

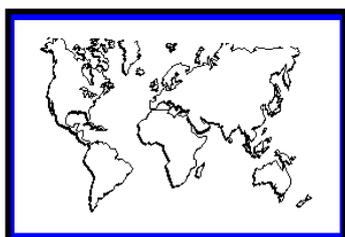
DOCUMENTOS DE ECONOMIA Y FINANZAS INTERNACIONALES

Foreign Direct Investment in a Process of Economic Integration: The Case of Spanish Manufacturing, 1986-1992

**Oscar Bajo-Rubio
Carmen López-Pueyo**

February 2002

DEFI 02/02



Asociación Española de Economía y Finanzas Internacionales

<http://www.fedea.es/hojas/publicaciones.html>

FOREIGN DIRECT INVESTMENT IN A PROCESS OF ECONOMIC INTEGRATION: THE CASE OF SPANISH MANUFACTURING, 1986-1992

Oscar Bajo-Rubio
(Universidad de Castilla-La Mancha)

Carmen López-Pueyo
(Universidad de Zaragoza)

Abstract

In this paper we analyze the main characteristic features of foreign direct investment (FDI) directed to Spanish manufacturing, both across industries and through time, for the years 1986-1992. During this period, Spain was one of the most important recipients of FDI inflows in the world, coinciding with the first years of integration into the European Union and the prospects about the completion of the Single European Market by 1992. To this end, a relative FDI measure is related to several industry indicators, as well as to some macroeconomic variables, which allows us to obtain a general characterization of FDI in Spanish manufacturing over that period.

Key words: Foreign direct investment, Spanish manufacturing industry, European integration

JEL Classification: F21, F23

1. Introduction

The period beginning around 1985 has witnessed what Graham and Krugman (1993) have called a surge in foreign direct investment (FDI hereafter), mainly among industrialized nations, with Southern Europe as one of its most important destinations in relative terms. The increasing importance of FDI at an international level is shown by its higher growth as compared to world trade and output in recent years. So, during the second half of the eighties FDI increased at a yearly average rate of 24 per cent, unlike world imports and gross domestic product which grew at rates of 6.5 and 3.5 per cent, respectively. In addition, the globalization of the multinational enterprise (MNE) activities, together with the efforts made by governments in order to attract FDI, show the role of FDI as a development factor, as well as its close linkages with trade, technology transfer, and financial flows (United Nations Centre on Transnational Corporations, 1991).

The Spanish economy was one of the most important recipients of FDI inflows during that period, coinciding with the first years of integration into the European Community (now European Union, EU), as well as the prospects about the completion of the Single European Market by 1992. Even though FDI has been historically a very important factor of economic development for the Spanish economy, the integration into the EU after 1986, together with the prospect of the Single European Market, have led to substantial changes in the strategies of foreign investors (Bajo-Rubio and Torres, 2001). In this way, the Spanish case might provide a relevant case study, with regard to the main patterns of FDI directed to a country experiencing a process of integration with other relatively more advanced countries.

As can be seen in Table 1, FDI directed to Spain during the period 1986-1992 was a 13.71 per cent of total FDI received by the EU, only below the United Kingdom (32.22) and

France (16.06). This meant a GDP share of around 2 per cent, the highest among the largest EU countries with the exception of the United Kingdom. Also, as Table 2 shows, the GDP share of the gross inflows of FDI, according to balance of payments figures, has grown from an average of 0.5 per cent during the sixties and seventies to 0.7 in the first eighties, reaching 1.8 per cent between 1986 and 1992. If we look at its share of gross capital formation (excluding construction), these developments have been even more impressive: 6 per cent during the sixties and seventies, 9 per cent in the first eighties, and 20.5 per cent between 1986 and 1992 (a period in which gross capital formation grew at a yearly average rate of more than 8 per cent).

On the other hand, manufacturing activities have been the traditional major recipients of FDI inflows (mainly in chemicals, motor vehicles, and machinery), and despite the recent higher relative increase of FDI in some services sectors (such as finance, insurance, and real estate), manufacturing FDI experienced a sustained growth in quantitative terms between 1986 and 1992: 171 per cent in real terms over the whole period, or a yearly average of almost 25 per cent. Regarding geographical distribution, the OECD area has been the almost exclusive source of FDI inflows during our period of analysis, with the EU accounting for more than 60 per cent of total. Also, FDI by foreign firms already established in Spain increased its share until more than 20 per cent of total, at the same time that the share of FDI from the United States fell quite strongly.

The purpose of this paper is to analyze the main features of FDI directed to Spanish manufacturing by means of econometric methods, both across industries and through time; a macroeconomic analysis of FDI, in a longer-time perspective, can be found in Bajo-Rubio and Sosvilla-Rivero (1994). The approach of this paper means a difference compared to previous available evidence on FDI in Spanish manufacturing (see the references below), which either

analyzed FDI in a particular year or, when focusing on a several years perspective, made use of descriptive statistics or multivariate analysis. To accomplish our objective, we have assembled a wide data set on several variables likely to influence FDI inflows (including proxies of scale economies and barriers to entry, locational advantages, as well as macroeconomic indicators), for 20 manufacturing sectors during the period 1986-1992. This data set is later used to investigate the main explanatory factors behind the huge increase in FDI inflows in Spain along those years. Recall that our period of analysis coincides with the first years of the Spanish integration into the EU, and is a rather homogeneous period in which the whole Spanish economy, and in particular manufacturing industry, experienced a sustained recovery after more than a decade of slump.

The rest of the paper is organized as follows. In Section 2 we discuss the specific hypotheses to be tested, based on the literature on FDI and MNEs, which will serve us as a theoretical framework for the empirical analysis. The econometric results are presented in Section 3. Finally, Section 4 summarizes the main findings of the paper.

2. Theoretical issues

There are several theories addressed to explain the internationalization of the firms' operations or, in other words, the emergence of the MNE [see, e. g., Agarwal (1980), Cantwell (1991), or Markusen (1995) for surveys]. Starting from Hymer's (1976) pioneering contribution, it has been stressed that MNEs must own some particular advantage over domestic firms in the host country market. Given such an ownership advantage, it must be beneficial for the MNE to internalise it within the firm by means of FDI, provided that the foreign country possess a location advantage over the home country making FDI more profitable than exporting. This is the essence of the well-known Dunning's "eclectic theory" or OLI (ownership-location-internalisation) paradigm; see

Dunning (1977,1993).

In this section we will present the hypotheses to be tested in the empirical part of the paper, which will be founded on the available literature on FDI and MNEs. Our basic framework of reference will be Dunning's OLI theory, although we will be also concerned with other more recent contributions. In this way, the variables used in the empirical analysis to proxy market structure characteristics have been grouped under two main headings: economies of scale and barriers to entry, and locational advantages. These two groups of variables would fit in a broad sense, according to Dunning's terminology, with ownership and internalization, and locational conditions, respectively. In addition, we have analyzed the role of several macroeconomic factors, i. e., a set of variables pertaining to the overall economic environment and common to all manufacturing sectors. In what follows we will discuss our theoretical hypotheses, as well as the particular variables used to represent them.

Economies of scale and barriers to entry

As noticed before, these variables would proxy the particular advantages possessed by MNEs over domestic firms in the host country market, as well as the incentive to internalise them within the firm by means of FDI.

Regarding the role of scale economies, new models of MNEs in an imperfectly competitive setting derive a negative relationship between the extent of plant-level, relative to firm-level, scale economies and FDI, since this would favor the internalization of MNEs' activities in a multi-plant setting (Brainard, 1993; Markusen and Venables, 1998). Several proxy variables for plant scale economies have been used in the empirical analysis, but the best results were obtained for

SCALE = degree of mechanization of the productive process, measured by gross fixed capital formation per employee

Another type of barriers to entry can arise from the presence of product differentiation. MNEs possess certain advantages in product differentiation activities with respect to the host country firms, coming mainly from two sources (Caves, 1974a). First, product differentiation implies developing some marketing skills, which eventually will become “public goods” for the firm and reduce the expected cost of FDI; and, second, there are spillovers derived from advertising activities, which spread from the home to the host country market. On the other hand, and together with advertising differentiation, we have considered a measure of “complexity” or technological differentiation (Caves and Williamson, 1985), so that a certain technological advantage enjoyed by a firm would mean an ownership advantage to be exploited by some kind of internalization. Product differentiation has been measured by

ADS = advertising expenditures as a percentage of sales

and

RDS = research and development expenditures as a percentage of sales

Locational advantages of the host country

There are several possible variables that would indicate those specific conditions of the host country market favoring FDI. Among them, we have selected labor skills, trade performance, labor costs, and industry growth.

Given the large scale of their operations and their need for worldwide coordination, MNEs must develop a high level of skill resources. Hence, FDI would arise as a way to give employment to

some underutilized skills (in marketing, management, technical efficiency, and the like) within the firm, to the extent that they are transferable abroad (Caves, 1974b). The important role played by the availability of skilled labor in the host country as a factor of attraction for FDI, has been also stressed in recent imperfect competition models of FDI (Zhang and Markusen, 1999). Labor skills have been measured by

$SKILL$ = research and development related personnel as a percentage of the industry's value added

On the other hand, it is commonly assumed that a MNE would invest in a foreign country only if costs (and in particular labor costs) of producing in that country are relatively lower than in the home country of the MNE. However, this would be true only if the technological advantages (in the broad sense of ownership advantages) enjoyed by such MNE are not portable (Maki and Meredith, 1986). In this way, if a MNE enjoys lower costs in its home country and can make use of these advantages also in the host country (that is, if technology is “portable”), then the firm might choose investing abroad despite the higher relative costs in the host country. In the empirical application we have used unit labor costs, i. e.,

ULC = ratio of hourly labor compensation to labor productivity (measured by hourly value added per employee, in real terms)

Regarding trade performance, the influence of this variable can change according to the strategy followed by MNEs. So, theoretical imperfect competition models would predict a complementary relationship between FDI and trade flows for the case of “vertical” MNEs, i. e., those separating geographically each stage of the production process according to relative cost advantages [as in, e. g., Helpman (1984) or Helpman and Krugman (1985)]. However, FDI and

trade might be substitutes rather than complements in the case of “horizontal” MNEs, i. e., those producing roughly the same product in different locations in order to gain an easier access to the host market [see, e. g., Brainard (1993) or Markusen and Venables (1998)]. Trade performance has been measured by export and import propensities

EXP = exports as a percentage of sales

and

IMP = imports as a percentage of apparent consumption (i. e., sales, plus imports, minus exports)

Finally, we will consider the role of market size on the decision of producing abroad, which has been emphasized in some contributions to the FDI literature [see, e. g., Rowthorn (1992)]. In relation to this, product demand would be one of the main factors affecting the location decisions of manufacturing firms, as shown in the recent models of economic geography [see, e. g., Krugman (1991)]. So, FDI in a particular industry would tend to increase with the growth of that industry, measured by

$IGROWTH$ = percentage yearly growth of the domestic market, proxied by apparent consumption (i. e., sales, plus imports, minus exports), in real terms

Macroeconomic factors

Unlike the variables discussed till now, which take a different value for each industry and year (i. e., they change both across industries and through time), macroeconomic factors would be common to all industries, changing only through time.

Among macroeconomic factors, we have first included the exchange rate, as well as

exchange rate expectations. According to the literature, a depreciation of the exchange rate should be coupled with higher FDI inflows, for a variety of reasons. So, for instance, assuming a Dixit and Stiglitz (1977) framework, an exchange rate depreciation would increase the domestic currency price of the imported varieties, so lowering demand elasticity for the varieties produced at home, and then increasing their price and profit rate, which would favor FDI inflows (Baldwin, 1988; Mann, 1993). Also, an exchange rate depreciation should increase the domestic currency value of foreign wealth, thus increasing FDI in the domestic country (Froot and Stein, 1991). In general, however, the effect of the exchange rate on FDI would not be fully unambiguous, depending on the configuration of the foreign investor's activities (Caves, 1989). Regarding exchange rate expectations, and by a similar reasoning, an expected exchange rate appreciation should be accompanied with FDI inflows: if the value of the domestic currency is "low" and is expected to appreciate, then the expected return on domestic assets would rise, as does the demand for them. Several possible measures of both the exchange rate and exchange rate expectations have been tried, but the best results (and those reported below) were obtained using

$EXRATE$ = nominal effective exchange rate of the peseta against the OECD

and

$$EREXP = (EXRATE_{t-1} + EXRATE_t) / 2$$

In addition, we have analyzed the role of the growth and inflation differentials of Spain *vis-à-vis* the EU. On the one hand, a higher relative growth of the host country's economy would mean a locational advantage leading to an increased level of sales in that domestic market. On the other hand, and taking inflation as a proxy of macroeconomic instability (reflecting the presence of internal economic pressures and inability to balance the budget or restrict money supply), FDI would be favored by a relatively lower inflation rate in the host country. Growth and inflation differentials have

been measured by

$DGROWTH$ = difference between Spain's and the EU's growth rates in real gross domestic product

and

$DINF$ = difference between Spain's and the EU's rates of change in gross domestic product deflator

The empirical model

The previous hypotheses have been tested for the case of FDI in Spanish manufacturing along the period 1986-1992. In particular, the estimated model is the following:

$$FDI_{it} = \mathbf{a}_1 SCALE_{it} + \mathbf{a}_2 ADS_{it} + \mathbf{a}_3 RDS_{it} + \mathbf{a}_4 SKILL_{it} + \mathbf{a}_5 ULC_{it} + \mathbf{a}_6 EXP_{it} + \mathbf{a}_7 IMP_{it} \\ + \mathbf{a}_8 IGROWTH_{it} + \mathbf{a}_9 EXRATE_t + \mathbf{a}_{10} EREXP_t + \mathbf{a}_{11} DGROWTH_t + \mathbf{a}_{12} DINF_t + \\ \mathbf{e}_{it}$$

where subscripts '*i*' and '*t*' denote industry and time, respectively, and \mathbf{e}_{it} is an error term. In the next section we will present some econometric estimates of this equation.

3. Econometric results

In this section we present the results of the econometric estimation of the above equation, using data for 20 manufacturing sectors during the period 1986-1992. The dependent variable in our empirical analysis is FDI inflows as a percentage of sales, according to investment projects reported to the Spanish Administration by statistical reasons. Notice that our sample period ends in 1992 given that the change in the Spanish National Classification of Economic Activities from 1993 on makes impossible to obtain some of our variables at the same level of sectoral disaggregation. The industry classification and data sources are presented in the Appendix.

Table 3 shows some alternative specifications of our empirical model. Notice that some variables have not been included together in the equations to estimate, given the high degree of collinearity between them; in particular, this was the case of technological differentiation and labor skills, and trade performance indicators. In this way, the technological differentiation and labor skill indicators appear in columns (1) and (2), and columns (3) and (4), respectively; whereas export and import propensities appear in columns (1) and (3), and columns (2) and (4), respectively.

The method of estimation is ordinary least squares (OLS) including fixed effects for every industry, so that the coefficients in Table 3 would be within-group estimates. Together with the standard error of the regression (σ) and coefficient of determination (R^2), we also present some diagnostic tests: FE is a test on the joint significance of the fixed effects (i. e., a test of the fixed effects model against the OLS model with all the individual effects assumed equal), distributed as a $F(19,110)$; and H is Hausman's test on the correlation between the individual effects and the explanatory variables (i. e., a test of the fixed effects model against the random effects model), distributed as a $\chi^2(6)$. The null hypotheses of the fixed effects equal to zero, and of no correlation between the fixed effects and the explanatory variables, are both rejected at the 1 per cent level of significance. In this way, the within-groups estimates would be consistent, and preferred to both the simple OLS and random effects models. On the other hand, the results presented in Table 3 have been obtained using the correction proposed by Newey and West (1987), which provides consistent estimates of the covariance matrix in the presence of heteroscedasticity and autocorrelation of the residuals to the estimated equations.

Looking first at our proxy of scale economies, the degree of mechanization shows a negative and significant relationship with FDI, which agrees with the results of Bajo-Rubio (1991) in a cross-

section for the year 1980, and would support our previous hypothesis on this variable. This result also agrees with the Irish experience, as can be seen in Barry and Bradley (1997), who report that FDI manufacturing inflows to Ireland have gone primarily into sectors with increasing returns to scale at the level of the firm. In addition, these authors notice that the competitive advantage enjoyed by MNEs in these sectors could be of particular importance for peripheral economies.

The evidence, however, is mixed for the product differentiation variables: technological differentiation consistently appears as one of the more characteristic features of those sectors receiving higher FDI inflows, unlike advertising differentiation, for which a negative but generally non-significant coefficient is found. The preference of FDI for industries with high or very high technological complexity during this period has been documented, among others, by Barrell and Pain (1997) for German and British FDI, or Barry and Bradley (1997) and Buesa and Molero (1998) for FDI inflows to Ireland and Spain, respectively.

Taken together the results obtained for scale economies and technological intensity of manufacturing sectors, they would point to the relevance of firm-specific advantages in explaining MNEs behavior (Brainard, 1997).

We turn now to the next group of variables, locational conditions of the host country. First of all, and in accordance with the previous result regarding technological intensity, our skill variable shows a clear significant association, of a positive sign, with the degree of FDI. This is a common feature to other similar studies for other countries (Caves, 1974b; Lall, 1980; Meredith, 1984; Ray, 1989; Mann, 1993; Barry and Bradley, 1997; Martín and Velázquez, 1997), and agrees with some previous results for the Spanish case (Bajo-Rubio, 1991; Egea-Román and López-Pueyo, 1991b; Alonso and Donoso, 1994). Interestingly, the higher skilled labor intensity of those industries more

penetrated by FDI might reveal a greater involvement in local sales relative to export sales by affiliates of MNEs in Spain, since the latter are primarily determined by international differences in relative factor endowments and prices (Markusen and Maskus, 2001).

On the other hand, we did not find a significant role for lower unit labor costs, which maybe could be interpreted so that their inter-industry variability is not great enough to lead to any significantly different FDI behavior. In any case, this result agrees with previous findings by several authors (Bajo-Rubio, 1991; Egea-Román and López-Pueyo, 1991a; Martínez-Serrano and Myro, 1992), and is also consistent with the international evidence on the subject [see, e. g., Aitken, Harrison and Lipsey (1996) or Martín and Velázquez (1997)].

Therefore, it would appear that MNEs investing in Spain would attach a higher value to the availability of a skilled and educated labor force, rather than to the relatively advantageous Spanish labor costs. For instance, Molero, Buesa and Casado (1995b), when studying the behaviour of German and Dutch MNEs affiliates in Spain during these years, find that the labor force skills would have played a much more relevant role than wage levels as a factor of attraction of FDI inflows. And these results would support Porter's (1986) argument that, when choosing a country to locate FDI, MNEs would tend to give a higher value to the availability of skilled labor and advanced infrastructure, rather than to cheap unskilled labor or natural resources.

According with the trade performance indicators, those manufacturing industries receiving higher FDI inflows would simultaneously enjoy higher export and import propensities. This result would reflect the more active behavior shown by both exports and imports in those industries (Bajo-Rubio and Torres, 2001), and would agree with other studies (Martín and Velázquez, 1993; Alonso

and Donoso, 1994) that also found higher export and import propensities for foreign-participated firms. However, as noticed by Martín and Velázquez (1993), the higher import propensity of foreign-participated firms might be partly due to the fact that they are also positioned in sectors that are more import-prone.

The coefficient on industry growth shows a positive sign and is always significant, supporting the hypothesis of the importance of the domestic market for FDI [see, e. g., Meredith (1984), Barrell and Pain (1997) or Ray (1989), and Martínez-Serrano and Myro (1992) for the Spanish case]. Notice that this fact would not be necessarily in contradiction with the higher export propensity found in those manufacturing industries receiving higher FDI inflows, since the latter result applies in relative terms. In other words, MNEs can be located in industries enjoying a larger domestic market, and, at the same time, show higher exports-sales ratios than domestic firms. This would be particularly plausible in the Spanish case given the still low involvement in international markets of Spanish firms during our period of analysis [see, e. g., Alonso and Donoso (1994)].

On the other hand, the different strategies of MNEs might be also reflected in these results. For instance, in their analysis of the behaviour of German and Dutch MNEs affiliates in Spain, Molero, Buesa and Casado (1995a) find that domestic market size would have been one of the main factors of attraction for German firms; however, accessing to foreign markets (especially, developing countries) through acquisitions of Spanish companies would have been determinant for Dutch firms. As noticed in Barry *et al.* (1997), the international experience shows that the elimination of trade barriers is a prerequisite for a country to attract potentially export-oriented FDI. But, unlike the Spanish case, where this strategy would have been combined with supplying the domestic market, in smaller economies such as Portugal or Ireland the priority given to the foreign

market would have been clear. However, in the Greek case trade liberalization would have not been a sufficient condition given the small attractiveness of other factors influencing FDI allocation (such as the lack of macroeconomic stability, infrastructures and human capital, or excess of bureaucracy).

Finally, regarding macroeconomic variables, higher FDI inflows seem to be associated with a depreciated exchange rate [as in Caves (1989), Ray (1989) or Mann (1993)] and, especially, with appreciation expectations [as in Mann (1993), but unlike Caves (1989)]. The role of exchange rate expectations on FDI would reflect the influence of favorable prospects on the evolution of the Spanish economy, stressing again the importance of a rigorous and credible macroeconomic policy in order to attract FDI inflows. This would have been of particular relevance for the Spanish economy during these years, since FDI meant a substantial addition to domestic savings and investment, as well as an important help to finance the current account deficits of that period. We also found the expected signs for the effect from both output and inflation differentials against the EU (the main source of FDI inflows), although non-significant at the conventional levels, providing only mild support to previous findings with aggregate data (Bajo-Rubio and Sosvilla-Rivero, 1994). This result would suggest that a growing and stable economy would be a prerequisite for a country to continuously receive FDI inflows, rather than a guide to MNEs decisions at the industry level.

4. Conclusions

In this paper we have analyzed the main characteristic features of FDI directed to Spanish manufacturing during the years 1986-1992. This period coincided with the first years of the Spanish integration into the EU, and the prospects about the completion of the Single European Market by 1992. This process was accompanied by a great amount of FDI inflows directed to the Spanish economy, one of the favorite destinations of FDI during those years. Overall, the Spanish experience

might provide some interesting lessons about the main patterns followed by FDI inflows, for countries experiencing a process of integration *vis-à-vis* other relatively more advanced countries.

In general terms, our results would stress the important role which, regarding the sectoral allocation of FDI, would be played by factors such as better labor skills, the extent of product differentiation (especially technological differentiation, as opposed to that based on advertising), or a higher productivity; all of them related to Dunning's (1977,1993) ownership and internalization advantages. Also, we found a higher FDI share in those industries with lower scale economies at the plant level, supporting the hypothesis put forward by Brainard (1993) and other authors in the context of models on horizontal FDI. The importance of a growing domestic demand on the location decisions of MNEs, as shown by their higher involvement into the most dynamic sectors, has been also stressed in the literature [see, e. g., Krugman (1991) or Rowthorn (1992)]. On the other hand, our results would point to a complementary relationship between FDI and trade, which agrees with the predictions from the models on vertical FDI, but also with those from the models on horizontal FDI in some particular situations. However, the non-significant role found for unit labor costs would not support the hypothesis, derived from the vertical FDI models, on cost differences as the main factor behind the allocation of FDI. Finally, the results obtained for the role of the exchange rate (i. e., higher FDI inflows associated with a depreciated exchange rate and an expected appreciation) would confirm the predictions from the models quoted above, both from a portfolio selection perspective and the industrial organization models.

To summarize, the results from this paper would agree with the greater importance given more recently to knowledge-based assets, rather than to physical capital assets, as the key element giving rise to FDI (Markusen, 1995). In this sense, FDI would be an important channel for the

diffusion across borders of ideas and technologies. Finally, while the main features of the sectoral allocation of manufacturing FDI would agree in many aspects with the Irish experience [see the results summarized in Barry and Bradley (1997)], FDI in Spain would have shown a greater orientation towards the domestic market. This fact (compatible, however, with a higher relative involvement in international markets than domestic firms) would be clearly related to the greater size of the Spanish market.

Appendix. Industry classification and data sources

The definition of sectors, and its correspondence with the *Encuesta Industrial* (Industrial Survey) published by the Ministry of Industry, as well as the 1974 CNAE (National Classification of Economic Activities) is as follows:

Sectors	Encuesta Industrial	CNAE
1. Ferrous metals	10,11	22
2. Non-metallic mineral industries	13 to 18	24
3. Chemicals	19 to 30	25
4. Metallic products	31 to 35	31
5. Mechanical equipment	36, 37	32
6. Office and data process	38	33
7. Electrical machinery	39	34
8. Electronic material	40	35
9. Motor vehicles	41	36
10. Shipbuilding	42	37
11. Other transportation equipment	43 to 45	38
12. Precision instruments	46	39
13. Food, beverages and tobacco	47 to 64	41, 42
14. Textiles	65 to 68	43
15. Leather	69, 70	44
16. Footwear and clothing	71 to 74	45
17. Timber and cork	75 to 79	46
18. Paper and publishing	80 to 82	47
19. Rubber and plastics	83, 84	48
20. Other manufacturing	85 to 89	49

Notice that the change in the CNAE occurring at 1993 entailed a deep transformation into the *Encuesta Industrial*, which prevented us from using those variables coming from that source, at our original sectoral disaggregation after that year.

Regarding the data sources, most of the industry variables are taken from the *Encuesta Industrial*, published by the Ministry of Industry and Energy, except for the data on:

- R&D expenditures and personnel, taken from the *Encuesta sobre actividades de I+D*, published by the National Institute of Statistics.
- Exports, imports and FDI, obtained from the State Secretariat for Trade, of the Ministry of Economy and Finance.

Finally, the macroeconomic variables come from the *Boletín Estadístico* of the Bank of Spain.

Acknowledgements

The authors wish to thank to Holger Görg, an anonymous referee, and the editor for helpful suggestions, as well as to Pablo Lozano-Chavarría for very able research assistance. Financial support from the Spanish Ministry of Education through the Projects PB98-0546-C02-01 and SEC96-0524 is also gratefully acknowledged.

References

- Agarwal, Jamuna P. (1980) Determinants of foreign direct investment: A survey, *Weltwirtschaftliches Archiv*, **116**, 739-773.
- Aitken, Brian, Harrison, Ann and Lipsey, Robert E. (1996) Wages and foreign ownership. A comparative study of Mexico, Venezuela, and the United States, *Journal of International Economics*, **40**, 345-371.
- Alonso, José Antonio and Donoso, Vicente (1994) *Competitividad de la empresa exportadora española*, ICEX, Madrid.
- Bajo-Rubio, Oscar (1991) Determinantes macroeconómicos y sectoriales de la inversión extranjera directa en España, *Información Comercial Española*, **696-697**, 53-74.
- Bajo-Rubio, Oscar and Sosvilla-Rivero, Simón (1994) An econometric analysis of foreign direct investment in Spain, 1964-89, *Southern Economic Journal*, **61**, 104-120.
- Bajo-Rubio, Oscar and Torres, Angel (2001) *The impact of Spain's integration with the EC on trade and foreign investment*, The Wroclaw University of Economics Press, Wroclaw.
- Baldwin, Richard (1988) Hysteresis in import prices: The beachhead effect, *American Economic Review*, **78**, 773-785.
- Barrell, Ray and Pain, Nigel (1997) Foreign direct investment, technological change, and economic growth within Europe, *Economic Journal*, **107**, 1770-1786.
- Barry, Frank and Bradley, John (1997) FDI and trade: The Irish host-country experience, *Economic Journal*, **107**, 1798-1811.
- Barry, Frank, Bradley, John, Hannan, Aoife, McCartan, Joanne and Sosvilla-Rivero, Simón (1997) *Single Market Review 1996: Aggregate and Regional Impact: The cases of Greece, Ireland, Portugal and Spain*, Kogan Page, London and Office for Official Publications of the European Communities, Luxembourg.

- Brainard, S. Lael (1993) A simple theory of multinational corporations and trade with a trade-off between proximity and concentration, Working Paper 4269, National Bureau of Economic Research, Cambridge, MA.
- Brainard, S. Lael (1997) An empirical assessment of the proximity-concentration trade-off between multinational sales and trade, *American Economic Review*, **87**, 520-544.
- Buesa, Mikel and Molero, José (1998) *Economía industrial de España. Organización, tecnología e internacionalización*, Civitas, Madrid.
- Cantwell, John (1991) A survey of theories of international production, in Christos N. Pitelis and Roger Sugden (eds.) *The nature of the transnational firm*, Routledge, London, 16-63.
- Caves, Richard E. (1974a) Industrial organisation, in John H. Dunning (ed.) *Economic analysis and the multinational enterprise*, Praeger, New York, 115-146.
- Caves, Richard E. (1974b) Causes of foreign direct investment: Foreign firms' shares in Canadian and United Kingdom manufacturing industries, *Review of Economics and Statistics*, **56**, 279-293.
- Caves, Richard E. (1989) Exchange-rate movements and foreign direct investment in the United States, in David B. Audretsch and Michael P. Claudon (eds.) *The internationalization of U. S. markets*, The New York University Press, New York, 199-228.
- Caves, Richard E. and Williamson, Peter J. (1985) What is product differentiation, really?, *Journal of Industrial Economics*, **34**, 113-132.
- Dixit, Avinash K. and Stiglitz, Joseph E. (1977) Monopolistic competition and optimum product diversity, *American Economic Review*, **67**, 297-308.
- Dunning, John H. (1977) Trade, location of economic activity and the multinational enterprise: A search for an eclectic approach, in Bertil Ohlin, Per Ove Hesselborn and Per Magnus Wijkman (eds.) *The international allocation of economic activity*, Macmillan, London,

395-418.

Dunning, John H. (1993) *Multinational enterprises and the global economy*, Addison-Wesley, Harlow.

Egea-Román, M. Pilar and López-Pueyo, Carmen (1991a) Comportamiento sectorial de la inversión extranjera directa en España (1986-1989), *Información Comercial Española*, **696-697**, 75-92.

Egea-Román, M. Pilar and López-Pueyo, Carmen (1991b) Un estudio sobre la distribución geográfica de la inversión extranjera directa en España, *Información Comercial Española*, **696-697**, 105-118.

Froot, Kenneth A. and Stein, Jeremy C. (1991) Exchange rates and foreign direct investment: An imperfect capital markets approach, *Quarterly Journal of Economics*, **104**, 1191-1217.

Graham, Edward M. and Krugman, Paul R. (1993) The surge in foreign direct investment in the 1980s, in Kenneth A. Froot (ed.) *Foreign direct investment*, The University of Chicago Press, Chicago, 13-33.

Helpman, Elhanan (1984) A simple theory of international trade with multinational corporations, *Journal of Political Economy*, **92**, 451-471.

Helpman, Elhanan and Krugman, Paul R. (1985) *Market structure and foreign trade: Increasing returns, imperfect competition, and the international economy*, The MIT Press, Cambridge, MA.

Hymer, Stephen H. (1976) *The international operations of national firms: A study of direct foreign investment*, The MIT Press, Cambridge, MA.

Krugman, Paul R. (1991) Increasing returns and economic geography, *Journal of Political Economy*, **99**, 483-499.

Lall, Sanjaya (1980) Monopolistic advantages and foreign involvement by US manufacturing

- industry, *Oxford Economic Papers*, **32**, 102-122.
- Maki, Dennis R. and Meredith, Lindsay N. (1986) Production costs differentials and foreign direct investment: A test of two models, *Applied Economics*, **18**, 1127-1134.
- Mann, Catherine L. (1993) Determinants of Japanese direct investment in US manufacturing industries, *Journal of International Money and Finance*, **12**, 523-541.
- Markusen, James R. (1995) The boundaries of multinational enterprises and the theory of international trade, *Journal of Economic Perspectives*, **9**, 169-189.
- Markusen, James R. and Maskus, Keith E. (2001) Multinationals firms: Reconciling theory and evidence, in Magnus Blomström and Linda S. Goldberg (eds.) *Topics in Empirical International Economics: A Festschrift in Honor of Robert E. Lipsey*, The University of Chicago Press, Chicago, 71-95.
- Markusen, James R. and Venables, Anthony J. (1998) Multinational firms and the new trade theory, *Journal of International Economics*, **46**, 183-203.
- Martín, Carmela and Velázquez, Francisco J. (1993) El capital extranjero y el comercio exterior de las empresas manufactureras, *Papeles de Economía Española*, **56**, 221-234.
- Martín, Carmela and Velázquez, Francisco J. (1997) The determining factors of foreign direct investment in Spain and the rest of the OECD: Lessons for the CEECs, Centre for Economic Policy Research, Discussion Paper 1637, London.
- Martínez-Serrano, José Antonio and Myro, Rafael (1992) La penetración del capital extranjero en la industria española, *Moneda y Crédito*, **194**, 149-191.
- Meredith, Lindsay (1984) U. S. multinational investment in Canadian manufacturing industries, *Review of Economics and Statistics*, **66**, 111-119.
- Molero, José, Buesa, Mikel and Casado, Montserrat (1995a) Factors in the siting and commercial behaviour of multinational companies in Spain, in José Molero (ed.) *Technological*

innovation, multinational corporations and new international competitiveness. The case of intermediate countries, Harwood, Reading, 237-263.

Molero, José, Buesa, Mikel and Casado, Montserrat (1995b) Technological strategies of MNCs in intermediate countries: The case of Spain, in José Molero (ed.) *Technological innovation, multinational corporations and new international competitiveness. The case of intermediate countries*, Harwood, Reading, 265-291.

Newey, Whitney K. and West, Kenneth D. (1987) A simple positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix, *Econometrica*, **55**, 703-708.

Porter, Michael E. (1986) Competition in global industries: A conceptual framework, in Michael E. Porter (ed.) *Competition in global industries*, Harvard Business School Press, Boston, 15-60.

Ray, Edward John (1989) The determinants of foreign direct investment in the United States, 1979-85, in Robert C. Feenstra (ed.) *Trade policies for international competitiveness*, The University of Chicago Press, Chicago, 53-77.

Rowthorn, Robert E. (1992) Intra-industry trade and investment under oligopoly: The role of market size, *Economic Journal*, **102**, 402-414.

United Nations Centre on Transnational Corporations (1991) *World Investment Report*, United Nations Publications, New York.

Zhang, Kevin Honglin and Markusen, James R. (1999) Vertical multinationals and host-country characteristics, *Journal of Development Economics* 59, 233-252.

Table 1: FDI inflows in the EU, 1986-1992

	Yearly growth rates	% over total	% of GDP
Austria	31.60	0.80	0.35
Belgium-Luxembourg	60.93	8.33	3.16
Denmark	35.92	1.07	0.65
Finland	3.00	0.67	0.36
France	36.60	16.06	1.01
Germany	15.20	4.49	0.20
Greece	15.94	1.46	1.21
Ireland	69.33	0.52	0.89
Italy	-4.98	5.49	0.38
Netherlands	16.43	10.07	2.55
Portugal	41.25	2.02	2.31
Spain	25.35	13.71	2.11
Sweden	42.56	3.08	0.94
United Kingdom	11.24	32.22	2.35
EU-15	23.62	100.00	1.09

Source: OECD, International Direct Investment Statistics Yearbook 1997, and National Accounts. Main Aggregates

Table 2: FDI in Spain: Overall trends

	Yearly average value (1)	% of GDP (2)	% of GFCF (3)
1961-65	3.80	0.35	3.20
1966-70	12.70	0.60	6.50
1971-75	22.70	0.54	6.10
1976-80	55.60	0.47	6.40
1981-85	151.70	0.69	9.00
1986-92	826.50	1.77	20.50

Notes:

- (1) Gross inflows according to balance of payments figures, in billion pesetas
- (2) GDP = gross domestic product
- (3) GFCF = gross fixed capital formation, excluding construction

Source: Bank of Spain, *Balanza de Pagos*; and National Institute of Statistics, *Contabilidad Nacional*

Table 3: FDI determinants in Spanish manufacturing industries, 1986-1992

	(1)	(2)	(3)	(4)
<i>SCALE</i>	-3.03 ^b (-2.13)	-2.81 ^b (-1.99)	-2.65 ^c (-1.69)	-2.06 ^d (-1.38)
<i>ADS</i>	-0.40 (-1.00)	-0.39 (-0.94)	-0.60 ^d (-1.49)	-0.61 ^d (-1.51)
<i>RDS</i>	1.30 ^a (2.75)	1.44 ^a (3.19)	-	-
<i>SKILL</i>	-	-	4.26 ^b (2.01)	4.86 ^b (2.13)
<i>ULC</i>	2.22 (1.24)	0.94 (0.44)	1.24 (0.53)	0.04 (0.02)
<i>EXP</i>	0.11 ^b (2.33)	-	0.13 ^a (3.84)	-
<i>IMP</i>	-	0.11 ^d (1.57)	-	0.10 ^c (1.66)
<i>IGROWTH</i>	0.03 ^b (2.12)	0.02 ^c (1.79)	0.03 ^b (2.34)	0.02 ^c (1.71)
<i>EXRATE</i>	-0.22 ^d (-1.28)	-0.30 ^b (-1.98)	-0.19 (-0.93)	-0.27 ^d (-1.51)
<i>EREXP</i>	0.48 ^a (2.80)	0.51 ^a (3.04)	0.52 ^a (2.82)	0.56 ^a (3.15)
<i>DGROWTH</i>	0.12 (0.31)	0.13 (0.32)	0.17 (0.41)	0.12 (0.27)
<i>DINF</i>	-0.23 (-0.99)	-0.13 (-0.46)	-0.22 (-0.88)	-0.15 (-0.51)
σ	1.99	2.01	2.24	2.30
R^2	0.67	0.67	0.58	0.56
FE	5.63 ^a	5.49 ^a	3.88 ^a	3.42 ^a
H	38.70 ^a	36.59 ^a	28.51 ^a	22.42 ^a

Notes:

- (i) t-ratios in parentheses
(ii) a, b, c, and d denote significance at the 1%, 5%, 10%, and 20% levels, respectively