

THE LOCATIONAL DETERMINANTS OF U.S. FOREIGN DIRECT INVESTMENT IN THE EUROPEAN UNION

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Abstract

This paper empirically assesses United States direct investment in the European Union. In that respect, market size, growth rate, labor costs, export flows and tariff barriers have already been shown to influence U.S. foreign direct investment in the European Union. The present paper enlarges the field of knowledge on the matter by: (i) exploring the impact of two locational determinants of foreign direct investments, namely infrastructure and taxes and, (ii) including the opportunity costs associated with foreign investment.

INTRODUCTION

Since its inception in 1957, the European Community, now the European Union (EU) has been an exercise in using economic self-interest to achieve political cohesion. This strategy worked brilliantly during the EU's first decade. However, since that time, the EU has projected an image of such interminable and inconclusive wrangling that some observers have become skeptical about its development.

1985-1986 marked a turning point for the EU. The amendment of the *Treaty of Rome* and the accompanying *White Paper*, while restating the objective of creation of an area without frontiers, with no restrictions on the movement of goods, persons, services, and capital, introduced two crucial changes in the method by which the process of integration was to be managed. First, a shift from *unanimous approval* toward *majority approval* was proposed and second, a principle of *minimal harmonization* instead of total harmonization was adopted. A timetable was also developed, setting 1992 as the deadline for meeting these goals.

Since then, "Europe 1992" has become a catchphrase for Europeans as well as non-Europeans. However, although 1992 was supposed to be the year when the 12 EU¹ countries become a cohesive unit, it seems that it was the year during which these countries flew apart. Very recently, the *Maastricht Treaty*, which set a timetable for establishing a common EU currency by 1999 and procedures for developing a joint EU policy has been beset by an infusion of intricacies. Three elements are now threatening the development of the EU: (i) the end of The Cold War², (ii) the reunification of Germany, the union's dominant member and (iii) the economic slowdown and accompanying persistent recession in the U.K.

In any case, the critical 1992 date has led private economic agents as well as government bodies inside and outside the EU to change their behavior in order to be ready for the "post-1992 world." The goal of this research is to assess and to explain U.S. foreign direct investment (*FDI*) in the 350 million customer-market that constitutes the EU.

The primary contribution of this research is related to the specification of the model. The effects of two previously unexplored locational determinants of *FDI* are appraised, infrastructure and taxes. In addition, our model incorporates the host country interest rate, to include the financial feature of *FDI* flows, and characteristics not only of the host country but also of the investing country³. Further, we investigate models using different dependent variables. Finally, we update the field of observations. The data used for our investigation have been gathered from the U.S. *Department of Commerce*, the *International Financial Statistics* published by the International Monetary Fund (IMF) and the *World Tables* published by the World Bank (WB). These data were gathered for the 13 consecutive years for which recent information was available, 1977 until 1989, and for 11 of the 12 European Countries⁴.

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The impact of host market size and growth rate, as well as tariff barriers on U.S. direct investment in the EU have been empirically tested by Scaperlanda and Mauer (1969), Schimtz and Beri (1972), Lunn (1980) and Scaperlanda and Balough (1983). More recently, Culem (1988) has explored the impact of the adjunction of unit labor costs and export flows in the model. Our research hypothesizes that a well developed infrastructure and low tax regime might also be significant determinants of U.S. direct investment motivation.

Results obtained validate previous findings by Nicolaides (1991) and Beer and Cory (1994): U.S. *FDI* is still largely concentrated in France, Germany, the U.K and the Netherlands. Results obtained also shed some light on the variables explaining U.S. preference. Results show that U.S. *FDI* in the EU is motivated by the defense of foreign market shares, the level of interest rates and cultural similarities.

The remainder of this paper is organized into 4 sections. Section 1 presents a brief overview of the literature of U.S. *FDI* in the EU and discusses U.S. *FDI* past strategies. Section 2 presents the data and the methodology used in this study. Section 3 examines the results of our statistical tests. Section 4 summarizes our findings.

U.S. FDI PAST STRATEGY

Since the mid-1930s, U.S. foreign policy has been to perpetuate freedom of *FDI*. After World War II, U.S. companies were strongly encouraged to aid in European reconstruction. These factors help explain why *FDI* became the primary form of international business activity for many U.S. companies during the 1950s. Weekly and Aggarwal (1987) indicated that during that period the growth rate of U.S. *FDI* worldwide averaged 10 percent annually.

In the early 1960s, *FDI* was accused of contributing to the “dollar glut” in Europe. U.S. companies were discouraged from *FDI* in industrial countries and simultaneously encouraged toward *FDI* in the developing world. Today, the unification of the EU has caused many U.S. companies to take a second look at *FDI* in industrialized countries. It is well known that the formation of a custom union, such as the EU, by altering patterns of trade between countries joining the union and between the union bloc and other countries, also alters patterns in the international flow of productive factors [Viner (1960)].

The impact of custom unions on U.S. *FDI* in the EU has been studied by several authors. Determinants of U.S. *FDI* in the EU has been studied extensively. A demand pull model, incorporating market size, tariff structure changes, and market growth has been used to analyze the impact of integration on U.S. *FDI* [Scaperlanda and Mauer (1969), Schimtz and Bieri (1972), Lunn (1980), and Scaperlanda and Balough (1983)].

Relative production costs and investment strategy globalization have been emphasized in the explanation of location decision of multinational companies (MNCs) [Cantwell (1987), Dunning and Robson (1987)]. Evidence reported by these authors indicates that the goal of cost minimization within an integrated productive system is the goal of MNCs.

This article follows the same framework as the studies of Culem (1988) and Millington and Bayliss (1991) as it extends the analysis of U.S. *FDI* location in the EU. As postulated by previous studies, this research assumes that managers attempt to maximize profits subject to economic and political constraints. Given that assumption, the decision to invest in one country instead of another is based on a set of variables similar to the set of variables used in making domestic investment decisions. Domestic firms build plants in areas of the U.S. when it is cheaper to do so than to ship the goods to the area. Similarly, firms build plants in other countries when the expected cost of doing so is less than the cost incurred when exporting to the areas and when they can effectively compete with local firms.

DATA AND METHODOLOGY

U.S. FDI Position In The EU: The Dependent Variables

Previous studies have concentrated on the locational determinants of the manufacturing sector only. In the current paper, we investigate two issues: (i) U.S. *FDI* in all businesses in the EU and, (ii) U.S. *FDI* in manufacturing only⁵. Information on U.S. *FDI* position per European country has been obtained from the U.S. Department of Commerce. The symbols FDI_{it} are used to refer to U.S. total direct investment in country i during period t . Similarly, MAN_{it} refers to U.S. investment in manufacturing in country i in period t . Information for the two dependent variables covers the period 1977-1989 and is expressed in millions of U.S. dollars.

U.S. FDI Position In The EU: The Independent Variables⁶

Stevens (1972) shows that *FDI* is positively related to the lagged sales of foreign affiliates. Since data on sales are not available, we are relying on the best available proxy. Scaperlanda and Balough (1983) and Culem (1988) show that for most countries, lagged real gross national product (GNP) is a good proxy for sales. GNP is also a good proxy for market size, a variable that has been documented as being an important determinant of *FDI* [Ajami and Ricks (1981) and Culem (1988)]. “A small market prohibits firms from exploiting scale economies and limits the degree to which factors of production can be specialized. As the market expands increased specialization can occur. Eventually, if the market keeps growing, economies of scale can be exploited and large scale production can begin” [Lunn (1980) p.95]. In accordance with the studies referred to above, the variable *GNP* was used. GNP figures are obtained from *International Financial Statistics*, measured in billions of U.S. dollars and is symbolized by GNP_{t-1} . For this variable, we expected a positive correlation with the dependent variable and thus a positive regression coefficient. Bearing in mind that the EU countries form a common market, market size is measured by the overall GNP of the EU, i.e.:

Equation 1

$$GNP_{t-1} = GNP_{1t-1} + GNP_{2t-1} + \dots + GNP_{nt-1}$$

where n is the number of EU countries. Since countries joined the EU at different times, n is equal to 8 from 1977 until 1981 (Greece joined the EU in 1981), to 9 from 1981 until 1985 (Spain and Portugal joined the EU in 1986) and to 11 thereafter.

Following the acceleration principle, growing aggregate demand calls for new investments and consequently stimulates *FDI*. Market growth rates, measured by the percentage of annual GNP growth have been used in this respect [Culem (1988)]. This is symbolized by $g_{GNP_{it-1}}$ and is expected to be positively related to the dependent variable.

Wages contribute toward measurement of the business climate within a country. Falling wages may indicate economic recession and excessive wage increases can be associated with hyper inflationary periods. A wage index, defined as the index of hourly earnings, was obtained for each country for each year studied. Notice however, that low hourly wages are attractive only insofar as they are not offset by lower hourly productivity. For this reason the hourly wage index was divided by the hourly productivity index. Data for these variables, symbolized as WP_{it} , were gathered from *International Financial Statistics*. Regression coefficients are expected to be negative.

Vernon (1966) shows that *FDI* may be motivated by the defense of foreign market shares. Foreign markets might have been previously served through exports. To assess the impact of previous exports on *FDI*, lagged U.S. exports to an EU country were introduced in the model. This variable is divided by the EU country GNP to control for the country size and is symbolized by EXP_{it-1} . It is expected to have a positive sign⁷. As with other variables, these data were gathered from *International Financial Statistics*, and are expressed in billions of U.S. dollars.

Culem (1988) introduces the nominal interest rate differential between the host country⁸ and the rest of the world as an independent variable. Justification for the inclusion of this variable is inherent to the definition of *FDI*.

FDI is recorded in the balance of payments as a special division of long-term financial flows allowing control of foreign enterprises. Accordingly, funds raised in one country are invested in another where they are used to acquire foreign affiliates. It is apparent that foreign investors have the possibility of raising funds elsewhere than in their home countries. Funds can be raised in the host country or borrowed in another country where the interest rate is lower. This is particularly feasible for MNCs due to the greater trust they inspire. Their asset diversification allows them to obtain cheaper sources of funds. It follows that lower interest rates encourage investors to borrow funds in that country, resulting in lower *FDI* flows towards that country, as measured by the balance of payments. For that reason, a proxy for the interest rate, identified as $INTE_{it}$, was introduced in the model. This variable is computed as:

Equation 2

$$INTE_{it} = RATE_{it} - RATE_{wt}$$

In equation 2, $RATE_{it}$ refers to the level of the interest rates in the host country and $RATE_{wt}$ to the level of interest rates in the rest of the world. $RATE_{wt}$ has been proxied by the average level of interest rates in the countries sampled at each time period. Data for these variables were obtained from *International Financial Statistics*. Regression coefficients are expected to be negative⁹.

The industrial climate faced by U.S. companies investing in the EU has been captured by two variables, gross fixed capital formation and tax rates. Gross fixed capital formation measures machinery and equipment investments as well as residential construction and transportation infrastructure in a foreign country. Existing plant facilities may prove attractive to foreign investors, since minimal construction would be necessary prior to initiation of business activities. This variable, which measures the country's available resources, is also a good proxy for country development and sophistication level. Gross capital formation is expressed in billions of U.S. dollars and has been divided by country GNP to control for size. It has been lagged one period, to reflect the fact that an *FDI* decision takes time, and it is symbolized by $GROSS_{it-1}$. Data were collected from *International Financial Statistics* for each year studied. For this variable, we expect a positive correlation with the dependent variable and thus a positive regression coefficient.

A country tax policy toward foreign investment might have a tremendous impact on the profitability of foreign businesses. To assess that hypothesis, we assume a positive relationship between taxes raised by a particular government and the variable central government revenues. The variable central government revenues expressed as a percentage of GDP (TAX_{it-1}) was thus used. Data for this variable, gathered from *International Financial Statistics* were used as a proxy for governmental attitude toward *FDI* within its borders. We assume a negative correlation with the dependent variables.

Finally, a variable capturing the effect of tariffs and a variable measuring the impact of social and cultural similarity between the EU and the U.S are introduced. Tariffs and other aspects of trade barriers can deter the competitiveness of exports, therefore forcing *FDI* [Schmitz and Bieri (1972)]. Tariff reduction took place at the Tokyo Round, where according to Ethier (1983), post 1979 tariffs between the EU and the U.S. were reduced by one third. Accordingly, our variable takes the value 1 for the years 1977, 1978 and 1979 and the value .67 thereafter. A second variable, accounting for greater cultural proximity between the U.S. and the U.K was also introduced in the models as a dummy variable taking the value one for the U.K. and zero for all other countries [see Kravis and Lipsey (1982)]. The last two variables are symbolized by TAR_t and CUL_i respectively.

In addition to explaining U.S. *FDI* in the EU, the model includes characteristics for the European countries and for the investing country. This model is tested because we share Culem's (1988) opinion that "a firm is simultaneously confronted by both domestic and foreign investment opportunities, this is a priori a more realistic specification." The mathematical expression for the model is given by:

Equation 3

$$Y_{it} = a_0 + a_1 GNP_{t-1} + a_2 [g_{GNP_{it-1}} - g_{GNP_{ust-1}}] + a_3 [WP_{it-1} - WP_{ust-1}] + a_4 EXP_{it-1} + a_5 INTE_{it} + a_6 [GROSS_{it-1} - GROSS_{ust-1}] + a_7 [TAX_{it-1} - TAX_{ust-1}] + a_8 TAR_t + a_9 CUL_i + e_{it}$$

In this equation, $g_{GNP_{ust-1}}$ is the annual percent growth rate of U.S. GNP, WP_{ust-1} is the U.S. hourly wage corrected by hourly productivity, $GROSS_{ust-1}$ is lagged gross capital formation for the U.S and, TAX_{ust-1} is the proxy for the U.S. tax rates.

The sample thus pools cross-section and chronological annual data. It covers 13 years, 11 European countries and the U.S. with 10 variables per country. Selected mean averages for the sample are presented in Panels A and B of Table 1.

Evidence reported in Table 1 shows that the average amount of U.S. *FDI* in the EU reached \$9,222 million over the period under investigation. U.S. *FDI* is the largest in the U.K. (\$33,109), Germany (\$17,067), the Netherlands (\$9,520) and France (\$9,113). This first observation confirms the findings of Beer and Cory (1994). Studying a sample of the largest U.S. companies located in the EU, Beer and Cory (1994) found that these companies tended to locate in the 4 countries listed above.

TABLE 1
U.S. FDI Position In The EU: Mean Averages

Panel A

	GNP (\$bn)	WAGE (index)	PROD (index)	EXP (\$bn)	RATE (%)	TAX (%)	GROSS (\$bn)
U.S.	3,521	89	95	–	8	20	546
Belgium	90	89	99	55,623	10	44	16
Denmark	58	90	92	18,210	15	38	11
France	444	81	99	113,773	–	40	112
Germany	684	93	98	208,068	6	29	139
Greece	32	100	99	4,990	–	36	6
Ireland	10	81	95	10,616	12	40	2
Italy	413	78	102	85,330	14	34	88
Netherlands	136	92	106	73,032	7	51	27
Portugal	27	122	112	10,014	–	36	7
Spain	250	120	109	36,558	11	29	55
U.K.	229	85	98	103,247	11	37	40
EU	226	88	99	72,241	11	38	50

GNP is the Gross National Product. WAGE is the wage index and PROD the hourly productivity index. EXP refers to U.S. exports to an EU country. RATE is the nominal interest rate. TAX is the proxy used for taxes. GROSS refers to gross capital formation. – is printed data were not available.

Panel B

	U.S. Manufacturing FDI (millions of \$ U.S.)	Total U.S. FDI (millions of \$ U.S.)
Belgium	3,162	5,951
Denmark	222	1,173
France	5,913	9,113
Germany	10,832	17,067
Greece	69	240
Ireland	2,654	3,431
Italy	3,979	6,007
Netherlands	3,987	9,520
Portugal	182	484
Spain	2,834	7,879
U.K.	13,848	33,109
EU	4,896	9,222

RESULTS¹⁰

Results are reported in Tables 2 and 3. Table 2 reports findings when the dependent variable is U.S. manufacturing *FDI*. Table 3 reports findings when the dependent variable is U.S. *FDI* in all businesses. These two tables are designed similarly. The first column contains the symbols pertaining to each independent variable. The second and third columns depict regression coefficients and t-statistics respectively. These coefficients are obtained when Generalized Least Square (*GLS*) is used. *GLS* was used because of a probable violation of the assumption of homoscedasticity, as is often

encountered with cross-sectional data. The violation of this assumption is due to significant correlations between residuals. These correlations can be expected to occur when dealing with a model such as ours. In that regard, Culem (1988) wrote: "Within a same year, *FDI* from a given country towards different host countries may be positively correlated due to the low growth rate of the home market compared to those observed in the rest of the world, or negatively correlated due to the fact that a country is attractive as a host of *FDI* while another is not."

TABLE 2
Determinants Of U.S. FDI In The EU Using
Manufacturing As Dependent Variable And Aggregate GNP

	Coefficients	t-statistics
GNP_{t-1}	.0909	2.2894*
$g_{GNP_{it-1}} - g_{GNP_{ust-1}}$	-.0235	-.7128
$WP_{it-1} - WP_{ust-1}$	.0399	.8251
EXP_{it-1}	.5661	10.3624*
$INTE_{it}$	-.1293	-2.4768*
$GROSS_{it-1} - GROSS_{ust-1}$	.0206	.5829
$TAX_{it-1} - TAX_{ust-1}$	-.0662	-1.5301
TAR_t	.0259	.5509
CUL_i	.6004	18.789*
R^2	92%	
$F-test$	91.37*	

*significant at least at 5%. GNP_{t-1} refers to market size, $g_{GNP_{it-1}} - g_{GNP_{ust-1}}$ to the size of aggregate demand differential, $WP_{it-1} - WP_{ust-1}$ to wages divided by productivity differential, EXP_{it-1} is exports corrected by GNP , $INTE_{it}$ refers to differential interest rates, $GROSS_{it-1} - GROSS_{ust-1}$ is the differential of gross fixed capital formation corrected by GNP , $TAX_{it-1} - TAX_{ust-1}$ is the tax rates differential, TAR_t is tariffs and CUL_i is cultural similarity. The Least square and the F-tests are from *OLS*.

TABLE 3
Determinants Of U.S. FDI In The EU Using Total FDI Per
Country As Dependent Variable And Aggregate GNP

	Coefficients	t-statistics
GNP_{t-1}	.0601	1.5261
$g_{GNP_{it-1}} - g_{GNP_{ust-1}}$	.0200	-.6106
$WP_{it-1} - WP_{ust-1}$	.0625	1.3020
EXP_{it-1}	.5012	9.2489*
$INTE_{it}$	-.0502	-.9702
$GROSS_{it-1} - GROSS_{ust-1}$	.0094	.2665
$TAX_{it-1} - TAX_{ust-1}$	.1018	2.3722*
TAR_t	.0328	.7208
CUL_i	.7504	23.9881*
R^2	93%	
$F-test$	92.95*	

*significant at least at 5%. GNP_{t-1} refers to market size, $g_{GNP_{it-1}} - g_{GNP_{ust-1}}$ to the size of aggregate demand differential, $WP_{it-1} - WP_{ust-1}$ to wages divided by productivity differential, EXP_{it-1} is exports corrected by GNP , $INTE_{it}$ refers to differential interest rates, $GROSS_{it-1} - GROSS_{ust-1}$ is the differential of gross fixed capital formation corrected by GNP , $TAX_{it-1} - TAX_{ust-1}$ is the tax rates differential, TAR_t is tariffs and CUL_i is cultural similarity. The Least square and the F-tests are from *OLS*.

As shown in Table 2, the regression coefficient for the variable used as a proxy for market size (GNP_{t-1}) is, as expected, positive and significant when the dependent variable is U.S. *FDI* in manufacturing only. This result is similar to that reported by Ajami and Ricks (1981). It confirms that market size is an important determinant of *FDI* in manufacturing. Findings depicted in Table 3 also show that when the dependent variable is U.S. *FDI* in all businesses, market size as proxied by GNP_{t-1} is positive but not significant. Similar findings were reported by Culem (1988). This might indicate that

TABLE 4
Determinants Of U.S. FDI In The EU Using Manufacturing
As Dependent Variable And GNP Per Country

	Coefficients	t-statistics
GNP_{t-1}	.177	5.6814*
$g_{GNP_{it-1}} - g_{GNP_{ust-1}}$	-.0037	-.1332
$WP_{it-1} - WP_{ust-1}$	.0921	2.2224*
EXP_{it-1}	.6807	14.104*
$INTE_{it}$	-.0857	-1.903*
$GROSS_{it-1} - GROSS_{ust-1}$	-.0176	-5.595*
$TAX_{it-1} - TAX_{ust-1}$	-.0432	-1.161
TAR_t	.0465	1.1926
CUL_i	.6151	22.234*
R^2	94%	
$F-test$	125.76*	

*significant at least at 10%. GNP_{t-1} refers to market size, $g_{GNP_{it-1}} - g_{GNP_{ust-1}}$ to the size of aggregate demand differential, $WP_{it-1} - WP_{ust-1}$ to wages divided by productivity differential, EXP_{it-1} is exports corrected by GNP , $INTE_{it}$ refers to differential interest rates, $GROSS_{it-1} - GROSS_{ust-1}$ is the differential of gross fixed capital formation corrected by GNP , $TAX_{it-1} - TAX_{ust-1}$ is the tax rates differential, TAR_t is tariffs and CUL_i is cultural similarity. The Least square and the F-tests are from *OLS*.

TABLE 5
Determinants Of U.S. FDI In The EU Using Total FDI
As Dependent Variable And GNP Per Country

	Coefficients	t-statistics
GNP_{t-1}	.0699	1.9594*
$g_{GNP_{it-1}} - g_{GNP_{ust-1}}$	-.0086	-.2710
$WP_{it-1} - WP_{ust-1}$	.0883	1.8694*
EXP_{it-1}	.5539	10.0577*
$INTE_{it}$	-.0297	-.5780
$GROSS_{it-1} - GROSS_{ust-1}$	-.0028	-.0794
$TAX_{it-1} - TAX_{ust-1}$	.1128	2.6556*
TAR_t	.0334	.7511
CUL_i	.7647	24.234*
R^2	92%	
$F-test$	94.95*	

* significant at least at 10%. GNP_{t-1} refers to market size, $g_{GNP_{it-1}} - g_{GNP_{ust-1}}$ to the size of aggregate demand differential, $WP_{it-1} - WP_{ust-1}$ to wages divided by productivity differential, EXP_{it-1} is exports corrected by GNP , $INTE_{it}$ refers to differential interest rates, $GROSS_{it-1} - GROSS_{ust-1}$ is the differential of gross fixed capital formation corrected by GNP , $TAX_{it-1} - TAX_{ust-1}$ is the tax rates differential, TAR_t is tariffs and CUL_i is cultural similarity. The Least square and the F-tests are from *OLS*.

the variable GNP_{t-1} is not a good proxy for size in all cases. It might also indicate that market size should not be measured by overall GNP since the EU is still largely fragmented. To assess the possibility of fragmentation, analyses were reproduced using GNP per country. Findings are presented in Tables 4 and 5.

As shown in these tables, the regression coefficients for GNP per country are now positive and significant for both dependent variables. Evidence accordingly seems to validate fragmentation, indicating that various barriers of trade might, to a substantial extent, divide the EU into separate national markets. The interpretation and the discussion that follow are based on the results presented in Tables 4 and 5.

Relative growth rate of the aggregate demand ($g_{GNP_{it-1}} - g_{GNP_{ust-1}}$) does not have the expected positive sign. It is negative although not significant for either model. Consequently, results do not indicate that U.S. investors tend to prefer fast growing markets. Our findings in this regard differ from those reported by Schmitz and Bieri (1972) and Culem (1988). This difference might be explained by the fact that we are relying on the period 1977-1989 and that the majority of previous studies use periods that overlap the creation of the EU. During some of these time periods, the market was developing faster or at least was expected to develop faster. To assess this potential explanation, additional data were gathered for some of the countries and growth rates were computed. Results show that for the majority of the countries sampled, growth rates have been decreasing. For instance, Germany's growth rate between 1970-1976 was 9%, but for the period studied it is only 6%.

Regression coefficients for relative wages divided by productivity ($WP_{it-1} - WP_{ust-1}$) are positive and significant in both models. Consequently, results indicate that *FDI* in the EU is not motivated by low labor costs. Similar findings are discussed by Culem (1988). Although negative coefficients were expected since they can easily be explained by the search for lower unit costs than at home, positive coefficients may indicate that investors tend to select locations characterized by higher labor cost than at home, suggesting that other locational advantages outweigh labor cost.

Regression coefficients for export (EXP_{it-1}) are positive and significant in both models. The positive significant coefficients observed indicate that greater U.S. exports to a particular country stimulate more *FDI* in that country. Results accordingly validate previously reported evidence indicating that *FDI* can be thought of as motivated by the defense of foreign market shares. Foreign markets might have been previously served through exports. The regression coefficient for interest rate differential ($INTE_{it}$) is negative and significant when the dependent variable used is U.S. *FDI* in manufacturing. The regression coefficient obtained when the dependent variable is U.S. *FDI* in all businesses, although negative, is not significant. Results accordingly show that controlling recorded *FDI* flows in manufacturing for relative interest rate differences is important. Lower interest rates in a country encourage investors to borrow funds in that country causing *FDI* flows to be lower for that country.

Relative gross fixed capital formation ($GROSS_{it-1} - GROSS_{ust-1}$), does not have the expected significant positive sign. The regression coefficients are negative in both models and significant when the dependent variable is U.S. investment in manufacturing. This evidence shows that overall locational advantages such as transportation infrastructure and pre-existing facilities may not be considered valuable locational determinants by U.S. investors. This evidence does not allow us to validate the hypothesis that U.S. companies favor investment in countries having a national advantage in gross fixed capital formation. This last result might show that the proxy used does not adequately measure human, physical and capital resources of a country or that other locational determinants outweigh the advantages captured by our proxy.

Regression coefficients for relative tax rates ($TAX_{it-1} - TAX_{ust-1}$) are negative and not significant when the dependent variable is U.S. *FDI* in manufacturing but positive and significant when the dependent variable is total U.S. *FDI* in the EU. As this finding is difficult to reconcile with economic reality, we examine the explanatory power of several additional variables that might be used as a proxy for tax rates. These additional variables are: (i) government deficit/surplus as a percent of gross domestic product (GDP)(DEFICIT), (ii) central government expenditures and lending as a percent of GDP (CENTRAL), (iii) domestic taxes on goods and services as a percent of government revenue (DOMES) and, (iv) taxes on international trade and transactions as a percent of government current revenue (INTER). The regression coefficients using each of these four proxies are reported in Table 6.

Evidence obtained is similar to that discussed above. Half of the regression coefficients are negative and not significant. The only significant coefficient is positive. It is obtained when using the variable DEFICIT in conjunction with the dependent variable "total U.S. *FDI* in the EU". Results accordingly do not validate the hypothesis that a particular country's government attitude toward inward international investment is a significant locational determinant for U.S. investors.

Regression coefficients for the variable *TAR*, measuring the effect of tariffs on U.S. *FDI* in the EU, are not significant nor negative for either model. Findings accordingly show that U.S. *FDI* in the EU does not follow a pattern consistent with the tariff discrimination hypothesis. The hypothesis states that to avoid trade obstacles resulting from the imposition

TABLE 6
Regression Coefficients Using Various Proxies For Tax Rates
(t-statistics In Parentheses)

	AFF	MAN
DEFICIT	.1188 (2.617)*	.0067 (.1839)
CENTRAL	-.0103 (-.1856)	-.0300 (-.7067)
DOMES	-.0706 (-1.1459)	-.058 (-1.162)
INTER	.0033 (.0941)	.00933 (1.5233)

In this table, AFF refers to total *FDI* in the EU, MAN to *FDI* in manufacturing only, DEFICIT to government deficit/surplus as a percent of GDP, CENTRAL to government expenditures and lending as a percent of GDP, DOMES as domestic taxes on goods and services as a percent of government revenue and INTER as taxes on international trade and transactions.

of a tariff, foreign investment is undertaken in a country to which it is difficult to export. One possible explanation for the lack of significance of that variable is the time period used in our study. Empirical support for the tariff discrimination hypothesis might exist when comparing U.S. *FDI* prior to the EU formation with U.S. *FDI* after the EU formation. Studies investigating longer time periods may show that increasing discrimination against the products of non-members, would cause increased foreign investment inside the EU.

Regression coefficients for the variable *CUL_i* are positive and significant for both manufacturing and total *FDI* in the EU. This validates previous findings by Culem (1988) and by Kravis and Lipsey (1982) showing that cultural similarities are important determinants of *FDI*. If we recall that the variable *CUL_i* was a dummy variable taking the value 1 for the U.K. and zero for the other EU countries, results might be interpreted as indicating that similarity of language is meaningful for U.S. investors. This element was discussed by Julian and Keller (1991). They stated: "MNCs have shown a preference for sitting R&D facilities in nations with a similar culture and language, which make sense considering the difficulties associated with operating any business in a different cultural and social environment."

CONCLUSION

We investigate U.S. *FDI* in 11 of the 12 EU countries for the 13-year period 1977 to 1989. In the models tested, we measure the effects of two previously unexplored locational determinants of *FDI*, infrastructure and taxes. Our models include the host country interest rate and characteristics of the home country. Finally, we investigate models using two different dependent variables, U.S. *FDI* in manufacturing and U.S. *FDI* in all EU businesses. Results of the study allow several comments.

First, findings do not allow the validation of the hypothesis that overall locational advantages such as transportation infrastructure and pre-existing facilities are considered valuable locational determinants by U.S. investors. Evidence obtained also shows that a particular country's government attitude toward inward international investment is not regarded as significant locational determinants by U.S. investors.

Second, results obtained validate previous findings by Culem (1988) and, Beer and Cory (1994): U.S. *FDI* is still largely concentrated in France, Germany, the U.K. and the Netherlands. Results indicate that some EU countries attract more *FDI* than others regardless of size. Investment clustering might be explained by various barriers to trade which, to a substantial extent, divided the EU into separate markets.

Third, results obtained also shed some light on the variables explaining U.S. locational preference. Findings show that U.S. *FDI* in the EU is motivated by defense of foreign market shares and cultural similarities. Results also show that controlling recorded *FDI* flows for relative interest rate differences is important.

Fourth, the hypothesis that various barriers to trade divided the EU into segmented separate national markets is supported. Results also indicate that U.S. investors do not tend to locate in fast growing markets and that U.S. *FDI* in the EU is not stimulated by the industrial climate. Finally, findings show that U.S. *FDI* in the EU does not seem to follow a pattern consistent with the tariff discrimination hypothesis.

ENDNOTES

1. These countries are: Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Portugal, Spain and the United Kingdom (U.K.).
2. The threat of the Soviet Union had encouraged small Western nations to huddle together.
3. Culem (1988) also introduces interest rates and the characteristics of the investing country in his model.
4. No information could be found for Luxembourg.
5. Manufacturing includes: food and kinderproducts, chemicals and allied products, primary and fabricated metals, machinery except electrical, electric and electronic equipment, transportation equipment and other manufacturing.
6. When the variables used in the analyzes are those traditionally used in the literature, our discussion was kept brief.
7. Notice that *FDIs* and exports can in theory be either substitutes or complements. The positive sign expected here means that we expect that more exports bring more *FDIs*. This positive sign is based on empirical findings from Culem (1988).
8. Treasury bill rates are used as proxies.
9. Culem (1988) relied on the same proxy.
10. Analyses have been reproduced with the exclusion of the newest EU members, Greece, Spain and Portugal. Findings were similar.

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