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JAPAN-EUROPEAN UNION BILATERAL TRADE: AN EMPIRICAL INVESTIGATION

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Abstract

The aim of this paper is to analyze the main determinants of the bilateral trade flows between Japan and seven countries members of the European Union. The analysis focuses on the importance of prices, activity variables, the inflows of Japanese Foreign Direct Investment (FDI) towards these European countries and the exchange rate fluctuations on exports and imports via the pass-through effect. The methodology adopted is the construction and econometric estimation of a model comprising of demand and supply equations. The analysis shows that a great part of bilateral trade between Japan and France, Germany and the Netherlands is of intra-industry type, while bilateral trade between Japan and Spain, Republic of Ireland and UK is of inter-industry type. Italy seems to show a dual behaviour. The analysis shows also that currency devaluation against the yen appears to affect the bilateral trade balance between Japan and four European countries, i.e. France, Germany, Italy and the Netherlands.

I. *Introduction*

Trade between the European Union (EU) member states and Japan has increased considerably over the last quarter of the century. In particular, total trade (imports plus exports) between the two regions increased from just below 4000 million dollars in 1970 to 93342 million by the end of 1994[1]. The pattern of trade of seven major EU states and that of the EU, taken as a whole, vis-a-vis Japan during the latter year appear in Table 1. From the information contained in the particular Table, one could identify two major elements. The first refers to the fact that the pattern of bilateral trade flows between the EU states included in Table 1 and Japan primarily involves manufacturing products (which include trade categories 5, 6, 7 and 8) and is quite similar across the member states. More specifically, almost all (99 per-cent) of Japanese exports to EU refer to manufacturing products with the category of Machinery and Transport Equipment (trade section 7) being by far the most dominant one accounting for 75 per-cent of total exports. Likewise, exports of the EU, taken as a whole, in manufacturing products to Japan are quite significant as well accounting for 86 per-cent of total exports. The Machinery and Transport Equipment category is the bigger one, representing 36.1 per-cent of total exports, in the case of EU exports as well. One could notice, however, that the EU manufacturing exports in comparison to those of Japan appear to be much more

[1] See IMF (1974) and OECD (1994).

TABLE 1. BILATERAL TRADE FLOWS BETWEEN EU MEMBER STATES AND JAPAN IN 1994* (Mil, of $).

Trade Classification**	France		Germany		Ireland		Italy		Netherlands		Spain		U.K		EU	
	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.	Imp.	Exp.
0	11.8	164.9	27.5	235.5	0.4	71	6.6	103.5	20.1	195.4	11.1	239.9	20.8	138	108.8	1713.8
	(0.14)	(3.6)	(0.13)	(2.13)	(0.03)	(6.62)	(0.17)	(2.55)	(0.42)	(14.6)	(0.34)	(24.4)	(0.15)	(3.14)	(0.17)	(5.35)
1	3.7	575.4	5.9	88.8	0.08	3.5	0.9	40.9	0.9	55.7	0.2	23.9	9	214.1	21.8	1062.8
	(0.04)	(12.6)	(0.03)	(0.8)	(0.01)	(0.3)	(0.02)	(1.01)	(0.02)	(4.17)	(0.01)	(2.43)	(0.07)	(4.87)	(0.03)	(3.4)
2	26.2	83.1	71.4	81	2.5	3.2	50.1	54.9	25.5	188.3	12	65	48.2	75.2	255.9	717.9
	(0.31)	(1.8)	(0.34)	(0.73)	(0.2)	(0.3)	(1.27)	(1.35)	(0.54)	(14.1)	(0.37)	(6.6)	(0.35)	(1.7)	(0.41)	(2.32)
3	9.9	6.7	20.3	9.9	0.1	0.4	135	8.8	0.2	2.6	2.4	0.01	6.8	19.9	72.1	55.8
	(0.1)	(0.15)	(0.1)	(0.09)	(0.0)	(0.04)	(3.4)	(0.22)	(0.0)	(0.19)	(0.1)	(0.0)	(0.0)	(0.45)	(0.1)	(0.18)
4	0.5	0.7	1.7	3.4	0.01	0.1	0.12	13.5	0.2	3.4	0.07	13.2	1.6	2.7	4.6	44.2
	(0.01)	(0.02)	(0.01)	(0.03)	(0.0)	(0.01)	(0.0)	(0.33)	(0.0)	(0.25)	(0.0)	(1.34)	(0.01)	(0.06)	(0.01)	(0.14)
5	643.2	914.4	1094.8	2476.6	81	535.8	435.3	284.5	355.5	314.3	238.9	57	471.7	860	3621.2	5941.4
	(7.6)	(19.95)	(5.2)	(22.4)	(6.6)	(50.0)	(11.0)	(7.0)	(7.5)	(23.5)	(7.4)	(5.8)	(3.4)	(19.5)	(5.8)	(19.2)
6	421	479.7	1111.1	626	32.4	43.8	352.1	827.5	260	97.6	215.7	120	827.5	573	3610.5	3583.6
	(4.9)	(10.5)	(5.3)	(5.7)	(2.6)	(4.09)	(8.9)	(20.4)	(5.5)	(7.3)	(6.6)	(12.2)	(6.0)	(13.0)	(5.8)	(11.6)
7	6077.6	1097	15812.8	6297.6	984.7	306.2	2584.3	768.2	3658.6	281.7	2305	310.2	10683.6	1611	46936.1	11173.6
	(71.5)	(23.9)	(75.6)	(56.6)	(80.0)	(28.6)	(65.3)	(18.95)	(77.0)	(21.1)	(70.9)	(31.6)	(77.9)	(36.6)	(75.2)	(36.1)
8	1309.6	1258.3	2666.3	1182.7	124.9	106.6	514.4	1923.8	432.6	191.1	463.3	146.5	1585.3	858	7580	5909.6
	(15.4)	(27.46)	(12.8)	(10.7)	(10.1)	(9.9)	(13.0)	(47.5)	(9.1)	(14.3)	(14.3)	(11.9)	(11.6)	(19.5)	(12.2)	(19.1)
9	2.1	2.3	97.6	55.4	5.5	1.4	0.07	27.7	0.7	5.5	0.4	6.5	55.3	48.8	168.6	245.7
	(0.02)	(0.05)	(0.47)	(0.5)	(0.4)	(0.13)	(0.0)	(0.68)	(0.01)	(0.41)	(0.01)	(0.66)	(0.4)	(1.11)	(0.27)	(0.8)
Total	8505.7	4582.6	20909.5	11056.9	1231.6	1072	3956	4053.4	4754.2	1335.6	3249.1	981.8	13709.8	4400.7	62379.4	30962.4

*Numbers in parentheses denote the percentage share of each trade category with respect to total exports to or imports from Japan.

**The numbers in the first column of the table correspond to the sections of the standard international classification of trade.

Source: Foreign Trade by Commodities, OECD, 1994.

evenly distributed among the various manufacturing product categories. The second element refers to the fact that most EU states have been running balance of trade deficits with Japan in a rather consistent basis. In 1994, in particular, EU imports from Japan are more than twice as large the corresponding imports. As a matter of fact, from the EU countries that appear in Table 1, Italy was the only one that had a slight trade surplus with Japan in 1994. This, of course, can hardly be considered as a surprise since it actually reflects the pattern of Japan's trade flows with most industrialized countries of the world.

The increasing importance of bilateral trade flows between the EU and Japan to their economic welfare makes any effort in ascertaining the principal factors that affect such flows a very vital matter for both regions. This paper represents such an attempt since it aims to explore the main determinants of the bilateral trade flows between Japan and the seven European countries which appear in Table 1, i.e. France, Germany, The Republic of Ireland, Italy, The Netherlands, Spain and the United Kingdom (UK). The analysis focuses on the importance of prices (export, import and domestic), activity variables and the inflows of Japanese Foreign Direct Investment (FDI) towards these European countries, on bilateral trade flows. Special consideration will be given on the influence of the exchange rate fluctuations on exports and imports via their effect on relative prices[2].

The group of EU countries we use in our analysis is quite representative since it includes the four bigger EU states as well as countries that differ in the degree of economic development and openness to trade. It must be stated, however, that for the remaining ones the case of Portugal was excluded primarily because its trade with Japan constitutes a very small fraction of its total trade, while in the case of Belgium and Greece we were not able to reach any meaningful results. Finally, the methodology adopted is the construction of a model comprising of demand and supply equations which are estimated by the use of the Three Stages Least Squares (3SLS) econometric technique.

The rest of the paper is organized as follows. In the next section we present and explain the specification of the theoretical model which is going to be estimated for each of the seven EU member states. The analysis of our empirical results takes place in section 3. Finally, section 4 includes our concluding remarks.

II. *The Model*

The model developed in this paper consists of four equations describing the demand and supply sides of bilateral trade between Japan and each one of the seven member countries of the EU. The model is specified as following:

$$X = f\underset{(-)}{(P_x,}\ \underset{(+)}{P_{dj},}\ \underset{(+)}{Q_j,}\ FDI) \tag{1}$$

$$M = f\underset{(-)}{(P_m,}\ \underset{(+)}{P_d,}\ \underset{(+)}{Q_d,}\ FDI) \tag{2}$$

[2] Bilateral trade flows between Japan and five European countries were examined by the same authors in an earlier study in which, however, import and export prices were treated as exogenous. See Pantelidis, Kyrkilis and Papazoglou (1996).

$$P_X = f(\underset{(+)}{P_d}, \underset{(+)}{Q_d}, \underset{}{ER}) \tag{3}$$

$$P_m = f(\underset{(+)}{P_{dj}}, \underset{}{Q_j}, \underset{(-)}{ER}) \tag{4}$$

X and M are the values of EU country member exports to Japan and imports from Japan respectively; f is the sign for function; P_x and P_m are the price indices for exports to Japan and imports from Japan respectively; P_{dj} is the domestic wholesale price index of Japan; P_d is the domestic wholesale price index of each EU country; Q_j is the Japanese industrial production index; Q_d is the industrial production index of each European country; FDI is the Japanese foreign direct investment flows to each EU country; ER is the exchange rate between the yen and the currency of each EU country under investigation, expressed in yens per European currency i.e. per mark, per franc etc. The expected signs of each coefficient are indicated in parenthesis below each equation.

Equations (1) and (2) describe the demand side of the model. Equation (1) is the Japanese demand for European products and Equation (2) is the demand for Japanese products in each EU country. Equations (3) and (4) describe the supply side of the model. Equation (3) is the supply of European exports to Japan and equation (4) is the supply of Japanese exports to Europe.

The supply functions are specified with export (or import) price as the dependent variable under the assumption that firms are price setters due to a non-purely competitive environment and imperfect information about the market clearing price. All equations take the logarithmic form and they are basically traditional in their specification. Some justification though should be provided for the FDI variable and the use of industrial production as activity variable.

Assuming mobility of resources, those of the firm-specific nature included, across national boundaries international trade and foreign direct production are alternative options for the firm[3]. Local market oriented FDI replaces trade through import substitution but also promotes trade through intra-firm trade. The rationalised international production promotes trade either through intra-firm trade when it is of the vertically integrated type or through worldwide sourcing and marketing.

Multinationals seeking to improve their competitive advantages draw upon differentiated technological capabilities and specialized competencies in a variety of countries. Subsidiaries are allowed to work closely with local marketing, engineering and technological personnel for developing distinctive and innovative products that can be sold throughout the multinational's worldwide network, even back to the home market[4].

Another determinant of the volume of bilateral trade is an overlapping common fraction of the demand structures[5]. When the per capita incomes of the two countries are equally high, it is expected that the range of their taste differentiation is equally wide and the overlap of their demand structures is greater; then the volume of trade between them is larger. High incomes are also associated with better technological and other infrastructure, therefore with greater ability of supplying and demanding manufacturing goods, and hence the likelihood of trade

[3] See Dunning (1981), Dunning (1993).
[4] See Cantwell (1991), Ozawa (1991), Ozawa (1992).
[5] See Linder (1961).

between two countries with large sums of industrial production increases[6].

Finally, with respect to the impact of exchange rate changes, this is assessed by the degree of the pass-through effect on traded goods prices which in turn affect the volume of bilateral trade[7].

For estimating the model, quarterly time series data were used for the period 1983-1992[8]. The selection of the particular time period primarily reflects our intention to study the more recent developments in the pattern of bilateral trade flows between EU member states and Japan. It must be stated, however, that the availability of data constituted a significant constraint. Three dummy variables were also included allowing seasonality adjustment. The model was estimated by the use of the Three Stages Least Squares (3SLS) econometric technique for each country separately[9].

Testing the stationarity, we performed the Dickey-Fuller unit root test on our series and found the vast majority of them to be integrated of level 0, i.e. I(0). We had, however, problems in rejecting the hypothesis of a unit root in the case of the export series in all countries except Spain and the import series in the case of Italy. In view of this problem and the possibility of having mixtures of I(0) and I(1) variables in the corresponding equations, we checked the residuals of the Two Stages Least Squares (2SLS) estimation for stationarity. The results indicated that the residuals were I(0). We feel that this result minimizes the risk of having invalid inferences on the coefficients of the equations due to departures from stationarity. Also, for the detection of autocorrelation the Durbin-Watson statistic was used. If this statistic lied in the inconclusive area, the autocorrelation coefficient was estimated and its statistical significance was tested. In the case the ρ coefficient was statistically significant the Cohrane-Orcutt transformation was applied for the correction of autocorrelation. In addition, there is no evidence of existing multicolinearity because almost all estimated coefficients have the expected sign and they are statistically significant.

The export and import variables are indices extracted from Eurostat statistics. The export, import and domestic price variables, the industrial production indices and the exchange rate are adopted from the IMF statistics. The FDI variable is measured as the ratio of inward Japanese FDI to each of the European countries over the total Japanese outward FDI. The source of FDI data is Eurostat statistics.

In the demand equations (1) and (2), price elasticities are expected to have signs as these are suggested by the standard international trade theory. The signs of the activity variables i.e. industrial production indices are generally expected to be positive. Negative sign of the FDI variable in the import function indicates strong orientation towards import substitution, while a positive sign would suggest import promotion. In the export function, the positive sign of FDI suggests trade creation, whereas a negative sign may suggest trade supplanting effects of FDI in the host country.

In the supply equations (3) and (4), which are assumed to be highly elastic, the signs of

[6] See Kravis and Lipsey (1982).

[7] There is extensive literature on the pass-through effect. See, for instance, Dornbusch (1987), Krugman (1986), Dixit (1989), Menon (1995).

[8] For Spain the period of investigation is between 1986-1992.

[9] The Three stages Least Squares technique is applied as follows: We estimate by Two Stages Least Squares two systems. The first includes equations (1) and (3), while the second includes (2) and (4). Then by using Zellner estimation (Seemingly Urelated Regression Estimation) we combine the two systems and estimate the four equations.

the coefficients of Q_d, P_d and ER are obtained by normalizing a traditional supply-quantity equation on price[10].

III. *Results*

The results are reported individually in Tables 2–8 and *t*-statistics are presented below the estimates. A summary of the results is presented in Table 9 and discussed below.

Prices in demand equations and the Japanese scale variable in the export function are statistically significant and have the expected signs in the case of bilateral trade flows between Germany and Japan. FDI is both export promoting and import substituting. The exchange rate affects only German imports from Japan.

French trade with Japan seems to be determined by relative prices and both activity variables. FDI is export promoting and the exchange rare is a significant factor for the French imports from Japan.

The Italian export price and domestic price elasticities have the expected signs and are proved to be statistically significant. Both activity variables are significant determinants of the Italy-Japan bilateral trade and FDI is export promoting. The exchange rate variations influence Italian exports to Japan but only Italian import price elasticities.

In the case of the Netherlands relative prices are significant factors for imports from Japan, whereas Dutch exports to Japan are affected only by the Japanese scale variable. FDI is import creating and the exchange rate affects imports.

Activity variables are significant determinants in the UK-Japan bilateral trade. FDI is import substituting and the exchange rate affects only import prices. In both cases of Spain and the Republic of Ireland only activity variables affect trade flows with Japan. The exchange rate affects only import prices for Japanese products.

IV. *Conclusions*

The results of the estimation lead to some important conclusions:

a. Almost all activity approximating variables are statistically significant in all cases. This indicates that the volume of bilateral trade increases as demand and supply rise in both countries involved.

b. Import prices are significantly affected by exchange rate changes in all countries. Only in the case of Italy, exchange rate affects export prices, which in turn affect Italian exports. That is, there is a considerable exchange rate effect on European import prices but not on the corresponding Japanese import prices

c. In turn import prices are significant explanatory factors of the volume of bilateral trade in the cases of France, Germany and the Netherlands, whereas do not have any impact on the bilateral trade between Japan and the rest four countries.

This can be partly explained by the compatibility of production structures between Japan and the three countries, i.e. France, Germany and the Netherlands - that is, a great part of

[10] See Haynes, Hutchison and Mikesell (1986).

bilateral trade is rather of intra-industry type[11]. In the case of France and Germany this explanation is strengthened further by two additional elements. The first refers to the fact that in both countries export prices are significant determinants of the volume of bilateral trade with Japan. The second is based on the data regarding the pattern of bilateral trade between these two countries and Japan which appears in Table 1. More specifically, in the case of Germany we see that the bulk of bilateral trade with Japan concerns the trade category of Machinery and Transport Equipment which account for the 75.6 per-cent of imports from and the 56.6 per-cent of exports to that country. In the case of France, this trade category together with that of Miscellaneous Manufactured Articles (category 8) represent the 86.6 per-cent of total imports from and the 51.4 per-cent of total exports to Japan. Thus, in both cases appears quite plausible to have intra-industry type of trade.

Turning to the remaining countries, Spain and the Republic of Ireland present a lower level of industrialization and the UK experiences some degree of de-industrialization and therefore their bilateral trade with Japan is plausible to assume that is of the inter-industry type. The case of the first two countries is further supported by the data in Table 1. In particular, the bulk of their imports from Japan, as in all other countries, refer to Machinery and Transport Equipment (80 per-cent of total imports for Ireland and 70.9 per-cent for Spain). In the case of the Republic of Ireland, however, the majority of exports belong to the category of Chemicals and Related Products (50 per-cent of total exports to Japan), while Spain constitutes the EU's bigger exporter of Food and Live Animals to Japan which account for the 24.4 per-cent of its total exports to that country.

However, Italy should be treated separately, provided that exchange rates appear to exert significant influence on export prices, which in turn affect the volume of Italian exports to Japan. It seems that Italy shows a dual behaviour, experiencing intra-industry trade as far as exports to Japan are concerned and inter-industry trade with respect to its imports from Japan. From Table 1 we see that the portion of Italy's imports in Machinery and Transport Equipment is the lowest in the EU standing at 65.3 percent of its total imports from Japan. On the other hand, 47.5 per-cent of its exports concerns Miscellaneous Manufactured Articles for most of which there is a significant production base in Japan.

d. Another implication of our analysis refers to the importance of the exchange rate as a determinant of the bilateral trade flows. Our results suggest that possible devaluation of the European currencies against the yen and the subsequent altering in relative prices will have an impact on the bilateral trade flows of four European countries vis-a-vis Japan, i.e. France, Germany, Italy and the Netherlants[12].

e. Finally, Japanese FDI appears to have favourable influence on the bilateral trade balance between Japan and most European countries. In particular, it is export promoting for Italy, Germany and France and import substituting for Germany and the UK. Spain and the Republic of Ireland are not affected by Japanese FDI; while the Netherlands experiences an import creating effect, which means that the intra-firm trade outweighs any import substitution.

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[11] See Ozawa (1992).

[12] This does not necessarily mean that for these four European countries the exchange rate constitutes an effective tool in improving permanently their bilateral trade balance with Japan. The framework employed in our analysis is a short-run partial equilibrium model and thus, in the present context, we cannot examine whether exchange rate changes have lasting effects on the trade balance.

TABLE 2. 3SLS ESTIMATES OF FRANCE'S BILATERAL TRADE WITH JAPAN

	M	P_m		X	P_x
C	0.56*	0.78	C	2.41*	0.02
	(3.57)	(3.26)		(3.81)	(0.04)
P_m	−1.79*		P_x	−1.03**	
	(13.69)			(2.55)	
P_d	3.22*		P_{dj}	0.04	
	(10.95)			(0.05)	
Q_d	1.84*		Q_j	3.25*	
	(4.12)			(3.81)	
FDI	−0.004		FDI	0.37*	
	(0.12)			(3.16)	
P_{dj}		1.60*	P_d		
		(9.20)			
Q_j		0.18**	Q_d		0.78*
		(1.76)			(4.63)
ER		−0.24*	ER		−0.11
		(3.32)			(0.21)
R^2	0.97	0.94	R^2	0.88	0.95
DW	1.13	2.24	DW	1.28	1.48
F $st.$	176.81	74.87	F $st.$	34.29	95.75

(1) The values in parentheses are t-statistics.
(2) * means significant at the 5% level.
(3) ** means significant at the 10% level.
(4) C is the intercept of the equation.

TABLE 3. 3SLS ESTIMATES OF GERMANY'S BILATERAL TRADE WITH JAPAN

	M	P_m		X	P_x
C	0.83*	1.36*	C	3.50*	0.09
	(2.62)	(5.05)		(3.25)	(0.26)
P_m	−1.28**		P_x	−1.23**	
	(1.90)			(2.90)	
P_d	6.01*		P_{dj}	−2.94	
	(3.50)			(1.37)	
Q_d	−0.31		Q_j	2.21**	
	(0.30)			(1.90)	
FDI	−0.09*		FDI	0.69*	
	(1.90)			(2.53)	
P_{dj}		2.07*	P_d		0.57**
		(18.82)			(1.90)
Q_j		0.20*	Q_d		0.27
		(3.88)			(2.46)
ER		−0.32*	ER		−0.02
		(5.16)			(0.31)
R^2	0.96	0.98	R^2	0.65	0.54
DW	2.16	1.71	DW	1.56	2.20
F $st.$	91.44	225.49	F $st.$	8.34	6.56

(1) The values in parentheses are t-statistics.
(2) * means significant at the 5% level.
(3) ** means significant at the 10% level.
(4) C is the intercept of the equation.

TABLE 4. 3SLS ESTIMATES OF ITALY'S BILATERAL TRADE WITH JAPAN

	M	P_m		X	P_x
C	0.39	−0.51*	C	4.40*	0.42*
	(1.39)	(2.73)		(5.43)	(3.57)
P_m	−0.36		P_x	−5.61*	
	(1.23)			(2.56)	
P_d	2.07*		P_{dj}	−0.75	
	(4.53)			(0.69)	
Q_d	2.23*		Q_j	5.59*	
	(4.31)			(3.57)	
FDI	−0.04		FDI	0.64*	
	(1.01)			(4.53)	
P_{dj}		2.53*	P_d		1.20*
		(7.97)			(13.38)
Q_j		−0.02	Q_d		0.09
		(0.08)			(1.01)
ER		−0.32*	ER		0.20*
		(4.59)			(5.67)
R^2	0.89	0.93	R^2	0.84	0.92
DW	1.46	1.75	DW	1.39	1.60
F st.	37.02	62.89	F st.	25.88	160.04

(1) The values in parentheses are t-statistics.
(2) * means significant at the 5% level.
(3) ** means significant at the 10% level.
(4) C is the intercept of the equation.

TABLE 5. 3SLS ESTIMATES OF THE NETHERLANDS' BILATERAL TRADE WITH JAPAN

	M	P_m		X	P_x
C	0.38	1.09*	C	−0.69	−0.49
	(1.58)	(3.64)		(0.49)	(0.28)
P_m	−2.65*		P_x	1.03	
	(6.77)			(0.38)	
P_d	6.29*		P_{dj}	4.35	
	(5.38)			(0.98)	
Q_d	1.26		Q_j	9.40*	
	(1.57)			(5.73)	
FDI	0.11**		FDI	−0.29	
	(1.88)			(1.10)	
P_{dj}		1.90*	P_d		1.32*
		(11.55)			(2.90)
Q_j		−0.02	Q_d		−0.07
		(0.18)			(0.39)
ER		−0.20*	ER		−0.09
		(2.87)			(0.91)
R^2	0.92	0.98	R^2	0.78	0.94
DW	1.47	1.73	DW	1.63	1.14
F st.	52.78	217.02	F st.	13.93	82.54

(1) The values in parentheses are t-statistics.
(2) * means significant at the 5% level.
(3) ** means significant at the 10% level.
(4) C is the intercept of the equation.

TABLE 6. 3SLS ESTIMATES OF UNITED KINGDOM'S BILATERAL TRADE WITH JAPAN

	M	P_m		X	P_x
C	0.81*	1.16*	C	0.81	−0.19
	(23.28)	(3.58)		(1.48)	(0.91)
P_m	0.10		P_x	0.11	
	(0.28)			(0.08)	
P_d	0.56*		P_{dj}	1.22	
	(2.24)			(0.71)	
Q_d	2.53*		Q_j	1.41*	
	(4.96)			(2.47)	
FDI	−0.01*		FDI	−0.0002	
	(2.28)			(0.01)	
P_{dj}		0.78*	P_d		0.47*
		(5.37)			(4.16)
Q_j		0.51*	Q_d		−0.27
		(10.47)			(1.24)
ER		−0.21*	ER		−0.03
		(3.63)			(0.76)
R^2	0.94	0.84	R^2	0.92	0.94
DW	2.13	1.18	DW	1.77	1.21
F $st.$	61.52	29.58	F $st.$	43.39	72.49

(1) The values in parentheses are t-statistics.
(2) * means significant at the 5% level.
(3) ** means significant at the 10% level.
(4) C is the intercept of the equation.

TABLE 7. 3SLS ESTIMATES OF SPAIN'S BILATERAL TRADE WITH JAPAN

	M	P_m		X	P_x
C	−0.07	1.54*	C	−0.21	0.07
	(0.20)	(2.21)		(0.29)	(0.35)
P_m	−0.03		P_x	0.11	
	(0.36)			(0.76)	
P_d	4.53*		P_{dj}	−3.47	
	(6.02)			(0.88)	
Q_d	1.73*		Q_j	3.37*	
	(3.01)			(3.66)	
FDI	−0.06*		FDI	0.10	
	(1.03)			(0.98)	
P_{dj}		8.84**	P_d		−4.43**
		(2.00)			(1.80)
Q_j		0.02	Q_d		3.58**
		(0.02)			(1.76)
ER		−4.07*	ER		0.26
		(3.72)			(0.27)
R^2	0.87	0.47	R^2	0.78	0.21
DW	1.78	2.13	DW	1.92	1.79
F $st.$	20.66	2.49	F $st.$	8.21	0.95

(1) The values in parentheses are t-statistics.
(2) * means significant at the 5% level.
(3) ** means significant at the 10% level.
(4) C is the intercept of the equation.

TABLE 8. 3SLS ESTIMATES OF IRELAND'S BILATERAL TRADE WITH JAPAN

	M	P_m		X	P_x
C	1.13*	1.42*	C	5.91	0.16
	(4.25)	(2.61)		(1.26)	(0.99)
P_m	1.35		P_x	−0.09	
	(1.32)			(0.15)	
P_d	0.01		P_{dj}	3.64	
	(0.04)			(0.46)	
Q_d	0.56**		Q_j	5.45*	
	(1.90)			(3.58)	
FDI	0.04		FDI	0.008	
	(1.12)			(0.09)	
P_{dj}		1.10*	P_d		0.01
		(5.16)			(0.40)
Q_j		0.25*	Q_d		0.06
		(3.44)			(1.05)
ER		−0.26*	ER		−0.0007
		(2.62)			(1.49)
R^2	0.84	0.79	R^2	0.83	0.15
DW	2.33	1.84	DW	1.87	1.62
F st.	19.08	16.79	F st.	18.89	0.97

(1) The values in parentheses are t-statistics.
(2) * means significant at the 5% level.
(3) ** means significant at the 10% level.
(4) C is the intercept of the equation.

TABLE 9. SUMMURY OF EMPIRICAL RESULTS OF BILATERAL TRADE DETERNINANTS BETWEEN JAPAN AND MEMBERS OF THE EU

	PRICES	ACTIVITY VARIABLES	FDI	ER
FRANCE	*	*	*(3)	*(6)
GERMANY	*	*	*(3) (4)	*(6)
ITALY	*(1)	*	*(3)	*(7)
NETHERLANDS	*(2)	*	*(5)	*(6)
UK		*	*(4)	
SPAIN		*		
IRELAND		*		

(1) Only Italian prices (export and domestic) are significant.
(2) Prices are significant only in the import demand equation.
(3) FDI is export promoting.
(4) FDI is import substituting.
(5) FDI is import creating.
(6) ER affects European imports.
(7) ER affects European exports.
(8) In all cases ER affects European import prices.

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