Locational Determinants of US Foreign Direct Investment in Food and Kindred Products in Latin America

By

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Introduction

Long-term economic forecasts of world food demand suggest that much of the growth in sales will be in foreign countries. Consequently, more US agribusinesses are attempting to increase sales by expanding their activities abroad. Although exports are traditionally considered to be the primary way to access overseas markets, US food companies earn far more from sales of their foreign affiliates (Malanoski, 1994). In fact, in 1996 processed food sales by such firms reached $121 billion, an amount 4.39 times larger than U.S. processed food exports of $27.57 billion. This indicates that US firms reach foreign customers primarily through foreign direct investment[1] (FDI) (Bolling, Neff and Handy, 1998).

The international involvement of US agribusiness by way of FDI is large and growing rapidly. According to the BEA, from 1982 to 1997, the US FDI position in food and kindred products rose from $7.60 billion to $38.38 billion. Because of demographics, rapid economic growth and geographical proximity, Latin American is an important destination for much of this investment. Therefore, the growth of FDI flows into Latin America during the last decade is certain to generate new discussion as to how hemispheric production locations and patterns of trade could be affected. Despite the importance of US FDI activities, there are relatively few studies that specifically address US FDI in food and kindred products and fewer studies that focus on Latin American countries. Accordingly, both policymakers and agribusiness managers need to know what factors drive investment in this region. A better understanding of the factors will allow for better policy decisions in the future.

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[1] Investment whose aim is to exercise managerial control over a foreign enterprise.

With that in mind, the objective of this research is to determine the factors that are associated with US FDI in food and kindred products. Specifically, this research focuses on location specific determinants of US FDI in food and kindred products in the five largest Latin American economies.

This paper begins with an explanation of the broad conditions under which FDI takes place and introduces the framework for the creation of an empirical model of US FDI in food and kindred products in Latin America. The second section describes the method required to estimate the model and variable definitions. The third section identifies data sources and the last section presents conclusions and implications derived from empirical model results.

Determinants of FDI

Because FDI is a complex endeavor there are many theories seeking to explain it. In an attempt to organize the competing paradigms of neoclassical, behavioral and institutional theories of FDI developed by Hymer (1976), Vernon (1966), Buckley and Casson (1976), Caves (1971) and others, Dunning developed an eclectic approach. According to the eclectic paradigm, three conditions must exist in order for FDI to take place. The first is the presence of firm specific ownership advantages, the second is the existence of benefits from internalizing economic activity and the third is the existence of location specific advantages. Ownership advantages are firm specific qualities (e.g. proprietary technology and superior management skills) needed to overcome the disadvantage of operating in an unfamiliar environment. Internalization advantages are those that accrue from minimizing transaction costs or buyer uncertainty by exchanging intermediate inputs within branches of the firm rather than with others. Location specific advantages are factors external to the firm such as natural or created host country endowment, investment incentives or disincentives, provided infrastructure and the

economic system (Dunning, 1977). Viewed as a multi-stage decision making process, firms consider ownership and internalization advantages to determine whether to invest and evaluate location advantages to decide where to invest. Of the three determinants, location-specific factors are the most likely to be influenced by government (UNCTAD, 1998).

Empirical Model of Location Specific Determinants of FDI

A large body of empirical research investigates location specific determinants of FDI. Econometric analyses utilizing time-series data typically test the hypotheses that market size; market growth; exchange rates; trade impediments and capital controls influence the level of FDI (UNCTC, 1991).

The market size hypothesis suggests that a host economy must be of a sufficient size to allow local operations to achieve economies of scale. Numerous research have found that the size of the internal market (GNP or GDP) is the most significant determinant of FDI (Lunn; Scaperlanda and Barlough; Torrisi; UNCTAD (1998)). Ning (1993) confirms that GDP has a significant positive relationship for US FDI in food and kindred products.

The market growth hypothesis suggests that the growth rate of a host economy is an indicator of market potential. This has been tested in several studies and the evidence is mixed. Lunn (1980) for instance, finds the GDP growth rate in the most recent year to be significantly positively related to US FDI in the EEC, but lagged one year, is significantly negatively related.

The exchange rate hypothesis suggests that changes in relative exchange rate levels between countries influence FDI (Aliber, 1971; Cushman, 1985; Froot and Stein 1991). The rationale is that the value of the US dollar relative to a foreign currency affects the cost of acquiring and operating foreign assets, thereby making FDI a more or less attractive option. Within the context of real exchange risk and expectations Cushman (1985) argues that the exchange rate may have a

positive or negative influence on FDI depending on the cost/revenue structure of the investing firm. Froot and Stein (1991) focus on capital market imperfections (e.g. information asymmetries). Capital market imperfections, they maintain, may give rise to cost of capital disparities between countries and these disparities may in turn, give less credit constrained foreign investors the ability to outbid local rivals for the purchase of an asset. In a similar vein, Krugman (1998) argues that the dramatic depreciation of some Asian currencies lowered the value of local assets and hence, the ability of local firms to borrow and outbid foreign rivals. McCorriston and Sheldon (1998) tested the relationship between real exchange rates and relative share prices on FDI in the US food industry and surprisingly, found that neither variable offered explanatory power. This they attribute to industry specific factor or data inadequacy. The effect of tax rates has also been analyzed and generally been found to discourage FDI. Nevertheless, long-term investors may focus on the characteristics of the entire host country tax system rather than on particular tax incentives or disincentives (UNCTAD, 1998). This does not mean tax rates are irrelevant. Indeed, given comparable investment conditions, a tie between two locations may be broken by fiscal considerations. Other studies have also incorporated trade impediments into consideration as politically derived aspect of host country economic policies.

The trade impediment hypothesis suggests that trade policy may influence FDI in competing ways. On the one hand, import restraints would tend to promote import-substituting FDI while trade liberalization would tend to discourage it and instead, create incentives for market and/or efficiency seeking FDI. Therefore, in the context of regional integration, the impact of trade liberalization on FDI depends on the balancing out of these competing effects (Blomström and Kokko, 1997). From this perspective, Scaperlanda and Barlough (1983) test the hypothesis that US subsidiaries in Europe would increase FDI in anticipation of the single market and find that

the progressive lowering of tariffs within the EEC exerts a positive influence on US FDI. The

next section presents the methodology and variables used on the empirical model of FDI.

Methodology and Variable Definition

This empirical model seeks to explain the U.S. FDI position abroad in food and kindred

product as a function of variables intended to capture the market size, market growth, and

exchange rate hypotheses as well as the effect of taxes. These variables were chosen according to

data availability and suitability for hypothesis testing. GDP and GDP growth, rather than

projected total sales or sales growth, are included as broader measures intended to test the market

size and market growth hypotheses; both should be positively related to FDI. In the absence of

real exchange rate data, the nominal exchange rate between the host country and the US is used

to test the hypothesis that currency values influence FDI. Including a tax variable tests the

hypothesis that host country fiscal policies affect FDI. To test the trade impediment hypothesis,

a measure of "trade openness" was used instead of tariff levels as it better captures the outward

orientation of a host economy. The functional forms are assumed to be linear and the exact

specification is written:

$$POS_t^i = \beta_{i0} + \beta_{i1}POS^i t - 1 + \beta_{i2}GDP_t^i + \beta_{i3}GRW_t^i + \beta_{i4}EX_t^i + \beta_{i5}TAX_t^i + \beta_{i6}TRD_t^i + \varepsilon_{it}$$

Where i = Argentina, Colombia, Brazil, Mexico and Venezuela.

POS^i = the variable measuring FDI;

GDP^i = the host country gross domestic product in US dollars;

GRW^i = the year to year gross domestic product growth in the host country.

EX^i = the exchange rate, defined as the ratio of host country currency to the US dollar.

TAX^i = foreign income tax rate (foreign income tax paid by USMC'S divided by their sales in the host country).

TRD^i = Merchandise import plus merchandise exports divided by GDP (is the ratio of trade to GDP, which signifies trade openness).

For each country, the FDI model includes one-period lagged FDI values. This geometric lag specification accounts for potential adjustment cost, as investment is inherently costly and habit persistence, as well as institutional, technological and psychological inertia, impede the instantaneous attainment of ideal capital stocks levels. Consequently, each attempt is only partly successful during a given period, thereby creating dynamic demand (Kmenta, 1986). This situation describes a partial-adjustment model where the desired, rather than the actual value of the dependent variable is determined by the independent variables (Kennedy, 1979). This adjustment cost, or equivalently, partial adjustment hypothesis, is tested with a simple t-test of the lagged dependent variable coefficient.

Data Sources

The data used for this study are pooled across five countries over a period of fourteen years (a total of 70 observations). These countries are Argentina, Brazil, Colombia, Mexico and Venezuela and the time series data covers the years 1982 to 1995. The foreign direct investment position data came from the BEA's US Direct Investment Abroad: Balance of Payments & Direct Investment Position Estimates 1982-1996, diskette (BE-50), 1997 edition. The GDP, GDP growth and trade openness data was obtained from the World Bank, World Development Indicators CD-ROM, 1997 edition. Exchange rates were obtained from the IMF International Financial Statistics CD-ROM, 1997. Tax rates were calculated by dividing MNEs foreign income tax paid divided by total sales in the host country. This data was obtained from the U.S.

Bureau of Economic Analysis (BEA). With this data, econometric estimates of the FDI model

are obtained with a GLS/SUR procedure that pools the time-series and cross sectional data,

maintaining fixed country effects.

Results

The null hypothesis that the system variance-covariance matrix is diagonal was rejected but

further tests revealed the presence of heteroscedasticity. Therefore, a generalized least squares

heteroscedasticity correction method was applied to produce unbiased estimates of all model

parameters (Breusch-Pagan, 1980). The results obtained show that the direct investment position

equation has a high level of explanatory power, exhibiting R^2 .9678 for the entire system. Table

1 presents model results and shows that the POS_{t-1} variable has a positive and significant effect

on US FDI in Argentina, Mexico and Venezuela. Short-run elasticities show that responsiveness

is highest in Mexico followed by Brazil, Argentina, Venezuela and Colombia. In more than one

period the speed of adjustment of the FDI position follows the same order. That Mexico adjusts

fastest may be because U.S. investors could be better acquainted with Mexican business

conditions due to geographical proximity and closer communication.

The parameter estimates here also support previous studies maintaining that GDP is the most

influential location determinant of FDI. In this case, GDP (in U.S. dollars) has a positive and

significant effect in Brazil, Mexico and Venezuela at a greater than 5% significance level.

Surprisingly, the results for the GDP growth rate hypothesis are idiosyncratic as they vary by

country. In this case the GDP growth rate (GRW) has a negative effect in Argentina and

Venezuela and a positive effect in Brazil, Colombia and Mexico. The negative sign and lack of

significance is unexpected because GRW represents a market's underlying growth and thus, it

influences expectations of future GDP levels. A likely explanation is that because FDI is a long-term commitment, it is influenced by long run trends rather than by year to year GDP changes.

In this analysis, the signs for the exchange rate variable are positive in Argentina, Colombia, Mexico and Venezuela but significant and negative in Brazil. Therefore, for the majority of the countries studied, depreciation of the domestic currency in relation to the dollar has a positive influence on FDI. A plausible explanation is that during the time period involved, rigid currency stabilization programs applied by some of the countries in the study often led to currency overvaluation. An overvalued currency may discourage FDI since it raises investment cost and increases the risk of sudden exchange rate adjustment. The reverse effect in Brazil may be explained because the local currency depreciated at an almost exponential rate and the Cruzado stabilization plan was a dismal failure due to rampant inflation resulting from fiscal and credit profligacy.

In the case of the tax variable, the results show positive and negative effects across countries suggesting that the effect is country specific. The tax variable has a positive effect in Argentina and Venezuela and a negative effect in Brazil, Colombia and Mexico. Tax increases in Brazil may have been viewed negatively by investors because fiscal policies at the time encouraged inflation rather than infrastructure investment. In the case of Mexico and Colombia, the negative result may be due because the use of tax revenue to restore a fiscal balance may have reduced the amount of public funds available for public investment. In the case of Argentina tax increases may have been positively viewed by investors as they were part a credible plan of fiscal austerity and tax financed public investment. In the case of Venezuela, the same effect may be due to foreign investors welcoming successive rounds of liberalization of FDI regulations. In general terms, these results suggest that FDI may be discouraged by taxes as they have a direct impact on

profitability. However, tax increases may have a positive influence if they sign toward potential benefits such as infrastructure investment.

Finally, a test of the trade impediment theory yields interesting results. In this case, "trade openness" has as a positive effect in Argentina, Brazil and Colombia, while it has a negative effect in Mexico and Venezuela. As expected, trade openness exhibits a competing effect on FDI. One is complementary to FDI and the other is a substitute. Trade openness may be complementary as domestic buyers learn of foreign goods and their value but may also be a substitute as it may displace investment intended to avoid trade restrictions. This study shows that in Argentina, Brazil and Colombia, trade openness has a positive effect on FDI. This corresponds with the notion that the expectation of a trade union is likely to make a region more attractive for investment. However, for Mexico and Venezuela, trade openness was a negative influence on FDI. This may be because relative strong domestic currencies during part of the 1982-1995 time period and proximity to the US may have biased these economies toward imports rather than FDI to serve domestic and export markets. This effect is expected to dissipate after the effects Mexican devaluation of 1994 run their course and once NAFTA and the Andean Pact are well underway. Taking into consideration the estimating model results, conclusions and implications follow.

Conclusions and Implications

Based on these results, the main conclusion of this study is that market size is the dominant influence on US FDI in food and kindred product in Latin America. Hence, the presence of large prosperous economies allowing the achievement of economies of scale needed to operate in domestic or regional markets may be the principal driver of FDI into Latin America. This is

especially the case for food industries where bulky, perishable products and localized taste require firms to be in close proximity to the end consumer.

Further, that direct investment responds slowly to short-term economic conditions indicates that the growing international specialization and division of activities through FDI is a long-term, and by no means an automatic, process. It is characterized by rigidities and inertia created by physical, psychological and legal considerations that raises the cost of spatially rearranging productive activities. Positive elasticities for all countries suggests that macroeconomic structural adjustment policies implemented throughout the region may have created an economic environment that attracts U.S. FDI in food and kindred products.

In regard to the effect of nominal exchange rates on FDI, the depreciation of the local currency in relation to the dollar was shown to be a generally positive influence. However, the result for Brazil suggests that the economic environment under which extreme currency depreciation takes place also influence FDI. Model results also indicate that FDI is negatively influenced by taxes as they reduce profitability but that may not necessarily be the case if investors are also taking into account potential future benefits. In regards to trade openness, a reasonable generalization is that in the absence of gross macro-economic distortions (principally dealing with exchange rates), regional integration, especially in MERCOSUR may attract US FDI in food and kindred products

In conclusion, the interaction and linkages between companies, states and societies suggests that FDI is a dynamic process where the basis for choosing a given location may be determined by differences in factor endowment, technology and productivity levels between individual nations. This international specialization and division of activities, allows multinational corporations to access country specific resources and in turn, it allows nations to gain access to

multinational corporation resources (and its spillover effects). Since MNEs can shift resources at will, the implication is that there are certain initiatives that individual companies and the U.S. and individual Latin American governments can engage in that strengthen the relationship between ownership and location advantages.

These initiatives include the fostering of a stable macroeconomic environment that allows firms, governments and the public in general to conduct long-term projects. Private and public investment in infrastructure, education, training, health and the fulfillment of the basic needs of the poorest sectors of the population are also some ways in which governments and firms can work together to increase productivity and facilitate the structural adjustment process. The strengthening of public institutions (e.g. law enforcement, regulatory agencies) that help market based economies to operate more efficiently complement this initiatives.

In short, the aim of these proposals is to foster an environment that makes a host-economy more responsive and its people more able to take advantage of the dynamic economic opportunities created by the globalization of production activities. Or in other words, to attract and harness the benefits derived from FDI to create, retain and upgrade local industries.

While some these issues may on the surface appear to be subsidiary to traditional location determinants, once major barriers to FDI are removed, secondary considerations may gain importance in investor's decisions. Therefore, further research is needed to test whether a different class of country specific factors such as social stability, the structure of markets, the presence of business services, investment promotion, administrative efficiency and social amenities influence US FDI in food and kindred products in Latin America.

Table 1 Results of Latin American SUR Model of U.S. FDI in Food and Kindred Products:1982-1995

Dependent Variable		Explanatory Variable					
U.S. FDI Investment Position		POS$_{t-1}$	GDP	GRW	EX	TAX	TRD
Argentina	Coefficient	0.477*	165.3	-480.37	39.68	3751.8*	1010.5
	t-ratio	3.487	1.771	-1.458	0.382	2.145	1.243
	Short-run	[0.055]	[0.087]	[-0.003]	[0.006]	[0.022]	[0.044]
	Long-run	[0.106]	[0.167]	[-0.005]	[0.011]	[0.042]	[0.086]
Brazil	Coefficient	0.246	325.55*	406.10	-206.66	-6354.9*	4731.60
	t-ratio	1.533	2.810	0.402	-0.504	-1.981	1.461
	Short-run	[0.076]	[0.411]	[0.003]	[-0.010]	[-0.089]	[0.245]
	Long-run	[0.100]	[0.545]	[0.004]	[-0.013]	[-0.117]	[0.325]
Colombia	Coefficient	0.080	235.77	381.48	0.031	-99.51	154.52
	t-ratio	0.396	1.794	0.654	0.313	-0.887	0.269
	Short-run	[0.004]	[0.036]	[0.005]	[0.005]	[-0.002]	[0.014]
	Long-run	[0.019]	[0.177]	[0.025]	[0.024	[-0.007]	[0.068]
Mexico	Coefficient	0.659*	468.51*	1041.70	88.87	-15701*	-1800.10
	t-ratio	5.300	4.136	0.777	0.927	-2.191	-1.032
	Short-run	[0.194]	[0.365]	[0.003]	[0.074]	[-0.187]	[-0.195]
	Long-run	[0.567]	[1.070]	[0.009]	[0.216]	[-0.547]	[-0.571]
Venezuela	Coefficient	0.413*	646.54*	-190.52	0.825*	2818.4*	-268.26
	t-ratio	1.960	4.010	-1.608	2.219	2.535	-0.792
	Short-run	[0.026]	[0.134]	[-0.001]	[0.017]	[0.034]	[-0.037]
	Long-run	[0.045]	[0.228]	[-0.002]	[0.030]	[0.057]	[-0.064]

Numbers in brackets [ ] are elasticities
A single asterisk indicates significance at the 5% level

POS$_{t-1}$= The Lagged U.S foreign direct investment position in food and kindred products
GDP= The host country gross domestic product
GRW= The year to year gross domestic product growth rate in the host country
EX= The exchange rate, defined as the ratio of host country currency to the US dollar
TAX= Foreign income tax paid divided by foreign sales
TRD= Merchandise imports + merchandise exports divided by GDP

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