled 50% of total revenues (OECD 2006).

The agribusiness sector controls a large share of the EU's aggregate manufacturing base, representing around 10.5% of all value-added outputs and 11.5% of the workforce (estimated at 2.6 million workers). In addition, 40% of the production in this sector is concentrated in Germany and the United Kingdom, with another 40% in France, Spain, and Italy combined. Europe's food and beverage sector is mainly composed of small enterprises—of 277,000 companies, over 80% employ fewer than 10 workers, accounting for around 20% of the total workforce. Meanwhile, companies with more than 500 workers employ 30% of the workforce from all sectors. Most of the larger firms are MNEs; they possess large capital structures, boast well-known branded product lines, and use a variety of FDI modes (Agrodata 1998).

A Model of Modal Investment

Firms have an array of options for investing in ways that best suit their specific purposes and corporate requirements. For instance, firms may export, arrange licensing agreements, or use other methods to lessen the costs of managing overseas subsidiaries (Liu 1997). Brigham and Houston (1978) suggest that MNEs may establish joint ventures in order to utilize said foreign firms' experience and expertise. Finally, firms may invest directly by establishing wholly owned subsidiaries, by acquiring existing facilities, or by establishing joint ventures in which they partner as a minority with another foreign investor (Liu 1997). Following the work in Contractor and Kundu (1998) and later by Pan and Tse (2000), the theoretical foundation for this is study is that modal investment choice (M) is hypothesized as a function of firm (F) strengths, industry (I) characteristics, and (C) country factors: $M = f(F,I,C)$. Given that this study focuses exclusively on FDI

for the food and beverage industry alone, cross-industry variables are not considered. The model used investment count data for FDI of the world's 100 largest food and beverage firms. Our empirical model addressed the following questions:

1. How do political and market instability/ changes within the EU change the modal FDI decision? In particular, did the Maastricht Treaty significantly lower the barriers limiting wholly owned investment into the EU?
2. How do socio-cultural factors influence modal investment patterns?
3. How do past FDI influence current FDI patterns?

To address these questions, our sample was composed of the 100 largest agri-food and beverage enterprises with operations in the EU (Agrodata 1998). We considered twelve of the fifteen EU members: Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, and the UK from 1987 to 1998 (Austria, Finland, and Luxembourg experienced no investments within the study's time frame). More-recent data was not available. Because we use lagged modal investment in constructing one explanatory variable, the model was estimated using data from 1990 to 1998, and amounted to 432 total observations.

A binomial logit (hereafter logit) regression framework was selected for the empirical analysis because investments could be classified into two categories: wholly owned FDI and shared-ownership FDI.[2] Investment mode (INVEST), the dependent variable, takes on qualitative values: zero for wholly owned FDI and one for shared FDI. Operational activities in the wholly owned group consist of acquisitions, plant construction, subsidiaries, and mergers in which 90% or more of the invested firm is purchased. The shared-ownership group includes co-enterprise agreements, partnerships, joint ventures, licensing, contractual agreements, franchising, and stock investments with less than 90% equity ownership.

The logit model derives the choice probabilities of a specific investment mode (type 0 or 1) as given below:[3]

$$(1)\quad \text{Prob}\,[Y_i = 1|X_i] = \frac{1}{1+e^{-X_i\beta}},$$

where β is a vector of parameters linking the i^{th} observation of each independent variable X_i to the i^{th} observation of dependent variable Y_i. The marginal effect, which quantifies the effects of the jth continuous independent variable over investment styles in probability terms, is given by:

$$(2)\quad \frac{\partial \text{Prob}[Y_i = 1|X_i]}{\partial X_{ij}} = \beta_j \left(\frac{e^{-X_i\beta}}{(1+e^{-X_i\beta})^2}\right)$$

Limdep version 8.0 was used in the estimation. It calculates the estimated parameters, inference statistics, and marginal effects at the mean of each variable. Limdep also provides prediction probabilities, which are compared to the actual investment pattern.

The X-vector contains the following set of variables:

$$(3)\quad X = [EINV,\ EU92,\ CB,\ EU92CB,\ LANG,\ EXEV],$$

where EINV is a measure of past investment patterns for each firm in the study. The process of international expansion most certainly involves intrinsic firm-level assets such as past experiences and know-how. In particular, firms with a high level of expertise in shared- or wholly owned modal investment patterns are assumed to be more capable of duplicating those strategies in the future. Additionally, past modal patterns are likely to implicitly carry information about each firm's strategic and marketing plans, its product mix, and its internally derived assessment of risk its investments are likely to carry. Developing a single variable to capture past investment patterns proved implausible because many of the investments were initiated with no past investment, and marginal effects near zero are difficult to interpret. In this study, a variable for past investment (EINV) was constructed using the exponential form

$$(4)\quad EINV = \exp(inv0_{t-3} + inv0_{t-2} + inv0_{t-1} - inv1_{t-3} - inv1_{t-2} - inv1_{t-1}),$$

[2] An unordered-choice model between wholly owned investments and shared-ownership investments can be motivated by a random utility model or other similar conceptual framework (Greene 2000).

[3] To eliminate extreme outliers, which made solving the model difficult, EINV variable was bounded to E± 05. The model results were not sensitive to E±04 boundaries.

where *inv0* are wholly owned FDI and *inv1* are shared investments. Obviously, EINV is positively related to wholly owned FDI; thus a negative parameter estimate is anticipated.

EU92 is a binary variable (zero through 1992 and one afterwards) used to capture any changes in the modal investment climate occurring after the Maastricht Treaty of 1992.

Political risk is a major concern for international companies; indeed, changes in the political or market climate in the host country may threaten operating positions. For example, a foreign company may lose its operations through governmental takeovers of property; said takeovers may or may not include compensation. Still, despite the near-universal recognition of political risk among multinational corporations, political scientists, and economists, there remains no consensus regarding what exactly constitutes that risk or how to measure it (Shapiro 1996). At the same time, a number of commercial and academic risk-forecasting models are available. These models normally supply country risk indices that attempt to quantify the level of risk within each nation. Most of these indices rely on some measures of local stability. Models such as BERI are useful, as they measure the general level of stability within a given country (BERI 1999). In the period of our study, the European Union was socially and economically stable and the aforementioned indices show virtually no change over time.

In February of 1992, the Maastricht Treaty signed into law arguably the most sweeping array of political reform for this region since WWII. Although monetary union negotiations extend far back into European history, the convergence of the Maastricht Treaty is the most comprehensive. As a consequence, 1992 is a key year for Europe because of the ensuing economic and political adjustments. By effectively reducing national autonomy when setting investment policies (in lieu of an overall EU policy), firms could expect to see a changing payoff structure over their modal choice sets. Specifically, it is hypothesized that firms would be more likely to choose a go-it-alone strategy after the elements of Maastricht were made public. The eventual announcement of a single EU currency was likely to have a similar effect; this effect in turn was more likely to be more pronounced for firms in the EU. To elaborate from a budgetary standpoint, companies face currency risk in terms of profit and capital flows alike. A unified currency reduces the level of risk-sharing within the capital investment stage, and this lowered risk supports a hypothesis suggesting an increase in wholly owned FDI modes.

An obvious joint hypothesis problem emerges when interpreting a time-dummy variable such as EU92. Perhaps additional economic or financial phenomena also encouraged a change in modal investment patterns. It is impossible to ascertain whether such shocks were or were not present, and none could be uncovered in an exhaustive literature search.[4] The Common Agricultural Policy (CAP) reforms of the early 1990s may have had some impact on the investment climate for food-processing firms, but nothing relevant to modal investment patterns could be uncovered (see Dent 1997, Scheele 1996, Tozanli 1996, and ISMEA 1999). The same conclusion can be drawn easily from the events surrounding the early 1990s collapse of the Soviet Union sphere of influence in Eastern Europe. While it seems clear that the Soviet Union collapse prompted new incentive for FDI flows to the EU, the overall set of factors that alter modal decisions did not seem to change.

A second issue relates to the timing of investments and the 1992 announcement: why would the announcement stage change the modal investment climate, and why would the implementation stage(s) fail to do so? Investments are made on the basis of long-term returns and on strategic behavior in capital deemed possible among rivals. The announcement stage set in motion a structural change, a change most likely to be viewed through a long-run game-theoretic lens that involves the strike prices of real growth options on investment (Grenadier 2000). Indeed, it would be foolish to think that firms would choose a modal investment without carefully examining the long-run ramifications made possible by the Treaty. Therefore, if wholly owned FDI modes are deemed more preferable once the Treaty was operational, it is reasonable that delays in new shared FDI activity, shifts in strategies from shared to wholly owned FDI investments, and more aggressive wholly owned FDI investment would begin to occur shortly following the announcement.

[4] One finding involving structural shifts occurred in the electronics sector. Belderbos and Sleuwaegen (1998) conducted an extensive study of tariff-jumping FDI into the EU, relying on a model similar to the one used here. They found significant support for tariff-jumping FDI activity in a panel of electronics firms. These policy shifts varied across the different electronics sectors and occurred in various years between 1985–1988.

Much of the FDI in our dataset actually emanates from within the EU. CB is the common-border binary variable and as such takes a value of one when the home and host nations share a common border. EU92CB is the interaction term between CB and EU92. Finally, LANG is a language binary term equal to zero when the home and host nations share the same first language. These variables are important because cultural and spatial connections are expected to influence the modal investments of multinational companies. Prior research has shown that control ventures shared with host-country firms help to alleviate uncertainties arising from socio-cultural differences (Beamish and Banks 1998; Harrigan 1985; Klien, Frazer, and Roth 1990). Consequently, shared control structures enable foreign firms to reduce their risk by sharing equity with and assigning management tasks to local partners. Indeed, such partners may be better able to manage the local labor force and the various complex relationships with suppliers, buyers, and the governments in their respective countries (Root 1994).

In this study, we have chosen language and a cross-border binary variable as proxies for cultural similarities and psychic distance, respectively. LANG takes the value one (zero) if the language spoken in the investor's home country and the host country is (is not) the same. For example, this variable takes the value one if a U.S. company invests in the U.K.; it is zero if the U.S. firm invests in France. We expect LANG will be positively related to wholly owned FDI modes and thus will carry a negative parameter estimate. A cross-border dummy variable (CB) takes the value one (zero) if there is (is not) a common border between the investor and the host country. The risk of wholly owned FDI modes is likely to increase in proportion to distance between the home nation and the FDI location. Therefore, we expect CB to be positively related to wholly owned FDI, and thus anticipate a negative parameter.

Obviously, many non-cultural barriers to investment should be evaluated carefully by a multinational (i.e. access to capital, tax rates, labor rates, etc.). Because the Maastricht Treaty essentially moved the EU toward a much more unified structure, cultural barriers could begin to take a more prominent role in choosing a modal investment. As a consequence, an interaction term between EU92 and CB (noted as EU92CB) is included in the model. It is anticipated that firms are less likely to consider non-cultural factors when choosing a country for investment and that nations that share a geographic border are even more likely to adhere to sole venture-investment patterns.

Finally, variations in exchange rates (EXEC) are caused by economic factors, governmental decisions, and the overall political stability of a country. If FDI expansion occurs, key considerations include access to the invested capital and its earnings in the host-country currency. This concept of liquidity preference is a common theory that helps explain capital-budgeting decisions, and can be applied to international-expansion decisions. Liquidity-preference theory assumes that investors prefer that some of their holdings be in highly liquid assets, which usually provide a lower return. Liquidity is necessary in part to free-up funds for near-term payments, such as paying out dividends, and also to cover unexpected expenses such as stockpiling materials if a strike threatens supply. Finally, liquidity permits a shift in funds to even more profitable opportunities, such as purchasing materials at a discount during a temporary price depression (Daniels and Radebaugh 1994). A downside of maintaining highly liquid assets in other countries involves their vulnerability to exchange-rate volatilities. Because wholly owned investment strategies tend to be less liquid and involve a stronger commitment to maintaining a presence in the host nation, we anticipate a negative relationship between exchange rate-volatility and wholly owned investment patterns, and therefore a positive parameter estimate. EXEV was calculated simply as the percentage change in the exchange rate from year *t–1* to *t*.

Results

Table 2 details the variables used in the model and the descriptive statistics for each variable. Table 3 contains the results from a preliminary analysis of collinearity between variables in the data set. No evidence of problematic collinearity was found. After obtaining coefficient estimates, we first tested the null hypothesis that the model variables jointly do not explain modal investment: H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$. The test statistic from the likelihood-ratio test [$2 * (LR_{unrestricted} - LR_{restricted}) = 45.2152$] exceeded the critical chi-square value ($\chi^2_{0.005,n} = 16.7496$ for $n = 5$). Thus the null hypothesis was rejected, leading to a conclusion that the variables jointly explain investment modes.

Table 2. Model Variables: Variable Names and Descriptive Statistics.

Dependent variable:	
$INVEST_i$	Investment type i with i = 0: Wholly owned; i = 1: Shared ownership
Independent variables:	
LANG	Language: 1 if the investor and host country speak the same language, 0 otherwise
CB	Cross-Border; 1if the investor and host country are neighbors, 0 otherwise
EXE	Exchange rate fluctuation t -1 to t for host country c
EU92	European Union dummy variable taking the value 1 (0) after (before) the Maastrict Treaty in 1992.
EU92CB	An interaction term between CB and EU92 = (EU92 * CB)
EINV	$\exp(inv0_{t-3} + inv0_{t-2} + inv0_{t-1} - inv1_{t-3} - inv1_{t-2} - inv1_{t-1})$

Descriptive statistics

	Mean	Std. dev.	Minimum	Maximum
EINV	11413.00	53272.0	4.54E-05	5.32E+05
EU92	621673.0	0.48543	0	1
CB	0.342205	0.47490	0	1
EU92CB	0.136882	0.34405	0	1
LANG	0.169202	0.37529	0	1
EXEV	-0.539677	10.1683	-20.09	21.74

Table 3. Correlation Matrix of the Model Variables.

	EINV	**EU92**	**CB**	**EU92CB**	**LANG**	**EXEV**
EINV	1					
EU92	-0.10813	1				
CB	0.06799	-0.03223	1			
EU92CB	0.13361	-0.51049	0.55213	1		
LANG	0.2616	0.05929	0.12337	0.2681	1	
EXEV	-0.05952	0.39161	-0.06619	-0.23105	0.02377	1

The coefficient estimation results are reported in Table 4. All the variables in the model are significant at the 5-percent level, and all but the coefficient on the CB variable maintained the anticipated sign. However, the sign on the CB variable is less problematic than it could be because it is offset by the interaction term involving EU92. We discuss this more fully below from a perspective that considers the marginal effects of each variable.

In a standard linear model, one may assume that the coefficients obtained in the statistical analysis have only marginal effects. However, for a logit model, which is nonlinear by definition, the marginal effects defined in Equation 2 must be considered in any relevant interpretation of continuous variables (EINV and EXEV). For the discrete shift variables (EU92, LANG, and CB), we simply interpret parameter estimates to identify directions in shifts of probability.

Table 4 also reports the marginal effects of the continuous independent variables, comparing shared to wholly owned FDI modes.[5] Past modal investment behavior has a statistically significant effect on the probability of current modal investment behavior. Due to the exponential function used to measure past investment patterns, combined with the discrete count data used in the study, increases and decreases in shared or wholly owned FDI modes generate different marginal effects. At the mean of the data, for every additional past wholly owned investment or every reduction in past shared investment, the probability of a wholly owned investment increased by 23 percent. For every increase in shared investment or every drop in past wholly owned investment, the probability of a wholly owned investment declined by 9 percent.[6] We also found that an incremental increase in exchange-rate variability (EXEV) increases the probability of shared FDI modes by a small but statistically significant percentage (0.0057%).

Shifts in probability that relate to discrete changes in the binary variables are presented in Table 5 (continuous variables ENIV and EXEC are set to their mean values). The first column of zeros represents the base-case probabilities that apply when an investment was made prior to 1992 in a nation that lacks a common border or a common language

[5] In a binomial logit framework (as opposed to a multinomial), the marginal effects on the probability of choosing investment mode 1 (partial investment) are equal but opposite in sign to the probability of choosing wholly owned FDI. As a result, we will continue to draw inferences to wholly owned FDI when discussing the marginal effects.

[6] The reasons for these conclusions are quite simple. Unit increases in our function for past investment increase the function by 171 percent. Unit decreases cause the function to drop by 63 percent. Thus at the mean of the data the first measure is calculated as 0.0000042*171*11413/0.35=23%.

Table 4. Model Results.

Coefficient estimates:

Variable	Coefficient	t-statistic	P-value
EINV	–0.0000202	–2.667	0.007
EU92	–1.1412080	–5.957	0.000
CB	0.9439203	3.175	0.015
EU92CB	–1.0188463	–2.481	0.013
LANG	–0.6404920	–1.881	0.060
EXEV	0.02762396	2.548	0.011

Characteristics in numerator of Prob [Y = shared investment]

Marginal effects:

Variable	Coefficient	t-statistic	P-value
EINV	–0.0000042	–2.884	0.004
EXEV	0.00577288	2.589	0.009

Marginal Effects on Prob [Y = shared investment]

Table 5. Summary Results.

Probability shifts of discrete variables

Variable	Value of discrete variable				
LANG	0	1	0	0	0
EU92	0	0	1	0	1
CB	0	0	0	1	1
EU92xCB	0	0	0	0	1
Prob [Y = Wholly owned investment]	0.56	0.70	0.80	0.33	0.92
Prob [Y =Partial investment]	0.44	0.30	0.20	0.66	0.08

Determined at mean of continuous variables (EINV=11413, EXEV=-.53968)

Prediction table

	0	1	Actual
0	263	20	283
1	109	40	149
Predicted	372	60	432

with the home nation. As reported, the probability of a wholly owned investment under the base case was 56 percent. The second column represents the discrete change in probability that occurs when the home and host nations share the same base language. A major finding concluded that a home nation with the same base language as the host nation is the most likely candidate for wholly owned ownership investments, shifting the probability of wholly owned investment upwards by 14 percent (from 56 percent to 70 percent).

The other major findings related to discrete-variable changes jointly involve the signing of the Maastricht Treaty in 1992 and cross-border impacts. As expected, the negative coefficient on EU92 indicates the Treaty shifted the probability of wholly owned FDI upwards by 24 percent, to 80 percent. The probability of wholly owned investments were further enhanced to 92 percent when considering host-nation investments in neighboring nations (nations with a common border), with a negative coefficient on the interaction term EU92CB (both EU92 = 1 and CB = 1).

The cross-border parameter did not have the anticipated sign, and instead suggested that firms were 23 percent less likely to choose wholly owned FDI when investing in nations that share a common geographic border to the host nation (56 percent vs. 33 percent). Certainly, it is not implausible to suggest that firms seek levels of control that increase in proportion to their geographic distance from their investments. And perhaps the locational impacts imply that firms are most aware of competitor firms nearby, with whom they are best able to develop the sophisticated relationships that lead to joint firm activities. Regardless of the reason, the cross-border impacts of shared investments were completely offset after 1992 when the Maastricht Treaty encouraged more wholly owned FDI modes with neighboring nations. More specifically, for CB=1 and EU92=1 the probability of a wholly owned investment increased from 56 percent to 92 percent. Indeed, it appears that the Treaty broke some of the investment ties that spatially close firms may have had, and caused them to seek new avenues of investment patterns.

A conventional goodness-of-fit measure in logit analysis is the prediction table, which summarizes how well the model coefficients actually classify each observation (see Table 5). From a total of 149

observations for shared-ownership investments, only 40 are predicted with this model, a mere 27-percent predictability: [(40*100)/149] ≅ 27 percent. On the other hand, the model performed very well in predicting wholly owed ownership cases, with almost 93-percent accuracy: [(263*100)/283] ≅ 93 percent. Overall, the general predictability of this model remains satisfactory, with a 70-percent success ratio: [(263+40)*100/432] ≅ 70 percent.

Conclusion

This paper generates a better understanding of modal FDI into the EU. The model examined a variety of key variables to explain the binary choice between an aggregated set of wholly owned FDI modes versus shared FDI modes. We found that the Maastricht Treaty and cross-border effects taking place after the Treaty was signed in 1992 had the greatest joint impact on investment patterns. Specifically, the Treaty encouraged more wholly owned FDI modes and dampened the tendency for firms in neighboring nations to jointly invest. It appears the Treaty had a temporary pro-competitive effect, at least at the level of capital planning during the years of this study.

All other results conformed to current investment theories. Past firm-level investment activity played an important role in determining future investment behavior. Firms that established an investment style were found to be more likely to follow that same pattern. Increased exchange-rate volatility led to lower probabilities for wholly owned investments. Firms were found more likely to make wholly owned investments when the home and host nations shared a common language.

Obviously, many factors go into a decision to foreign direct invest, and the mode of investment only adds to that complexity. The research in this study attempts to clarify and enlighten our understanding of some of the major factors that influence firm investment patterns. Our results clearly suggest that macroeconomic forces, intrafirm strengths/abilities, and socioeconomic and geographic factors all have an influential role. Future research on foreign direct investment should investigate more specifically how these forces drive investment. These results should guide future government policy recommendations. It is also important for international agencies to monitor the activities of large multinationals and to collect data useful for public-policy analysis of their activities.

References

AGRODATA. 1998. "Centre International de Hautes Etudes Agronomiques Mediterranéenes (CIHEAM)." Montpellier.

Beamish, P. W. and J. C. Banks. 1998. "Equity Joint Ventures and the Theory of the Multinational Enterprise." In P. Beamish, ed., *Globalization of the World Economy, vol. 2*. Cheltenham, U.K.

BERI S.A. 1999. *Business Risk Service*. Washington, D.C.

Belderbos, R. and L. Sleuwaegen. 1998. "Tariff Jumping DFI and Export Substitution: Japanese Electronics Firms in Europe." *International Journal of Industrial Organization* 16: 601–638.

Brigham E. F. and J. F. Houston. 1978. *Fundamentals of Financial Management*, 8th edition. Philadelphia: The Dryden Press.

Buckley, P. J. and M. Casson. 1976. *The Future of the Multinational Enterprise*. London: Macmillon.

Bureau of Economic Analysis. http://www.bea.gov.

Chakrabarti, A. 2003. "A Theory of the Spatial Distribution of Foreign Direct Investment." *International Review of Economics and Finance 12*(2):149-169.

Contractor, F. and S. K. Kundu. 1998. "Modal Choice in a World of Alliances: Analyzing Organizational Forms in the International Hotel Sector." *Journal of International Business Studies* 29(2):325-357.

Daniels, J. D. and L. H. Radebaugh. 1994. *Intenational Business Environments and Operations,* 7th edition, New York: Addison-Wesley Publishing Company, Inc.

Dent, C. M. 1997. *The European Economy*. London: Routledge.

Eiteman, D. K., A. I. Stonehill, and M. H. Moffet. 1998. *Multinational Business Finance*. New York: Addison-Wesley Publishing Company.

Erdilek A. 1985. *Multinational as Mutual Invaders: Intra-Industry Direct Foreign Investment*. New York.

Erramilli, M. K. and C. P. Rao. 1993. "Service Firms' International Entry Mode Choice: A Modified Transaction Cost Analysis Approach." *Journal of Marketing* 57:19–38.

Greene, W. H. 2000. *Econometric Analysis,* Fourth Edition. New York: Prentice-Hall.

Grenadier, S. 2000. "An Introduction of Option Exercise Games." In *Game Choices: The Intersection of Real Options and Game Theory*. London: Risk Waters Group Ltd.

Harrigan, K. R. 1985. *Strategies for Joint Ventiures*. Lexington, MA.

Head, K., T. Mayer, and J. Ries. 2002. "Revisiting Oligopolistic Reaction: Are Decisions on Foreign Direct Investment Strategic Complements?" *Journal of Economics and Management Strategy* 11(3):453–472.

Hennert, J.-F. and Y.-R Park. 1993. "Greenfield versus acquisition: the Strategy of Japanese Investors in the United States." *Management Science* 39:1054–70.

Hooker, N. and J. Caswell. 1996. "Trends in Food Quality Regulation: Implications for Processed Food Trade and Foreign Direct Investment." *Agribusiness: An International Journal* 12(5) 411–419.

Hymer, S. 1976. *The International Operations on National Firms: A Study of Direct Foreign Investment.* Cambridge, MA: MIT Press.

ISMEA. 1999. *The European Agro-Food System and the Challenge of Global Competition*. Rome.

Kindleberger, C. P. 1969. *American Business Abroad: Six Lectures on Direct Investment*. New Haven, CT: Yale University Press.

Klien, S., G. L. Frazier, and V. J Roth. 1990. "A Transaction Cost Analysis Model of Channel Integration in International Markets." *Journal of Marketing Research* 27(2)196–208.

Korbin, S. J. 1982. *Managing Political Risk Assessement: Stratgic Response to Environmental Change*. Berkley : University of California Press.

Liu, S. X. 1997. *Foreign Direct Investment and the Multinational Enterprise*. Westport, CT: Praeger.

Organization for Economic Co-Operation and Development (OECD). 2006. http://www.oecd.org.

Pan, Y. and D. K. Tse. 2000. "The Hierarchical Model of Market Entry Modes." *Journal of International Business Studies* 31(4):535–554.

Root, F. R. 1994. *Entry Strategies for International Markets*. New York: Lexington Books.

Scheele, M. 1996. "The Agri-environment Measures in the Context of CAP Reform." In M. Whitby, ed., *The European Environment and CAP Reform.* Oxford, UK: CAB International.

Sethi, D., S. E. Guisinger, S. E. Phelan, and D. M. Berg. 2003. "Trends in Foreign Direct Investment Flows: A Theoretical and Empirical Analysis." *Journal of International Business Studies* 34(4):315–326.

Schaan, J.-L. 1988. "How to Control a Joint Venture Even as a Minority Partner." *Journal of General Management* 14(1):4–16.

Shane, S. A. 1996a. "Explaining Why Franchise Companies Expand Overseas." *Journal of Business Venturing* 11(2):216–234.

Shane, S. A. 1996b. "Hybrid Organizational Arrangements and Their Implications for Firm Growth and Survival: A study of New Franchisors." *Academy of Management Journal* 39(1): 216–234.

Shapiro A. C. 1996. *Multinational Financial Management,* 5th edition. New York: Prentice-Hall, Inc.

Tozanli, S. 1996. "L'évolution des structures des groupes agro-industriels multinationaux." *Economies Rurale* 231(January–February).

UNCTAD. 1999. *World Investment Report (1999): Foreign Direct Investment and the Challenge of Development*. New York.