CENTRE FOR RESEARCH ON GLOBALISATION AND LABOUR MARKETS

Anti-dumping, Trade Barriers and Japanese Direct Investment in the UK

by

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Abstract

During the 1980s and early 1990s when Japanese FDI in the UK grew rapidly, a range of non-tariff and natural barriers fragmented the European market and reliance on contingent protection measures increased markedly over this period. This paper explores which factors influence the distribution of Japanese inward investment across UK sectors, and the level of FDI in those sectors at a highly disaggregate sector level. In particular, we are interested in whether trade policy and anti-dumping actions have had a role to play in that distribution. The results give support to the hypothesis that trade barriers have acted as an incentive for Japanese direct investment in the UK; this has been mainly due to anti-dumping cases taken out against Japan, and to a limited extent VERs and tariff barriers. Anti-dumping cases against other countries have acted to reduce the level of Japanese.

Outline

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1   Introduction

Over the last decade, cross-border investment flows have grown more rapidly than cross-border trade, giving a major push to the internationalisation of production. The United Kingdom has played a major part in this development, both as a source of and host to foreign direct investment (FDI). The UK is the second largest recipient of FDI after the US, with 9% of the world inward stock, and the third largest outward investor after the US and Japan, with 12% of world outward investment stock (UNCTAD, 1995). To give some idea of the importance of FDI to the UK economy, the ratio of inward FDI flows to gross fixed capital formation was 10%, while the same ratio for outward investment was 18% in 1993. This is neither a unique nor a novel position for the UK. Its position as a key driver of international investment dates back to the nineteenth century.

In the period since the Second World War, the UK has been the most important host for inward investment into Western Europe, with around a quarter of the EU's stock in 1994 concentrated in the UK. For many years the key source country was the United States and investments from there still comprise the largest share of the UK's stock of FDI, and American firms are still the largest foreign employers of British labour. Since the 1980s, however, FDI from Japan has shown the fastest rate of growth. In addition, the UK is the largest recipient of Japanese investment in the EU, with around 40% of the Japanese investment stock located in the UK. The bulk of that investment has been in the services sector in general and financial services in particular. However, 35% has been in manufacturing and Japanese affiliates in the UK now employ more than 100,000 people: approximately 2.5% of the total manufacturing labour force in 1996.

An enormous literature has developed on the determinants of FDI in general and more recently the determinants of Japanese outward investment in particular. Dunning's (1977) well known 'eclectic paradigm' which emphasises the importance of ownership and locational advantages, together with internalisation needs has long been used as an organising framework. More recent work has concentrated on developing a formal theoretical framework and has continued to emphasise the role of locational advantages (see for instance Markusen 1984; Markusen and Venables, 1998).

Our focus in this paper is to explore which factors influence the distribution of Japanese inward investment across UK sectors, and the level of FDI in those sectors. In particular,

we are interested in whether trade policy and anti-dumping actions have had a role to play. That may seem a surprising focus since, as a member of the EU, the UK ought not to have an independent trade policy. In a legal sense that is indeed the case. However, during the 1980s and early 1990s when Japanese FDI in the UK grew so rapidly, a range of non-tariff and natural barriers fragmented the European market. In addition, over this period reliance on contingent protection measures increased markedly. Our purpose is to investigate whether the pattern of market fragmentation affected the pattern of FDI and to establish whether there were particular factors that influence investment by Japanese firms.

The remainder of the paper is organised as follows. Section 2 sets out the main features of Japanese investment in the UK and Section 3 reviews the literature on trade barriers and FDI. In Section 4 we examine the empirical literature prior to setting out our model in Section 5. Section 6 reports our results and Section 7 concludes.

2   Japanese FDI in the UK

As Figure 1 shows, Japanese inward investment in the manufacturing sector in the UK is small in comparison to either FDI from the US, or FDI from the rest of the EU. Nevertheless, it has increased five-fold in the 10-year period shown, from £300 million in 1987 to just over £1,400 million in 1996 partly explaining why it has received such a high public profile. There may be a number of additional reasons why Japanese investment has received so much attention. It is concentrated in a relatively small number of sectors; some of which provide a large number of jobs (automobile manufacturing) while others are technologically sophisticated (electronics). Japanese firms are perceived as innovative, in terms of both the technology they use, and in management techniques. Both raise the possibility of spillovers occurring from Japanese to domestic firms.

Japanese FDI in non-manufacturing, and in particular in financial services, has also increased sharply over the period, and in 1996 was four times larger than FDI in manufacturing. In addition, a large proportion is destined for the UK. As a result, Japanese investment has been held up as a major success story of the UK economy. Together these factors have combined to raise the profile of Japanese FDI in the UK.

Figure 1: Inward Manufacturing Stock in the UK
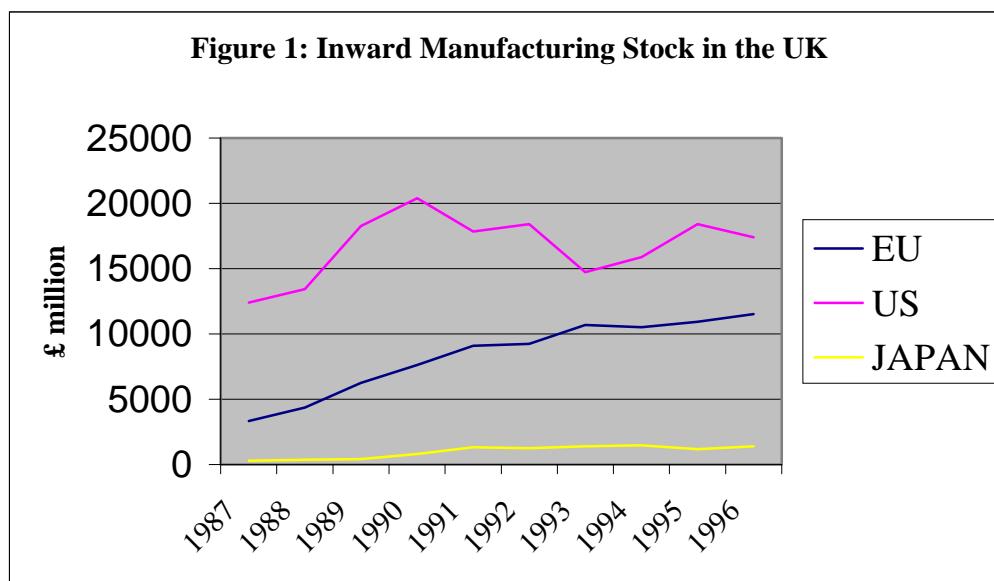
Source: JETRO (1997) and Onesource

Table 1 provides greater detail on Japanese FDI in manufacturing. The data shown reflect the number of Japanese manufacturing affiliates located in the UK, their employment, and their fixed assets.

Table 1: Japanese Manufacturing Firms in the UK

Year	Number of Firms	Employment	Total Real Fixed Assets (£ '000)
1988	94	56,099	960,488
1989	121	66,994	1,415,850
1990	152	83,335	1,691,731
1991	172	92,579	2,167,306
1992	200	104,715	3,866,882
1993	212	90,682	3,696,031
1994	230	94,988	3,579,133
1995	243	100,562	3,615,832
1996	237	105,938	3,958,406

Source: JETRO (1997) and Onesource

As it shows, the number of Japanese affiliates in the UK has more than doubled since 1988 and employment has nearly doubled. The largest rise in firm numbers was between 1988 and 1991 when more than 20 new firms a year were established. Real fixed assets have increased four-fold in the last nine years, indicating that individual investments have become more capital intensive over time. Average firm size in terms of fixed assets

increased from just over £10million in 1988 to over £16 million in 1996 in real terms[1], this has also been reflected in a five-fold increase in turnover. As a result, simple counts of the number of firms locating in the UK underestimate the rise in Japanese investment over time. Average employment per firm has actually shrunk over this period from around 600 in 1988 to 450 in 1996. To summarise, Japanese firms have become more capital intensive over the last nine years, but have shrunk in size in terms of employment. We will take account of this in our empirical model by using both employment and real fixed assets as indicators of Japanese FDI in the UK.

3   Trade Barriers and Foreign Direct Investment

A number of different approaches to the theory of multinationals point to trade barriers as a potential determinant of FDI, indeed it is one of the oldest explanations. In models based on firms looking to service the foreign market in the most cost-effective manner, tariffs act to raise the marginal costs of exporting relative to direct production abroad[2]. This leads to a substitution effect away from exports and a rise in what is often termed 'tariff-jumping' FDI. The prediction from such models is - the higher the tariffs to a market, the more firms will choose to service the market through local production rather than exports. Implicit in this approach is the assumption that exports and FDI are substitutes rather than complements.

In the case where trade and FDI are complements, trade barriers will act as a disincentive to both trade and FDI[3]. Empirical evidence indicates that multinational companies are more integrated in world trade than domestic firms (Aitken *et al*., 1997; Willmore, 1992). Restrictions on imports through tariffs will thus raise costs in multinational firms in particular, with the result that trade barriers may act to reduce trade and FDI[4]. Modelling investment and exports as alternatives or as co-determinants thus alters the view of the impact of tariffs on FDI. Whether they substitute or complement each other depends in part on whether FDI is horizontal or vertical in nature (Markusen, 1995; Helpman, 1984). In the case of horizontal investment, the multinational company (MNC) may aim to service the

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[1] The average statistics do not coincide with those in the table, as for some years firms are classified as 'existing', without having either employees or fixed assets. These have been excluded from the calculations. The large rise from 1991 to 1992 is due to the establishment of a large Toyota plant.

[2] Most of the theoretical literature concentrates on the case of tariffs. Levinsohn (1989) indicates that tariffs and quotas may be identical when markets are oligopolistic and open to FDI.

[3] For a discussion of the literature on trade and FDI as substitutes or complements see Pain and Wakelin (1998).

domestic market alone, and thus FDI is export substituting. If the foreign subsidiary is part of a vertically integrated MNC, FDI is likely to be trade creating, with the result that tariffs act to reduce both FDI and trade.

An alternative approach to FDI based on the eclectic paradigm (Dunning, 1977) indicates that trade barriers may influence the location of FDI, but alone they do not provide sufficient basis for a firm to become a multinational. Trade barriers confer a locational advantage to a particular country by reducing the feasibility of exporting and providing a protected domestic market. However, firms could still choose to license the product to domestic producers rather than undertake production themselves. The other preconditions of multinationality - ownership and internalisation advantages - are still required for a firm to become a multinational. However, the existence of tariffs can explain why the MNC chooses to locate in one country over another.

Instead of FDI aiming solely to jump tariffs, there is a theoretical literature that suggests FDI may also be aimed at defusing tariffs. In this approach (see Bhagwati *et al.*, 1987; Bhagwati *et al.*, 1992) trade and FDI are modelled as a two-stage game in which firms invest abroad in the first period (even though this may not be profitable) in order to reduce the likelihood of tariffs being applied in the second. This is referred to as *quid pro quo* foreign investment. Here, the threat of protection is predicted to lead to FDI, and in addition, FDI in turn influences trade policy in the following period[5]. One important hypothesis from these models is that the threat of protection may be as important as actual protection in leading to FDI.

Finally, the welfare effects of imposing a tariff in the presence of FDI have been analysed. The traditional literature on the impact of tariffs on welfare assumed FDI did not take place; however a more recent literature has extended the models to include FDI (Motta, 1992; Brecher and Diaz-Alejandro, 1977). The welfare effects appear to be clear: when tariffs are imposed and FDI takes place there is a rise in inefficient production, and a loss of tariff revenues (which may be replaced through domestic taxation). The net outcome is that welfare goes down. However, these welfare implications arise from models that make a number of assumptions concerning FDI. One is that no wage increases or technology

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[4] The important role of imported inputs also indicates it is imperative to use effective rather than nominal tariffs in any empirical study of the role of tariffs in FDI. This will be discussed in more detail later.
[5] Blonigen and Feenstra (1997) found some evidence for lagged FDI reducing the incidence of protection.

transfer to the host country takes place. Feenstra (1998) has criticised these welfare implications as naïve. He notes that along with the empirical evidence of spillovers from FDI to the host country, many developing countries are changing their policy stance from one of hostility to FDI to welcoming even tariff-jumping FDI.

4   The Empirical Evidence

The available evidence on the role of trade barriers in influencing FDI is mixed and in some cases contradictory. Two main approaches have been adopted. The first tests the import-substitution hypothesis by examining the relative shares of overseas production and exports in a foreign market. The second concentrates on estimating the determinants of FDI, rather than its share relative to exports. Different analyses can also be classified according to which trade barriers they have examined, and how they have measured them, including whether it is the threat of protection, or actual protection that prompts FDI.

4.1   Tariff Barriers

There appears to be some evidence in the case of the US for import substitution. Horst (1972) analysed both nominal and effective tariff rates in Canada, and their impact on the choice between exporting from the US and Canadian subsidiary production. He found both nominal and effective tariff rates to be significant factors in increasing the share of FDI relative to exports, but with a larger role for nominal tariffs[6]. Brainard, 1997, estimated a gravity model examining both bilateral trade and FDI in and out of the US. She found tariffs had a positive impact on both inward and outward affiliate production as a proportion of total foreign sales, and a negative impact on export shares. Grubert and Mutti (1991), using a weighted average tariff in manufactures, found tariffs (and taxes) to be important in determining the allocation of US FDI across countries. They found that tariffs encouraged local sales, but not sales to other countries through exports, indicating that in these cases FDI aimed to serve the local market rather than exporting either back to the home country or to a third market. In the presence of tariffs, it appears that FDI may substitute for exports.

More recent studies of US FDI have confirmed a role for trade barriers. Wheeler and Mody (1992) examined US FDI in manufacturing in the 1980s. They included one variable to

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[6] Grubaugh (1987) repeats Horst's analysis using a more appropriate functional form and found his results do not hold. He finds that firm-specific intangible assets provide the best predictor for a firm becoming a multinational using a sample of 300 US firms.

capture country openness using a principal components analysis to choose the variable, and another to reflect risk. The authors note that measures of government intervention including import restrictions, local content requirements, and controls on foreign investment tend to be highly collinear, so that economies which impose trade barriers are likely also to have controls on foreign investment such as profit repatriation and local content requirements. The authors find the openness variable to be negatively related to FDI, indicating that policy restrictions, whether they apply to trade or FDI, make a location more attractive to US multinationals. They cite Brazil and Mexico as examples of two countries that obtain low scores on the openness indicator, but may be attractive to foreign investors for other reasons. Culem (1988) extends the literature on the US by considering FDI flows among six industrialised countries – the US and five European countries. He includes a dummy variable for the dismantling of trade barriers over the period, and also finds it to have a positive and significant role in determining FDI flows. These results confirm that trade barriers may be one determinant of FDI, though other factors were also generally found to also play an important role.

As well as considering the determinants of US FDI to the rest of the world, much of the evidence attempts to explain Japanese FDI in the US. Here the results are more inconclusive. Some studies indicate that trade barriers have been important. For example Drake and Caves (1992) find that the Japanese share of new investments increases with US trade restrictions and Kogut and Chang (1991) found that a dummy variable for trade barriers such as quotas or VERs on Japanese exports had a positive impact on Japanese FDI. However, an extension of their model, Pugel *et al*. (1996), did not confirm their results. Pugel *et al*. (1996) included two different dummy variables for non-tariff barriers – one for traditional industries and another for industries in which barriers have been imposed more recently[7]. Only the latter was significant in explaining the intensity of Japanese FDI. The authors interpreted these sectors to be more important in the case of Japanese FDI to the US. Blonigen (1997) also found very little evidence of tariff jumping when examining Japanese acquisitions in the US from 1975-92, either in manufacturing or non-manufacturing.

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[7] The authors also tried including the tariff rate but found it not to be significant.

Attention has also been focused on Japanese investment in other countries, and especially in the European Union[8]. The discussion can be summarised by two opposing positions. Heitger and Stehn (1990) suggest that effective protection is the most important single factor in explaining the rise in Japanese investment. Thomsen and Woolcock (1993), on the other hand, suggest that the growth in Japanese FDI reflects the increasing maturity of some industries in Japan, and a desire to be close to the market. They note that Japanese FDI, exports and trade barriers are generally high in the same sectors, not necessarily indicating that FDI is substituting for trade in those sectors. Heitger and Stehn (1990) test their hypothesis. They calculate the effective protection given in West Germany in 1985 as a proxy for the whole EU. Unusually for studies in this area, their analysis is implemented for around 30 sectors. Two factors are considered – effective protection, and the revealed comparative advantage of Japan with respect to the EU. The interaction of the two is found to be positive and significant. The authors conclude that a combination of firm-specific assets (proxied by the revealed comparative advantage) and trade barriers explain Japanese FDI in the EU. Other studies, such as Neven and Siotis (1996) find no evidence of tariff-jumping FDI in the case of Japanese investment, though they do find some confirmation for tariff jumping by US multinationals in the EU. Once again, the evidence for Japanese FDI appears to be mixed.

As this brief overview has shown, the results are mixed, and appear to be sensitive to the individual characteristics of the analysis. A number of criticisms can be levelled at the methods generally adopted. First, most studies have been carried out at a highly aggregate level, either for the total manufacturing sector, or for a small number of broadly defined sectors (with the exception of Heitger and Stehn, 1990). This is mainly due to shortcomings in the data available on FDI. The main drawback with this aggregate approach is that tariffs vary considerably between products in the same sector. As a result, any aggregation of tariff rates across sectors fails to capture many of the important differences in tariffs across products. The same problem occurs with non-trade barriers such as anti-dumping legislation and voluntary export restraints (VERs) which mainly apply to a single product. More detailed studies at the level of the product, firm or plant are required in order to capture this variability.

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[8] See Yamawaki (1994) for a comparison between Japanese multinationals in the US and Europe.

A second drawback with much of the evidence relating to trade barriers is that tariffs and non-tariff barriers have been included in models of the stock of FDI (Caves, 1996). As the policy environment changes over time, it is unlikely that the trade regime at time t can explain the past stock of FDI accumulated prior to t. Using the change in the stock, or the change in employment in foreign-owned firms is more appropriate.

Many of the variables used to reflect tariff and non-tariff barriers are crude. In general, tariffs and non-tariff barriers are included as one of the determinants of FDI, with the former defined in either nominal or effective terms, and the second often included as a dummy variable taking the value of one in sectors noted as having high non-tariff barriers. In other cases, a simple index to capture variations in trade protection over time is used. Only a limited number of cases use effective protection, or the effective tariff level, which take account of the impact of tariffs on the input prices of firms, and thus capture the disincentive effect of tariffs for MNCs. In general, detailed information on trade barriers is not included; the aggregate nature of the analysis makes them superfluous.

4.2   Contingent Protection

Until recently the literature has focused almost exclusively on tariffs. As a result of successful GATT rounds tariffs have been lowered considerably over the post-war period. However, other forms of protection such as contingent protection and voluntary export restraints have become more widespread. Any analysis of the role of trade barriers needs to take account of these. Barrell and Pain (1999) have included the incidence of anti-dumping legislation in a model estimating the determinants of Japanese FDI over the 1980s. Their study is for a number of countries, and consequently considers total Japanese FDI in all industries and relates it to the discounted stock of anti-dumping cases taken out either in the EU or the USA. They found anti-dumping cases to be an important determinant of Japanese FDI. Blonigen and Feenstra (1997) attempted to separate the effects of actual protection resulting from anti-dumping actions from threatened protection. They found the latter to have an important role in determining Japanese FDI to the US. Actual protection had a significant impact on Japanese investment only in the case of non-acquisition investment.

The available evidence indicates that there may be differences in the way Japanese firms have responded to such cases depending on the market being protected. The evidence for the US indicates that anti-dumping cases have had only a small impact on Japanese investment in that country. Blonigen (1998) finds the number of employees in Japanese

affiliates in the US producing products that have been subject to anti-dumping investigation is as low as 5% of total US employment in Japanese affiliates. This is confirmed by a comparative study of Japanese affiliates in the EU and the US in electronics, which finds a much larger effect of anti-dumping cases on US FDI than European (Belderbos, 1997). After controlling for a number of other factors including firm and industry characteristics, market size and transport costs, Belderbos (1997) found that the initiation of anti-dumping cases was twice as likely to lead to tariff-jumping FDI in the EU than in the US.

Belderbos and Sleuwaegen (1998) confirmed these results for Japanese electronics firms in the EU, indicating that in the late 1980s Japanese FDI in Electronics had substituted for exports. There were some exceptions: if Japanese firms had invested in EU distribution activities, acquired EU firms, or produced components within a vertical *Keiretsu* structure, they were likely to have exported more to Europe. All these characteristics indicate firms that are vertically, rather than horizontally, integrated, when FDI and exports may be complements rather than substitutes. It appears that in this case import substitution may not have taken place, but for the majority of other firms trade restrictions acted to increase FDI, particularly in the EU.

The difference in the results for the EU and Japan may be due to the administrative review process in place in the US (Blonigen, 1998). This allows an anti-dumping duty initially imposed to be lowered if firms are judged to have complied over a given period by raising their price to what is deemed the 'fair' price. This gives firms an incentive, in some cases, to raise export prices rather than incur the fixed costs of direct production abroad. In the EU, no such review procedure occurs, and duties can be imposed for a longer period of time than in the US (Belderbos, 1997). As a result, anti-dumping actions in the EU act as a more serious deterrent to trade, and a (presumably unintended) consequence is that their application, at least in the electronics sector, has led to a rise in FDI in Europe.

4.3   Market Integration

The impact on FDI of dismantling trade barriers within a customs union, and the imposition of a common external tariff, has also attracted attention. The reduction in tariff and non-tariff barriers among members of the EU lessened the incentive for tariff-jumping FDI within the EU, and could have been expected to reduce intra-EU FDI; firms would now be able to achieve efficient scale within the single market by producing at a single location. However, FDI among EU countries increased considerably in the period from 1982-1993

when the single market was implemented (van Aarle, 1996; Yannopoulos 1990), indicating that at least in the case of FDI among European countries, tariff jumping was not the major motivation. For FDI originating outside the EU, the EU has become a more attractive location for a number of reasons. First, the potential market is now larger, allowing minimum efficient scale to be reached even in sectors where scale economies are important. Second, there is a potential concern over 'fortress Europe' i.e. an increase in outside protection may also act to encourage FDI within the EU. However, existing affiliates may restructure to take advantage of the larger market, where previously they aimed to serve a series of fragmented national markets. This could lead to a process of rationalisation of existing affiliates within the EU (Pearce and Papanastassiou, 1997).

5   The Empirical Model

We now turn to our investigation of how trade barriers - tariff and non-tariff barriers and anti-dumping actions - have affected the rise of Japanese FDI in the UK. As mentioned earlier, trade barriers are often highly specific, being placed on a single product, or group of products, with a high degree of variation occurring within each 2-digit industry. It is necessary to investigate trade barriers at a sufficiently disaggregate level to capture this variation. As we have data on firms, we could conduct our analysis at that level. However, anti-dumping duties in the EU may be applied not just to the individual firm, but to all firms originating in a particular country and exporting that product to the EU. This suggests that a highly disaggregated industry classification, may be the best level at which to undertake the analysis. In our analysis we use 223 sectors at the 4-digit level.

5.1   Market Variables

When a firm is considering whether to locate in the UK it takes into account a number of factors. These include the locational advantages of the UK market, including market size, the market growth rate, labour costs and features such as infrastructure and the supply of skilled labour. We capture these by including a variable for market size (SIZE), and for unit labour costs (ULC)[9]. Market size may act to attract investment in two different ways. One is a consumption effect, with a large level of final demand for the firm's product attracting a firm to a given location. Another is an agglomeration effect. MNCs may want to be based where there is a concentration of firms in a particular industry. The benefits to agglomeration may include technological spillovers, the availability of skilled labour,

infrastructure, and supplier links. Including output in a particular sector may capture both of these effects. Unit labour costs are included as an additional locational advantage. Some firms may be attracted to the UK by relatively low labour costs. Measuring labour costs as unit labour costs also takes productivity into account.

While agglomeration effects act to attract FDI, scale has the opposite effect. If a sector is characterised by a large minimum efficient size, firms may wish to keep production concentrated in the home country to exploit economies of scale rather than dispersing production activity over a number of countries. As a result a variable showing average size in the sector is included (SCALE), it is expected to have a negative relationship with Japanese FDI.

5.2   Japanese Advantages

In addition to the locational advantages specific to the UK, a further determinant will be the characteristics of the parent firms in Japan. Theory indicates that older firms and firms with high levels of intangible assets, are more likely to become multinationals (Markusen, 1995; Dunning 1977). As we are not conducting our analysis at the firm level, we need a proxy for the level of firm-specific assets at the sector level. In our case we have used an indicator of Japanese trade advantage with the rest of the world. The share of each sector's exports in total Japanese exports is calculated (XSHARE) and a positive relationship between this indicator of Japanese advantages and FDI is expected. Trade advantage has been widely used as a proxy for firm-specific advantages on the assumption that these are reflected in the trade patterns of the home country. Sectors with a comparative advantage may also be more mature, and thus be more likely to enter into direct investment (Vernon, 1966).

5.3   Trade Barriers

At the heart of our analysis is the role of trade impediments. Here we use three alternative measures. Clearly we want to include tariff barriers. We do so by having measures of both nominal and effective tariffs taken from Greenaway (1988) and Ennew, Greenaway and Reed (1990) for 1986. These were calculated for around 100 UK Input-Output industries and where necessary averaged across sectors. They are termed ETARIFF and NTARIFF. Second, we included a dummy variable for sector-specific voluntary export restraints (VER).

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[9] The variables are defined in Appendix 1.

To include anti-dumping activity, we drew upon a database of some 354 anti-dumping cases initiated between 1981 and 1993 as reported in Tharakan, Greenaway and Kerstens (1997). The cumulative number of anti-dumping actions brought in each sector reflects the threat of contingent protection. Not all these cases will result in anti-dumping duties being applied, but the threat may be enough to influence a firm's decision to enter a market by FDI rather than exports. The number of cases is accumulated over the period 1981-93 to capture the persistence of the threat over time.

As the threat of protection may recede over time, anti-dumping cases are weighted to give a 'stock' measure (see Barrell and Pain, 1999), in which the influence of past anti-dumping cases is discounted. Cumulative anti-dumping cases are thus given by:

$$CUMAD_{ts} = AD_{ts} + \sum_{i=1}^{n} (AD_{t-1,s}) / i$$

Where s is the market, t is for time t and n is the number of years. Cumulative anti-dumping thus relies on present cases, and a weighted average of past years, weighted by their distance from the present. During this period 28 of the 354 cases were against Japan. Cases taken out specifically against Japan and those taken out against all countries are included[10]. Sectors that have experienced a high level of anti-dumping legal activity, even if it was not directed specifically against Japan, may be those in which there is a credible threat of cases being brought. As a result, Japanese firms may be wary of exporting in those sectors, and prefer to invest abroad directly. Thus cases brought against other countries acts as a proxy for threat of potential contingent protection. Two anti-dumping variables are thus includes: ADJ which gives the cumulative anti-dumping cases against Japan, and ADOTHER which gives the cases against other countries.

In addition, another variable is included to capture the level of price variation in each sector in the European Union (SMP). A high degree of price dispersion across countries in a sector indicates that the market is segmented; as a result these sectors have the most to gain from the removal of internal barriers to trade such as standards. Sectors that have a low level of price variation are the most integrated, this indicates that a plant in any EU country

may be able to serve the entire EU market. We would therefore expect FDI to be attracted to sectors with high levels of integration (and thus a low level of price dispersion giving an expected negative relationship with the integration variable). The coefficient of price variation is not available annually, but can be obtained for 1985, 1990 and 1993.

5.4   The Data Set

The data set used in this study is based on the population of Japanese manufacturing affiliates in the UK. The sample has been assembled from two sources. The Japanese External Trade Organisation (JETRO) publishes an annual survey of the European operations of Japanese multinational companies in manufacturing. A Japanese affiliate is defined as one in which a Japanese firm has a share of at least 10%, although in practise most Japanese affiliates in Europe are majority owned (Yamawaki, 1994). The survey aims to be exhaustive, by using the previous year's list of firms, and by monitoring the establishment of new firms both in Japan and the UK. Our second source of data was Onesource, which provides data on all UK firms registered at company house and judged to be economically active. As we know the country of ownership of each firm in Onesource, we can build up a sample of Japanese-owned firms. Our sample matched almost perfectly: the 1997 JETRO survey named 223 Japanese manufacturing affiliates in the UK; Onesource covered all the firms from JETRO along with additional firms resulting in a sample of 248 firms. We used the latter as it covers a slightly later period and thus some firms might have been established since the JETRO survey. We are confident that this sample reflects as close as possible the population of Japanese firms in the UK.

Onesource provides us with firm-level data for the period 1988-1996 for all UK firms giving a panel data set. We aggregated the firm-level data to give 223 sectors at the 4-digit SIC level. Out of these sectors 77 had Japanese firms. As we want to explain the level of Japanese investment in the UK, we had a number of possibilities for the dependent variable. A count of the number of Japanese manufacturing firms was one possibility, but neglects the increasing size of those firms over time. In the end we opted for two dependent variables: employment in Japanese-owned firms, and their real fixed assets. The latter reflects the level of FDI from Japanese firms, whereas the former is of interest for obvious reasons.

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[10] See Appendix 2 for details of the anti-dumping cases. Cases against Eastern European were excluded as these are numerous, and probably do not reflect a credible trade threat to Japan but are motivated by separate

As the dependent variable is zero in the majority of cases (146 sectors have no Japanese firms) we estimate a Tobit model, which is suitable in the case of censored data. Four different models are estimated: with employment or fixed assets as the dependent variable, and with either effective or nominal tariffs as the explanatory variables. The relationship estimated is:

$$\text{JAPFDI}_{st} = f\ (\text{ULC}_{st},\ \text{SIZE}_{st},\ \text{SCALE}_{st},\ \text{ADJ}_{st},\ \text{ADOTHER}_{st},\ \text{SMP}_{st},\ \text{XSHARE}_{st},\ \text{VER}_{st},$$
$$\text{ETARIFF/NTARIFF}_{st})$$

Where JAPFDI is one of two dependent variables indicating the Japanese presence in the UK, either employment or fixed assets in Japanese subsidiaries based in the UK. The explanatory variables have already been defined and are for sector s at time t. Initially a Tobit model was estimated for all nine years pooled together, including time dummy variables to pick up omitted variables that vary over time such as exchange rate movements and the UK business cycle.

6   The Results

The results are given in Table 2 for the pooled Tobit model including time dummy variables. The results for the time dummies are not included for reasons of space; they are all significant with the exception of 1989 for both models. The results are only reported using effective tariff rates as the results are insignificantly different using nominal tariffs; this is to be expected as the two tend to be highly collinear[11].

As can be seen from Table 2, the results are broadly similar for the two dependent variables; only for two explanatory variables do they differ. They are VER the dummy variable showing the incidence of voluntary export restraints and quotas, and the effective tariff variable (this was also the case for nominal tariffs). The tariff variable is only significant in the case of the model with Japanese employment, and the VER variable only for the fixed asset model. It should be noted that these two explanatory variables have no variation over time, as neither forms of protection have varied over this nine-year period.

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region-specific reasons.
[11] We also experimented with specifying the SCALE variable using fixed assets rather than employment and this had no effect on the results.

Table 2: Pooled Tobit Models

	Employment		Fixed Assets	
	Coefficient	s.e.	Coefficient	s.e.
Constant	-2760.83***	430.29	-142537.40***	20317.32
ADJ	2179.67***	266.20	24402.89**	12473.89
ADOTHER	-282.26***	45.15	-4605.27**	2004.73
VER	-262.47	222.30	35427.94***	10189.24
ETARIFF	3318.94*	1763.78	56407.68	82283.45
XSHARE	145121.00***	8153.81	6573330***	378692.40
SCALE	-0.17	0.14	-3.83	5.94
ULC	339.54	281.37	17439.08	13102.38
SIZE	$9.80 \ 10^{-5}$***	$1.54 \ 10^{-5}$	$5.98 \ 10^{-3}$***	$0.71 \ 10^{-3}$
SMP	-73.14***	16.78	-3814.12***	804.29
N		1989		1989
Loglikelihood		-5781.37		-8072.17
Pseudo R^2		0.05		0.03

*** Significant at 1%; ** significant at 5%; * significant at 10%.

As we expected, cumulative anti-dumping cases against Japan (ADJ) have a positive impact on Japanese direct investment in the UK in terms of both employment and fixed assets. However, anti-dumping cases against other countries in the world (ADOTHER) have a negative impact on Japanese FDI in the UK; we expected it to indicate the potential protectionist threat against Japan, and thus to have a positive impact on Japanese FDI. An alternative explanation is that anti-dumping cases taken out against other countries act to increase Japanese trade rather than Japanese FDI, as they reduce the threat from competitors in export markets. There is only limited evidence for the importance of other barriers to trade in influencing Japanese FDI in the UK. These results indicate that anti-dumping cases are a more important cause than either tariff or non-tariff barriers such as quotas or VERs.

Another important variable in the model is the export share of Japan in each sector (XSHARE). As we expected this has a strong positive relationship to Japanese FDI in these sectors, indicating that Japan invests abroad in sectors in which she has a comparative advantage. In terms of the debate on whether FDI and trade are substitutes or complements, this relationship indicates that Japanese FDI and exports are both high in the same sectors.

The size of the domestic market (SIZE) in the UK also appears to have a positive impact on Japanese inward investment in terms of both employment and fixed assets. A large UK market in a product may indicate potential agglomeration economies, with easy availability

of inputs, technology and skilled labour. In addition, there may also be a well-developed market for the product in the UK. The significance of both the UK market size variable and the Japanese export share (included to show advantages already developed in the Japanese market) indicates that FDI responds to both the advantages of the host economy and the home economy.

The other two variables indicating conditions in the domestic market – scale and unit labour costs – are not significant. Scale has the expected sign, with large average scale acting as a disincentive to exports (as firms wish to locate all their production in one place and export in order to exploit economies of scale). Unit labour costs appear to have a positive relationship to FDI but this is not significant. Overall there is no evidence that the UK is attractive to Japanese FDI as a result of low labour costs.

Another variable that is significant is the SMP variable indicating the variation of prices in that sector over the EU. This has a negative relationship with Japanese FDI: i.e. inward investment from Japan is higher in sectors where prices have converged across Europe. Japanese firms appear to be attracted to sectors that are already integrated rather than remaining segmented into different national markets (which would have been indicated by a high coefficient of price variation with the EU).

6.1   A Two-Stage Approach

One drawback of the Tobit model is that it requires the explanatory variables to have the same impact both on the probability of a sector having some Japanese FDI, and on the level of FDI in those sectors. An alternative is to estimate a two-stage model, in which the first stage estimates the probability of having Japanese FDI in the sector, and the second takes those sub-sectors of firms that have Japanese FDI (around a quarter of the total) and estimates the level of FDI for those sectors. In the first stage a binary choice selection equation is estimated using a probit model. The dependent variable takes a value of one when there is FDI and zero when there is not. The same explanatory variables that were used in the earlier estimation are included with the exception of unit labour costs.

For the second stage the sub-set of sectors with Japanese FDI are taken. One difficulty with this stage is that there is selectivity bias as only the positive observations of the dependent variable are used. In order to take account of the selection bias a correction term taken from the first stage is included. This additional regressor is a function of the single index from

the first estimation. In the second stage not all the explanatory variables are included: scale, price dispersion across Europe and domestic market size are not included. It is assumed that these variables influence the distribution of FDI across sectors, the first stage of the estimation, rather than how much FDI those sectors have.

The results for the two-stage estimation are given in Tables 3 and 4. Once again two different dependent variables are used: employment in Japanese firms and fixed assets in Japanese firms in each sector respectively.

Table 3: Two-stage Heckman model with Employment

	First stage		Second Stage	
	Coefficient	**s.e.**	**Coefficient**	**s.e.**
Constant	-1.17***	0.11	-3870.64***	333.02
ADJ	0.74***	0.09	2396.78***	265.90
ADOTHER	-0.10***	0.02	-298.67***	45.73
VER	-0.10	0.07	-294.96	221.82
ETARIFF	1.31	1.60	3827.57	4776.85
XSHARE	52.84***	2.77	158414.80***	8206.85
SCALE	-1.10×10^{-04} ***	3.25×10^{-06}		
ULC			-10.07***	0.11
SIZE	2.92×10^{-09} ***	9.50×10^{-11}		
SMP	-2.77×10^{-03} ***	8.30×10^{-05}		
N	1989; Censored observations = 562; Uncensored = 1427.			
Loglikelihood	-5799.79			

Table 4: Two-stage Heckman Model with Fixed Assets

	First stage		Second Stage	
	Coefficient	**s.e.**	**Coefficient**	**s.e.**
Constant	-1.29***	0.12	-194759.20***	15499.32
ADJ	0.23***	0.09	33615.85***	12852.18
ADOTHER	-0.04***	0.01	-5527.82***	2086.14
VER	0.22***	0.07	31514.83***	10668.98
ETARIFF	-0.31	0.59	-61503.46	85306.78
XSHARE	51.90***	2.75	7502859.00***	387172.00
SCALE	-7.19×10^{-5}	4.95×10^{-5}		
ULC			-146.97	238.81
SIZE	3.14×10^{-9}	2.60×10^{-9}		
SMP	-2.39×10^{-3}	1.59×10^{-3}		
N	1989; censored observations=574; uncensored=1415			
Loglikelihood	-8110.89			

The main differences between the various estimations show up not so much between the first and second stages, but rather between using employment or fixed assets as the dependent variable[12]. Some variables remain the same across both dependent variables, namely the anti-dumping variables and export share. Other differences reflect the results of the earlier pooled Tobit model, for instance VER is positive and significant only for the fixed assets model, not for employment. However, the two-stage technique does result in some changes in the coefficients. Unit labour costs remain insignificant in influencing Japanese fixed assets, but in the case of employment have a strong negative impact in the second stage. This indicates that in terms of the level of employment in Japanese firms in the UK, high unit labour costs do act as a disincentive to employment. The same relationship cannot be found for fixed assets, perhaps indicating that the level of wages (and implicitly productivity) do not act as a deterrent for fixed assets but do for employment. This suggests that Japanese firms may choose a high capital to labour ratio partly as a result of high unit labour costs. This is consistent with the earlier descriptive statistics; they indicated that while average firm size measured in terms of employment has decreased, real fixed assets have increased by 60% on average. It appears that this difference is largely motivated by unit labour costs.

The other main difference in using the two-stage technique is that market size and EU price dispersion no longer appear to influence the level of Japanese fixed assets (though they remain significant for employment).

The consistency of the sign and significance of the joint explanatory variables between the two stages indicates that the joint variables have a similar impact both on the distribution of FDI among sectors and the level of FDI among those sectors with FDI. Importantly, the main results of the model appear to be robust to the choice of estimation procedure.

7 Conclusions

The main contribution of our study has been to consider the role of trade barriers in influencing Japanese direct investment at a highly disaggregate sector level. This level of disaggregation is appropriate given the targeted nature of many trade barriers such as voluntary export restraints, anti-dumping cases and tariffs. In addition, we have included a

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[12] The reason for any difference existing in the first stage between the two tables is that the sample is slightly different due to different missing observations for the second stage. Otherwise, given that the dependent

number of measures for trade barriers encompassing contingent protection measures as well as the more traditional barriers to trade. We have aimed to use the best measurements of these barriers by calculating effective as well as nominal tariffs.

The results give support to the hypothesis that trade barriers have acted as an incentive for Japanese direct investment in the UK, though this has been mainly due to anti-dumping cases taken out against Japan, and to a more limited extent VERs and tariff barriers. Anti-dumping cases against other countries have acted to reduce the level of Japanese FDI, possibly because they assisted Japanese exports in export markets by penalising competitors. Japanese firms also appear to be attracted to sectors that are integrated across Europe, indicating that the Single Market Programme has increased FDI in sectors in which is has been effective in eliminating price differences.

While these results partly support the claim of Heitger and Stehn (1990) that protection is an important factor in explaining the rise of Japanese FDI, other factors have also been found to play an important part. Most significantly, the pattern of Japanese comparative advantage (shown by export shares of different sectors) is a key factor in explaining Japanese FDI in the UK. Clearly Japan is investing abroad in sectors in which she already has a comparative advantage, indicating that factors in the home market, such as the maturity and development of the sector, are important in influencing FDI. In addition, the characteristics of the UK market also play a part. Japanese investment is attracted to sectors with a large market size, and unit labour costs appear to have negatively influenced the level of employment in different sectors. This may explain the rapid rise in real fixed assets per employee noted in Section 2. High unit labour costs appear to have influenced Japanese firms into favouring capital-intense methods of production in the UK.

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variable is binary, the probit model should be identical assuming there are no sectors with Japanese employment without fixed assets or vice versa.

Appendix One: Data definitions and sources

Variable Name	Definition	Source
Foreign employment	Number of employees in foreign-owned firms	Onesource, JETRO (various issues)
Foreign fixed assets	Fixed assets of foreign-owned firms	Onesource JETRO (various issues)
ULC	Unit labour costs i.e. total remuneration over total sales	Onesource
SCALE	Average firm size by employment	Onesource
XSHARE	Japanese exports in each sector over total Japanese exports	OECD Trade by Commodities SITC rev 3[13]
ADJ	Cumulated number of anti-dumping cases against Japan1981-93	European Commission
ADOTHER	Cumulated number of anti-dumping cases against all countries other than Japan 1981-93 excluding Eastern European countries.	European Commission
ETARIFF[*]	Effective tariff rates: see Greenaway (1988) and Ennew, Greenaway and Reed (1990)	
NTARIFF	Nominal external tariff rate for the EU in 1986	
SIZE	Total sales in the sector	Onesource
SMP	Coefficient of price variation at a sector level across the EU9 in 1985, 1990 and 1993; these year's values are attributed to the intervening years to give an annual series.	*The Single Market Review*, Subseries V vol 1 Appendix.
VER	Value of one when either a VER or quota in operation	Various

Notes:
1. All variables are at the SIC 4-digit level unless stated otherwise.
2. The definition of foreign ownership is taken from Onesource, which is based on information on firms lodged at Company House.

* Rate of effective protection with a single input:

$$e_j = \frac{(t_j - a_{ij} t_i)}{(1 - a_{ij})}$$

Where t_j – tariff on final good j, t_i – tariff on input i, a_{ij} – proportion of total price accounted for by inputs.

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[13] An official correspondence supplied by the Office of National Statistics was used to match the trade data to the SIC92 UK industrial classification.

Appendix Two: Anti-dumping cases against Japan 1981-93

Year of initiation	Frequency	Sector – NACE Definition
1981	1	Processing of plastics
1982	1	Manufacture of glass and glassware
1982 1983	2	Manufacture of other machinery and equipment
1983	1	Manufacture of other basic industrial chemicals
1983 1991	2	Manufacture of transmission equipment for motive power
1984	1	Manufacture of plant for mines, the iron and steel industry, and foundries, civil engineering and the building trade; manufacture of mechanical handling equipment
1984 1987 1987 1987	4	Manufacture of office machinery and data processing machinery
1985	1	Manufacture of optical instruments and photographic equipment
1987	1	Manufacture of other machinery and equipment
1988	1	Production and preliminary processing of non-ferrous metals
1989	1	Manufacture of electric lamps and other electric lighting equipment
1983 1989 1991 1991	4	Manufacture of other chemical products, chiefly for household and office use
1987 1987 1987 1987 1993	5	Manufacture of radio and television receiving sets, sound reproducing and recording equipment and of electronic equipment and apparatus; manufacture of gramophone records and pre-recorded magnetic tapes.
1991	1	Manufacture of electrical machinery
1984	1	Manufacture of chemicals obtained from petroleum (petrochemicals) and from coal
1990	1	Miscellaneous manufacturing industries

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