

**GLOBAL PRODUCTION and TRADE**  
**(THEORETICAL and EMPIRICAL ANALYSIS)**

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**1. Introduction: Complementarity Between Trade and Foreign Direct Investment**

The complementarity between international trade and production is an area little touched upon in international business literature albeit of great concern among economists.

In order to analyse the relationship between the two, first of all, the nature of foreign direct investments (henceforth FDI) must be looked at: market-seeking or defensive investments which are prone to generate trade-diverting effects substitute for home country's exports and probably host country's imports. Resource-seeking or offensive investments, on the other hand, complement trade due to their nature of being trade-creating. Some FDI specifically designed to take advantage of host country's production conditions in order to export to home-country markets as well as to third-country markets. That is to say, exports and foreign direct investment are different aspects of the same process of exploiting foreign markets after all: if the overall aim of the transnational companies (TNC) is to increase their control over international production, both are seen as all possible means of achieving the objective. The growth of host-country production will invariably involve the importation of components and related products or services (i.e. intra-firm trade). In addition, host-country production could involve greater efficiency through internal economies of scale and a larger market share through foreign trade multiplier mechanism. Referring to World Investment Report [1991], all those effects are called "*expansion effects*". At the same time, "*substitution effects*" will naturally occur as host-country production replaces home-country exports. As a result of this process, it is likely that expansion effects will outweigh substitution effects (p.68). In that sense, there is complementarity between exports and direct production rather than their substitution on the supply side.

However, there are sectoral differences in the impact of international production on trade. Foreign direct investment in manufacturing, the costs of serving markets and structure of international linkages within firms and between firms (e.g. vertical and horizontal forms

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of FDI) are likely to be important determinants of the degree to which international production is a complement or substitute with respect to international trade. For instance, in some industries (such as general machinery, electrical machinery, transportation and precision equipment), about three quarters of Japanese imports from Asia in 1986 were shipped by Japanese affiliates.

As the theory of foreign direct investment has yet to be improved, various aspects of the theory are also needed to be chosen as a study focus: the location determinants of FDI and its effects on the host-and home-country's trade relationships. For instance, the rapid growth of Japanese investment in UK, even if it is part of a trend for Japanese investors to increase overseas investment worldwide. The UK, up to know, has been the recipient of almost a quarter of the total Japanese FDI stock in the EC, increasing from £324.1 million in 1981 to £3629 million in 1989 [WID 1993]. Some [Oliver & Morris 1992] suggest that the destination of new Japanese investment is likely to follow closely the patterns of the 1970s and 1980s : at European level, the UK is likely to remain the most favoured destination (p.204). They also refer to Dillow's [1989] forecasts that Japanese manufacturers will account for 10 percent of British manufacturing output by the end of the century (p.202).

Referring to some studies [Panic & Joyce 1980 and Hughes 1986] which analyse the role of foreign multinationals, Hughes [1993] suggest that they may have a detrimental effect on UK trade performance as the UK net trade balance in manufactures become negative for the first time in 1983 (and remained so) (p.128). Ironically, Morris's figures [1988] also suggest that Japanese investment in the UK began on a significant scale only in the mid-1970s, and a sharp acceleration of investment in the mid-1980s [Oliver & Morris, p.117].

Those developments raise numerous questions concerning the determinants of Japanese foreign direct investment (JFDI) and its effects on British Manufacturing Industry (BMI). Thus, in my research, the aim is to analyse the determinants and trade impact of Japanese FDI on British Manufacturing Industry, which either substitutes for, or complements trade. In order to properly predict and assess the effects of FDI, this study will be based on an econometric model which is designed to examine the movements and main determinants of FDI in British Manufacturing Industry. As a result, empirical findings will enable us to see which motives are more explanatory in attracting FDI, and its implications for Britain's trade balance with the rest of the world.

## **2. Examination of the Literature**

This section explores the earlier works (econometric-based) concerning the specification of a model to identify the determinants of US foreign direct investment in the European Economic Community (EEC).

Whether we look at aggregate variables or micro data we must pay attention to the problem of where to place the new facilities. This is a subject of location theories. None of the models were, however, specifically derived from choice-theoretical consideration.

Much of the empirical work in this field has concentrated on whether market size, faster growth or shifts in trade policy in the European Union has been the main cause of attracting US investment to Europe.

Within the framework of the theory, the relevant market size variable is important and affects the location decisions of foreign firms for the best exploitation of economies of scale. EEC's Gross National Product (GNP) can therefore be considered as one of the determinants of US investment. In fact it may be the breakdown of internal barriers and faster growth significantly influenced the amount of US investment in Europe. Foreign investments which are sourced from market size and growth can be classified as offensive foreign investments. Defensive foreign investment, on the other hand, are based upon tariff-jumping hypothesis: when one country or country block imposes a tariff its capital-intensive good, it will induce an inflow of capital from the other country, that is to say, investment will **substitute** almost completely for trade. As foreign investors face numerous obstacles to their exports, it is assumed that foreign investment in Europe has stemmed from European integration. In other words, foreign investment takes place in the country or region which is difficult to export because of the obstacles such as tariff and non-tariff barriers to trade as formation of the EEC has changed the relative export prices between US and EEC and therefore increases intra-regional (EEC) trade.

Those three principal hypothesis have been posed as to motivation of US foreign investment in the EEC: size of market size in the receiving area, economic growth and tariff discrimination [Scaperlanda 1969, 1983; Lunn 1983]. The hypotheses are analysed within the framework of an investment demand model which is based on time-series data. Factors such as the relationship between cost of production and domestic price are not incorporated into the econometric models of the studies concerned.

The **market size** hypothesis is that foreign investment will take place as soon as the market is large enough to allow the capturing the economics of scale [Scaperlanda & Mauer 1969]. The measure of the EEC size of market is employed in these studies is the level of EEC Gross National Product (p.560). However, in its revision [Scaperlanda & Balough 1983], not only the value of output is used as an explanatory variable for direct investment, total output is taken as the value of sales of the foreign firms affiliated with US as well (p.384). Referring to Lipsey, they also suggested that the specification of the output market can further be improved if the 'market size' variable is not present market size, but rather the anticipated or potential demand (sales) for the output of direct investor's affiliates (p.384).

The second hypothesis is the **growth hypothesis** which is fundamentally based on the relation between the level of aggregate demand (GNP) and the **stock** of capital (total

investment) or total supply to satisfy this demand. When converted into **flow** terms, the relationship becomes similar to that expressed by the incremental capital-output ratio. In a flow context, the growth hypothesis should postulate a direct relationship between annual changes in the EEC's GNP and the annual flow of US direct investment. In other words, it is properly specified as the percentage rate of growth of GNP and foreign investment. Frequently, the hypotheses has taken the form of directly relating foreign investment flows to the relative US-EEC growth rates [Scaperlanda 1969, p.561]. The revision of his article [1983], the market growth variable also uses the more specific output measure-sales of the subsidiary. Therefore it reflects growth of subsidiaries outputs rather than growth of total output in the host area (p.384). The Lunn's revision article [1980] is also tested using a two-period lag of the change of sales (p.95).

As for the third category of hypothesis, it is called **tariff discrimination** hypothesis. Tariff and non-tariff restrictions impediment to trade increase, then, an implication of this hypothesis is that new US foreign investment will be undertaken in the EEC to which it is more difficult to adapt to the new obstacles. That is to say, this hypothesis is based on the assumption that increased effective discrimination will decrease imports from suppliers outside the discrimination area, namely US while simultaneously increasing intra-European imports.

The use of both flow and stock formulations of both and stock formulations of tariff discrimination incorporating the size of the market, growth and tariff discrimination arguments are specified in Scaperlanda's article [1969] using annual data for the period 1952-66 and employing the least-squares multiple regression technique as follows (p.562):

$$I = A_0 + A_1Y + A_2M + A_3\Delta M + A_4G$$

I= the annual change in the book value of US direct foreign investment in the EEC

Y= GNP of the EEC

$\Delta M = \Delta(E/T)$ , where

E= annual US exports to the EEC

T= annual exports from EEC countries to other EEC countries (intra-regional trade)

$\Delta M = \Delta(E/T)$

G = the general specification for three variations of the growth hypothesis:  $G_1$ ,  $G_2$ , and  $\Delta Y$ .

$G_1$  = percentage rate of change of EEC's GNP

$G_2$  = G divided by the rate of change of US's GNP

$\Delta Y$  = absolute annual change in Y.

The empirical tests of Scaperlanda & Mauer's study led to conclusion that only the size-of-market hypothesis can be supported statistically. Negative findings were discovered for all variants of growth and tariff discrimination hypotheses were rejected as not statistically significant regardless of the model and time period studied.

In his revision article [1983], the time period of the model was generally 1953-77, and used least squares method. His specified is as follows (p.383):

$$I_t = \alpha + \beta_1 PS_{t-1} + \beta_2 \Delta PS + \beta_3 TD + \beta_4 CD + u$$

$I_t$  = either the annual increase in the book value of US direct investment in manufacturing (this is equal to the annual change in US ownership of foreign affiliate firms which is a function of both capital outflows from parent to affiliated firm and the parent firm's proportion of the affiliates retained earnings) or the annual plant and equipment acquisitions by the foreign affiliates;

$PS$  = output variable measured by either GNP or the predicted value of sales of foreign affiliates of US manufacturing foreign investors;

$TD$ : tariff discrimination proxy (is measured by a dummy variable scheme that represents the progressive dismantlement of industrial tariffs on intra-EEC trade, and is defined as one minus the proportion of the original tariff rate in existence for the year).

$CD$ : dummy variables scheme to reflect the effects of the US capital control program (taking the value of 1 for the years 1968 to 1972 when the controls are mandatory and values of 0.1, 0.3, and 0.3 for the years of 1965, 1966, and 1967, respectively, when the controls were voluntary).

Scaperlanda's revised article reaffirmed the importance of market size in attracting US direct investment to the EEC. There was also rather consistent support for the growth of market size hypothesis.

In his first article [1980], Lunn altered Steven's specification by using changes in GNP instead of changes in sales in order to have a more comparable model to previous studies (pp.94-95), by using annual data from 1957 through 1970 and ordinary least squares.

$$I_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 G_1 + \beta_3 G_2 + \beta_4 NK_{t-1} + \beta_5 NK_{t-2} + B_6 X + e_t$$

$I_t$  = Direct foreign investment of US firms to foreign affiliates

$Y_t$  = GNP of the EEC

$G_1 = Y_t - Y_{t-1}$

$G_2 = Y_{t-1} - Y_{t-2}$

NK= Net fixed assets of US foreign affiliates owed in the EEC

X= is a proxy for trade barriers

Lunn's results differ from those of Scaperlanda and Mauer. Size of the market is an important variable in explaining US direct investment in the EEC, but not only significant variable. He suggested, then, the size of the market and tariff discrimination hypotheses are supported as is the growth of the market hypothesis with some reservations. These results also indicate that the formation of a customs union will alter the flow of direct investment since the size of the market and height of trade barriers will be affected by custom unions.

Lunn's revisited article [1983] take account of the period 1957-70 and is specified as follows:

$$I_t = \alpha_1 + \beta_1 Y_{t-1} + \beta_2 G_1 + \beta_3 G_2 + \beta_4 PE_{t-1} + \beta_5 PE_{t-2} + \beta_6 X + \beta_7 CD$$

Y=the GNP of the EEC

G=growth of GNP

PE=plant and equipment expenditures

X=a proxy for tariff barriers

CD=control variables

The pattern of coefficients of Lunn's subsequent study is similar to that reported in his first article. The results when CD is included are worse than when CD is not included.

None of those studies take account of profit differentials between US and the EEC as there was no significant difference in rates of return in the US and Europe.

However, in Coughlin's study [1991] which specified the location determinants of FDI within the US relates the profits of foreign manufacturing firms in different states to twelve independent variables for the period 1981-83.

The results of that study show that states with higher per capita incomes, a proxy for market demand, manufacturing density and government expenditures (fiscal incentives) attracted relatively more FDI. States with higher unemployment rate also attracted more FDI whereas higher wages deterred FDI. Higher unionization rates however were not associated with reduced FDI (pp. 680-681).

Scaperlanda and Lunn, in their studies, make suggestions to the extensions and modifications of current models. For example, the effects of European single market as a result of the Community's evolution and exchange rate changes as well as direct investment control programme should be included in the estimate of equation although it might be made more sophisticated.

### 3. The Theory and Motives Behind Japanese Foreign Direct Investment in British Manufacturing Industry

In the light of previous hypotheses and some empirical works, this section explores the motives behind attracting UK to JFDI albeit within the framework of locational theories to see whether there is any theoretical justification behind investment behaviours of Japanese firms in UK. I will later develop a model which will be build upon the earlier econometric models.

Similar to the behaviours of US investment in the EEC, much of the empirical work concerning those of Japanese investment has focused on whether market size, faster growth and shifts in trade policy in the European Union has been the main cause of attracting Japanese manufacturing investment to Europe. Once again, European Union GNP can then be considered as one of the determinants of Japanese investment. However, if the relevant market size variable is important why does Britain have the largest share of Japanese manufacturing investment by %27 and its export share 23% while Germany which is a large export market by 31% while receives a relatively smaller share (18%) of inward investment [Jetro 1991].

However, according to Dunning [1986] market size is still important to attract Japanese investment: UK was initially chosen because it offered one of the largest domestic markets in Europe for Japanese exports (e.g.video records) even though the locational determinants of JFDI differ by industry. In other words, they had initially set up in the UK to supply to local market (p.44).

As for the market growth argument, Dunning points out "UK shares of European sales of Japanese firms has fallen over time; and that increasingly, Japanese firms are viewing Western Europe as a single market. This has the important implication that supply (e.g.cost) and strategic factors are more likely to influence the locational choice of Japanese investors **than the size or growth of domestic markets;** and that for the electronics firms, at least, the UK has been (and is being) chosen as a site for production either because of its (perceived) favourable costs, and/ or because of agglomerative and other benefits offered by it" (pp.44-45). In other words, UK is chosen as a production base to secure a foothold for supplying goods to the EEC whose market size has substantially been increasing due to its evolution. As a result, Japanese firms have tended to shift their products that have already gained a large market share to their largest export markets. In doing so, Japanese firms set up their production facilities in UK when the expected costs of doing so is less than those involved in exporting to the region.

That argument justifies the locational theories of FDI, and provides rationale for the industrial and geographical pattern of Japanese investment in Europe. In the dynamic context of Vernon's product cycle theory, for instance, market size and growth are important determinants in attracting FDI. At the same time, closeness to the markets is important in satisfying the requirements of the markets since it allows firms to have a

greater responsiveness to the needs of local costumers. For non-standardised products, many of which involve labour-saving innovations this may be one of the major motives behind the attraction of UK to Japanese FDI. This process therefore changes industrial structure in the home-as well as the host-country. In the light of the theory, the new product is developed at home and exported to other developed countries until the product becomes more standardised and more human-capital endowed. Over time, firms shift their production abroad to free up resources for research of new products (i.e.the maturity stage of the product's life span). In sum, "the theory offers a stylized representation of the location of technological innovation and its subsequent international transfer or spread along the product cycle. Its model model is also a dynamic justification for complementarity between trade and production with both intra-and inter-industry specialization. The developments in TNCs strategies which aims at strengthening linkages within and between the firms (i.e.intra-and inter-firm trade) well qualify the argument of the locational theories of trade and investment" [Yilmaz 1994, p.907].

For those reasons, it may be believed to be applicable to the explanation of the determinants of Japanese outward investment in UK. It implies that FDI will eventually replace, or substitute for existing exports as they allow the parent firm in Japan to specialise on higher value added production. In the automobile sector, for example, Japanese firms are shifting abroad some of the most standardised, high volume production in order to concentrate on newer models at home. Similar tendencies are observed in consumer electronics, televisions and microwave ovens. Meanwhile, Japanese TNCs enters Britain in other manufacturing sectors (e.g.chemicals) through mergers to gain access to high British technology not through direct investments. It is characterised by large unlike in US by a low share of intra-industry trade in total trade, which accord well with the product cycle hypothesis. "Indeed only in one was there a substantial amount (over £1m) of intra-firm trade. This is a very different situation from that of US MNE activity, and reflects that Japanese investment centralise their plant capacity to capture the economies of large-scale production" [Dunning, p.47].

As a result, I include UK market size, market growth and one of the cost variables, UK net wages or unit labour cost in manufacturing industry (real wages/productivity) in my econometric model as explanatory variables. Indeed, some see the 1980s as a period both of major de-industrialisation in the UK and high productivity growth as well as high profitability [Hughes 1993]. The JETRO survey [1991] also shows that labour costs together with worker's skill in UK were important motives for the locational choice of Japanese investor in UK. My specification can further be improved if it the equation takes the form directly relating Japanese foreign investment stock to relative UK-EEC GNP.

Besides the importance of those variables, we should take account of the tariff-jumping hypothesis postulates that protectionism are likely to increase inward investment and thereby substitute almost completely for trade. As it is thought that Japanese investors see UK to secure a foothold for exporting goods to jump tariff and non-tariff barriers to EEC



trade, the trade diversion between Japan and EEC can be measured as the ratio of Japanese manufacturing exports to EC and to those from Britain to other EC countries.

Some [Oliver & Wilkinson 1988] argue that the rapid growth of Japanese investment in UK is partly reflects the effect of strong yen (p.117). In other words, the falling value of pound in relation to the yen can be considered as one of the determinants of JFDI. Therefore, the relative value of yen in terms of pound must also be considered as an explanatory variable. The effects of having left the ERM on the value of pound might be included in an econometric model.

Finally, the survey by JETRO [1991] indicates that investment incentives are left out as one of the motives of Japanese investors for choosing UK. Indeed, Ireland has traditionally offered enormous incentives, however only four percent of Japanese firms invest there. However, Coughlin [1991] found that larger promotional subsidies from governments to firms were associated with increased US FDI in the EEC. Some believe, in the dynamic context of FDI, incentives have only minor effect or accelerate the FDI, but not determine the location of FDI. Consequently, for the sake of my expanded model, I incorporate incentives as a regressor into my econometric model. Whether or not incentives exert any influence on investment decisions, they will have important policy implications, and in either case, an argument can be made for restricting them.

#### 4. An Expanded Econometric Model for the Determinants of JFDI in BMI

As my aim here is to predict and assess the determinants and effects of Japanese FDI on BMI, this section examines movements in FDI which enable us to estimate the investment elasticities at the manufacturing industry level. In doing so, we will develop an econometric model which is built upon the earlier models and derived from my choice-theoretical consideration. We will specify a single equation model, and completely abstract from the simultaneity problem. The single equation model is applied to BMI, using annual time series data, including static and dynamic formulations. It starts from the mid-1970s which Japanese investment in the UK began on a significant scale [Oliver & Wilkinson, p. 117] is believed to be the beginning of the accelerating process of TNC activities or globalisation. My model only includes the quantifiable incentives and some measures such as the tax exemption and other regional investment incentives as a regressor. For our estimates, firstly a multiple regression model is used as a general distributed lag model, and secondly it is reduced to the specific model. Then a one period lagged model in a log-form is represented as follows:

$$\ln IJ = \alpha_0 + \alpha_1 \ln Y_t + \alpha_2 \ln I_{t-1} + \alpha_3 M_t + \alpha_4 M_{t-1} + \alpha_5 \ln RER + \alpha_6 \ln W + \alpha_7 \ln TR + e_t$$

t = time trend

IJ = Japanese FDI stock in BMI as annual

Y = the GNP of Britain in constant prices (relative to other European Union countries)

M = E/T

E= annual Japanese manufacturing exports to EU; T=annual manufacturing exports from Britain to other European Union countries).

RER = real exchange rate for £ in terms of Yen (nominal exchange rate/relative price index)

W = index of relative real wages or unit labour cost (Net wages in manufacturing/productivity).

TR = total annual subsidies as proportion of annual investment flow (investment, regional development grants, selective financial assistance, tax rebates).

e = random error

As a result of empirical findings such as market size, growth, tariff, wage, incentive and other relevant elasticities of Japanese FDI, we will enable to find out which motives have played an important role in attracting Japanese manufacturing investment in Britain as well as its implications on British trade balance.

The emgirical findings will be disseminated subsequently.

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