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Foreign Direct Investment and Exchange Rate Pass-through: Access to Foreign Markets[1]

Yushi Yoshida
Faculty of Economics
Kyushu Sangyo University

[Abstracts]

We examine the effects of foreign direct investment on exchange rate pass-through. By distinguishing the purpose of foreign direct investment, different hypothesis for production subsidiary and distribution subsidiary can be tested. We are able to find a clear evidence of "power-shift" effect and "elimination" effect of distribution subsidiary, with foreign direct investment data properly constructed to capture the timing of establishment. We also obtained significant downward effect of local production, conforming to the previous research.

Keywords: distribution subsidiary, exchange rate pass-through, foreign direct investment.

Journal of Economic Literature Classification Numbers: F12; F14; L14; L63; L68

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I. Introduction

The lack of adjustment for the US current account after steady depreciation of the US dollar in the second half of the 1980s has re-motivated research examining the relationship between exchange rate and tradable prices. The less than proportionate response of tradable prices to changes in exchange rates, termed as incomplete pass-through in the literature, has been well documented in other circumstances as well.

The seminal work by Dornbusch (1987) has suggested that the some features of imperfect competition, namely the number of competitors, finite demand elasticity, and etc., lead to incomplete pass-through. Krugman (1987) on the other hand extended the decades old literature to a different direction, suggesting that same features affecting incomplete pass-through can explain the international price differentials arising from exchange rate fluctuations, termed as pricing-to-market. Enormous amounts of research both theoretical and empirical have followed these works[2].

Rather than providing an additional empirical evidence of incomplete pass-through as a contribution, empirical research has recently shifted more toward focusing on the causes of incomplete pass-through. Gron and Swenson (1996) has included the degree of local production in a pass-through equation to explain the partial reduction of pass-through with exporters with local plants. In stead of reduced-form pass-through equation, Kadiyali (2000) uses a structural econometric framework to capture interacting effects of market structures and pricing strategies in the US photographic industry. Bernhofen and Xu (2000) examines the effect of market share in exporting market in pass-through equation and finds that German and Japanese firms exercised significant market power in the US petrochemical market.

Whereas demand and cost fluctuations are, for each exporting firm, exogenous parameter that influence the pricing behavior, some changes in market structure, e.g., the entry decision to foreign markets or acquisition of foreign subsidiaries, are endogenously determined parameters that also affect the optimizing behavior. In search of a larger market for products, a manufacturer begins to access to foreign markets with lack of information for the local market. Eventually exporting firm establishes distribution and production networks via setting up a brand new firm or by acquisitions of local firms.

Figure 1 indicates that the numbers of Japanese foreign subsidiaries almost doubled in recent ten years, 1988 - 1997. The most significant region is Asia in which the number of foreign subsidiary has increased approximately 150 percent within the period. Figure 2 summarized the response of Japanese parent firms to a questionnaire that asks for the most significant causes for establishing foreign subsidiaries. Although inexpensive wage for labor

[2] See Goldberg and Knetter (1997) for a recent survey.

is significant in developing countries in Asia, the major reason for foreign direct investment is to secure access for local markets.

Intuitively, it is clear that these changes in market structure might affect the pricing behavior of exporting firms, consequently, exchange rate pass-through as well. In the next section we provide a concrete theoretical foundation for particular channels through which foreign direct investments affect exchange rate pass-through. Section 3 describes data and an econometric methodology. Section 4 discusses the empirical results. Section 5 concludes the paper.

II. Theoretical Background

Yoshida (1999) examines an explicit incorporation of local distributors in a theoretical analysis of pricing behavior of exporting firms in the pricing-to-market literature. With a successive monopolies model in an international setting, Yoshida showed that the degree of exchange rate pass-through is likely to be higher for an exporter with a subsidiary distributor than with a local independent distributor. This result then suggests that exchange rate pass-through increases with foreign direct investments, FDI henceforth, aiming for establishing a local distribution network.

However, we need to be very cautious about interpreting underlying assumptions in the model when the results are used as empirical testing hypothesis. While the bargaining power between an exporter and an independent local distributor is assumed to fall entirely on the exporter side in Yoshida (1999), it is more natural to assume that the local distributor retains some bargaining power. For example, this can be observed when the local distributor has private information about the local market. This is especially true at the initial stage of exporting in a dynamic process. Moreover, there are even cases in which the local distributor can be assumed to have all the bargaining power if there are sufficient competition among exporters.

If the bargaining power totally rests on the independent local distributor as in the latter case, then, the exchange rate pass-through becomes complete since an export price is fixed to be equal to a marginal cost. Since pass-through is shown to be incomplete, i.e. less than proportionate, after vertical integration, FDI in this case results in decreasing pass-through. However, this should not be interpreted as a contradicting evidence against the results obtained in Yoshida (1999), rather they reveal different aspects of vertical integration effect. By vertically integrating forward with an independent local distributor, bargaining power is shifted to an exporter, forming successive monopolies, and negative externality arising from the structure of successive monopolies can be eliminated at the same time. We might call these effects as “power-shift” effect and “elimination” effect, respectively. In terms of exchange rate pass-through, power-shift effect is associated with decreasing pass-through and elimination

effect with increasing pass-through[3].

Excluding a non-generic case of two effects canceling out completely, our empirical null hypothesis is that foreign direct investment for establishing own distribution should appear as a significant explanatory variable in an exchange rate pass-through regression. As discussed fully in the following section, we also attempt to capture these two effects separately. In addition, we also examine the effect of foreign direct investment for local production as in Gron and Svenson (1996). Their empirical evidence indicates that the ability to produce in multiple locations gives firms more flexibility to adjust to changes in exchange rates, resulting in a smaller pass-through. We, however, note that the estimated coefficients of multiple location are sometimes insignificant in their estimation result.

III. The Data and The Model for Estimation

Empirical model

We will follow the panel estimation approach in line with Knetter (1989) and Takagi and Yoshida (2001). In addition we add FDI variables in order to test the hypothesis that FDI affects the degree of exchange rate pass-through. Our general estimation model for pass-through equation is expressed in equation (1).

$$p_{it} = \beta e_{it} + \gamma e_{it} FDI_{it} + \alpha_i + \lambda_t + \varepsilon_{it} \qquad (1)$$

The log of price denominated in the currency of destination market, p_{it}, is regressed on the foreign currency price of the Japanese yen, e_{it}, FDI variable, FDI_{it}, time dummy, λ_t, a fixed effect error component, α_i, and a disturbance term, ε_{it}. The FDI variable is multiplied by exchange rate in order to capture the effect of subsidiaries on exchange rate pass-through, rather than on the price level. Inclusion of FDI variable in the pass-through equation is utilized in Gron and Swenson (1996) although destination market is only restricted to a single country, namely the US. Therefore, testing the effect of local production on pass-through with a panel of destination countries is also our contribution to the literature.

The fixed effect error component is necessary for eliminating absolute price level dispersion among destination countries, due to the differences in quality level of products. Without an explicit cost data, estimated exchange rate pass-through might be biased since an observed price movement is also affected by the change in industry cost. Time dummy variable is introduced to capture these underlying cost fluctuations.

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[3] As formally proved in the appendix, an intermediate case in which partial bargaining power are retained by both an exporter and a distributor is also associated with decreasing pass-through for power-shift effect.

Data source

The Japan Exports and Imports, Japan Tariff Association, contains values and quantities for nine-digit CCFTS-classified commodities by country[4]. The Commodity Classification for Foreign Trade Statistics, CCFTS, is based upon the Harmonized Commodity Description and Coding System, HS. The values of commodity export are the FOB values. We calculated a unit price for each commodity from dividing corresponding value by quantity. The Overseas Japanese Companies Data, Toyo Keizai, contains relevant information for approximately 19000 Japanese foreign subsidiaries. From 68 industry classifications, electronics manufacturer (1900) and electronics wholesaler (3700) were actually used, totaling 3204 subsidiary firm data. The average annual exchange rates for destination countries are obtained from the International Financial Statistics, International Monetary Fund.

Selection process for products and countries

For a preliminary empirical examination, we selected three commodities satisfying the two criteria, among the largest share in exports and sufficient FDI observation for corresponding commodity. In addition, we narrow down the commodity classification to only electronics products due to its overwhelming share in the Japanese exports. Some of the candidates are dispelled due to the shot length of time for the availability. With these selection procedures, chosen are video recording or reproducing apparatus of magnetic tape-type (852110000), parts of electronic integrated circuits or microassemblies (854290000), and electrostatic photocopier (900912000)[5].

For each product, sampled countries are selected only if its share in 1998-export value for that product exceeds one percent share[6]. This selection process avoids unfavorably excessive volatility of export price due to a change in the composition within the product category and missing data due to the lack of transaction for more than a year.

Construction of FDI variables

As a first proxy for the relevant FDI data, we used the total number of foreign subsidiaries in electronics industry by country. This FDI data, denoted as *FDIIND*, is a common variable

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[4] See Takagi and Yoshida (2001) for a more description of this data source.

[5] The values of exports in 1998 for video, IC, and copier are 197 billion, 273 billion, and 390 billion yen, respectively. We note that the 1998-export value of the largest export of Japan, motor cars with engine exceeding 2000cc but not exceeding 3000cc, is 2017 billion yen.

[6] Sample countries for video are Australia, Canada, China, Germany, Hong Kong, Netherlands, Saudi Arabia, Singapore, UAE, UK, US; for copier, Australia, Belgium, Canada, France, Germany, Hong Kong, Italy, Netherlands, Singapore, UK, US; for IC, Canada, Germany, Korea, Malaysia, Philippine, Singapore, Thailand, US.

for all products. Since foreign subsidiaries for specific products are not distinguished, counting all subsidiaries in electronics industry as relevant FDI may also pick up interactive effects among subsidiaries, considered as distribution or/and production network effects. For a given product, however, it is likely to blur the significant effect of establishing a relevant subsidiary from an irrelevant subsidiary.

Next, we created product level FDI dummy variables for each product, taking a value of one if there exists a related foreign subsidiary for specific product in a destination country during the sample period and a distinction between distribution and production subsidiaries is also made. *FDIDEAL*1 and *FDIPLANT1* denote for subsidiary for distribution and production, respectively. These dummy variables might overstate the presence of subsidiary for a country if the first subsidiary is established at the end of sample period. Therefore, we modified these dummy variables to take a value of zero for years in which the first subsidiary is not present yet. These modified variables are denoted as *FDIDEAL2* and *FDIPLANT2*. Since these dummy variables do not assess the number of multiple subsidiaries, estimated coefficient may understate the effect of foreign subsidiary for a country with multiple subsidiaries. Finally, *FDIDEAL3* and *FDIPLANT3* are created for the number of subsidiary in a destination country. The summary statistics for FDI data are given in Table 1.

The simultaneous appearance of *FDIDEAL2* and *FDIDEAL3* in the regression is a scope of interest to test our theoretical hypothesis. The presence of subsidiary can make a great difference if the bargaining power is tilted a priori toward independent local distributors because it will shift the bargaining power to an exporting firm. Therefore, the "power-shift" effect from establishing the first subsidiary distributor can be captured by *FDIDEAL2* while the "elimination" effect, which can be attributed to *FDIDEAL3,* can be gradually achieved as the number of subsidiary distributors increases, replacing independent local firms. We recall that the "power-shift" effect decreases pass-through and "elimination" effect increases pass-through. Expected signs for *FDIDEAL2* and *FDIDEAL3* are negative and positive, respectively, when they appear simultaneously in the regression.

IV. Estimation results

Table 2 to 4 present estimation results for video, copier, and IC, respectively. The first column (i) of each table show that the industry wide FDI is not significant and the estimated coefficient is actually zero at least up to two decimal digits for all three products. As shown in column (ii) the breakdown of subsidiary into distribution and production purpose for each product does not provide any evidence that FDI affects exchange rate pass-through.

However, as FDI data are modified to correctly capture the timing of entry to foreign market with establishment of subsidiary, the effect of FDI on pass-through appears to be significant in

many specifications. These estimation results are shown in columns (iii) to (vii). Only *FDIDEAL2* and *FDIPLANT2* are included in column (iii) whereas only *FDIDEAL3* and *FDIPLANT3* appear as regressors in column (iv). For specifications (v) to (vi), we proceeded in the following steps. In column (v) we incorporate all *FDIDEAL2*, *FDIDEAL3*, *FDIPLANT2*, and *FDIPLANT3* in the regression. Then insignificant FDI variables are omitted in column (vi). For the IC price estimation, insignificant time dummies are deleted since only two out of eleven dummies are significant at 10 percent level while more than half of dummies are significant for video and copier estimation. This result for IC is displayed in column (vii).

Column (vi) for video in Table 2 provides that a Japanese exporter will pass 85 percent of exchange rate shock to a price if products are sold through independent local distributors. However the pass-through is reduced to 65 percent if there is at least one subsidiary for distribution in local market. Moreover, for each additional local plant the pass-through is reduced 5 percent. For the purpose of giving a clear interpretation of the result, for example, the exchange rate pass-through is 85 percent for Australia due to no Japanese subsidiary for video and the pass-through is 40 percent for China after 1996.

For copier column (vi) in Table 3 shows the most striking result of this paper. Both FDI variables for subsidiary distribution firm remain significant and the sings are consistent with null hypothesis discussed in the previous section. As the first subsidiary is established in a foreign market as captured in *FDIDEAL2*, the bargaining power is shifted to an exporting firm and it results in decreasing the pass-through. But at the same time acquisition of this first subsidiary instantly eliminates the negative externality previously present between the exporter and local distributor. The exporter consequently increases the pass-through, as a theorem obtained in Yoshida (1999). Surprisingly, for the copier product case the magnitude of these effects turn out to be exactly the same, therefore a simple regression only containing one distribution FDI variable as in specification (iii) or (iv) can not capture the significant effect of FDI on exchange rate pass-through. In addition, the estimated coefficient for production FDI is also significant at 1 percent level while the exchange rate pass-through coefficient is imprecise for copier.

For the IC pass-through regression in Table 4, column (vii) shows three FDI variables are significant at 5 percent level. Whereas the exporters for parts of integrated circuits and microassemblies pass 74 percent of exchange rate shock to their prices to a foreign market without their foreign subsidiary plants, the exporters pass more or less completely to IC prices if local production subsidiaries are present in a local market. For a distribution subsidiary, the "power-shift" effect is extremely large whereas the "elimination" effect is insignificant.

This increase in pass-through associated with local production seems to contradict with the hypothesis of Gron and Swenson (1996), however it can be explained in the framework of

Yoshida (1999). As indicated in footnote 5 of Yoshida (1999), a local distributor in his model can be reinterpreted as a local downstream manufacturer, with a constant marginal cost, which uses products of an exporter as an intermediate input. In this case vertical integration results in a higher exchange rate pass-through. The important key is that a local production is compliment in the entire production process in Yoshida (1999) whereas it is a substitute in Gron and Swenson (1996). Since IC parts are obviously intermediate inputs, the establishment of local downstream subsidiary can theoretically result in a higher exchange rate pass-through and in fact it is higher as in colunm (vii). Alternative explanation might be that *FDIPLANT2* is only distinguishing two non-Asian countries, namely Canada and Germany, from others since the Japanese IC manufacturing firms have foreign plants in only Asian area and US, although the first Philippine plant is established only after 1995.

V. Concluding Remarks

Observing estimation results from our limited number of products in electronics industry we tentatively conclude that establishing own distribution network in local market shift the bargaining power to an exporter and exchange rate pass-through is then decreased. More strikingly, the degree of exchange rate pass-through is increased simultaneously for copier product due to elimination of negative externality between two successive monopolistic firms. This gives the strong supporting evidence for the theoretical results obtained in Yoshida (1999).

Conforming to the results of Gron and Swenson (1996), we also consistently found the significant downward effect of local production on exchange rate pass-through. Moreover, significant positive effect of foreign plant for IC suggests that distinction between complimentary production and substitute production in foreign plants with respect to products of parent firms must be clearly defined in an empirical analysis.

In any case, inclusion of FDI variable properly constructed to capture the timing of establishment is essential to the estimation of exchange rate pass-through. In addition, we are able to capture the dynamic behavior of exchange rate pass-through due to a change in establishment of own network for both production and distribution. However, a further investigation is necessary to correctly assess the effects of the ongoing world trend for globalization and regionalization on balance of payment adjustments.

Appendix:

In the followings we present a simple model of vertical structure with an arbitrary bargaining weight between an exporter and a local distributor.[7] We follow very closely the analysis of Yoshida (1999) with an additional aspect of bargaining in terms of Nash bargaining solution[8]. We obtain an explicit form of exchange rate pass-through for an arbitrary bargaining weight, α. Then, we establish the fact that exchange rate pass-through is the lowest when bargaining power entirely falls on an exporter.

The profits for an exporter and a local distributor in explicit forms are, respectively:

$$\begin{aligned} \pi_U &= (w-c)q(p) \\ \pi_D &= (p-ew)q(p) \end{aligned} \qquad (1)$$

where the exchange rate, *e*, is expressed as the price of domestic currency in terms of foreign currency. We also assume a demand function for export is linear in retail price in foreign currency, $q(p) = d - p$. The wholesale price determined between two firms is w.

In a symmetric information case with a given wholesale price, an outcome of profit optimizing behavior of distributor is common knowledge. Therefore, it is a derived demand of distributor for export products that matters to the exporter. We obtain the derived demand,

$$q(ew) = \frac{d-ew}{2}. \qquad (2)$$

With equation (2) the profits for two firms can be reduced to;

$$\begin{aligned} \pi_U &= (w-c)(d-ew)/2 \\ \pi_D &= (d-ew)^2/4. \end{aligned} \qquad (3)$$

The Nash bargaining solution can be obtained as a maximum of the weighted multiplicand of profits for both firms. The bargaining weight for an exporter is denoted as α.

$$\max_w [(d-ew)^2/4]^{1-\alpha}[(w-c)(d-ew)/2]^{\alpha}$$

$$s.t. \quad (d-ew)^2/4 \geq 0, (w-c)(d-ew)/2 \geq 0$$

[α=1: successive monopolies]

When bargaining power totally rests on the exporter, it is successive monopolies as assumed in Yoshida (1999). From the first order condition for the Nash product, we obtain the export price in terms of foreign currency, $ew = (d+ec)/2$. Defining exchange rate pass-through as the elasticity of export price in terms of foreign currency with respect to exchange rate,

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[7] The frameworks for this model and Yoshida (1999) are very similar in vein, except that the latter analyzes the subject with a more general demand function but only for the limited case in which a bargaining weight of a local distributor is zero.

[8] It is well known that the solution of the Nash bargaining problem coincides with the solution to a particular non-cooperative sequential bargaining problem.

$$\frac{(d\ln ew)}{(d\ln e)} = \frac{ec}{d+ec} < 1. \quad (4)$$

[α=0: monopsony]

In this opposite extreme case, a distributor behaves as monopsony in wholesale market while remaining as monopoly in retail market. Since wholesale price is cost for a distributor, it will increase the profit by decreasing wholesale price as low as possible until an exporter leaves the contract. This will result in setting wholesale price equal to marginal cost, i.e., $w = c$. Therefore, the exchange rate pass-through becomes complete,

$$\frac{(d\ln ew)}{(d\ln e)} = \frac{ec}{ec} = 1 \quad (5)$$

[0<α<1: intermediate case]

As in the previous subsections, the first order condition for the Nash product is,

$$\begin{aligned} &-(1-\alpha)2e\frac{(d-ew)}{4}[(d-ew)^2/4]^{-\alpha}[(w-c)(d-ew)/2]^{\alpha} \\ &+\alpha\left\{-ew+\frac{(d+ec)}{2}\right\}[(d-ew)^2/4]^{1-\alpha}[(w-c)(d-ew)/2]^{\alpha-1} = 0 \end{aligned} \quad (6)$$

With some algebra, we obtain an explicit form of wholesale price in terms of foreign currency, $ew = (1-\alpha)ec + (\alpha c/2)$. Then, the exchange rate pass-through is

$$\frac{(d\ln ew)}{(d\ln e)} = \frac{[(1-\alpha)2ec + \alpha[ec]]}{[(1-\alpha)2ec + \alpha[d+ec]]} < 1 \quad (7)$$

It is easy to see that this equation converges to the previous two extreme cases if α is either one or zero.

By comparing equation (4), (5), and (7), we have formally established that exchange rate pass-through is, prior to vertical integration, larger if a distributor retains more bargaining power. Since vertical integration, i.e., acquiring entire stock of local distribution firm, by an exporter shifts all bargaining power to the exporter, namely α=1, foreign direct investment in this sense surely decreases exchange rate pass-through. This appendix, therefore, gives a strong supporting theoretical evidence for power-shift effect in foreign direct investment for exchange rate pass-through.

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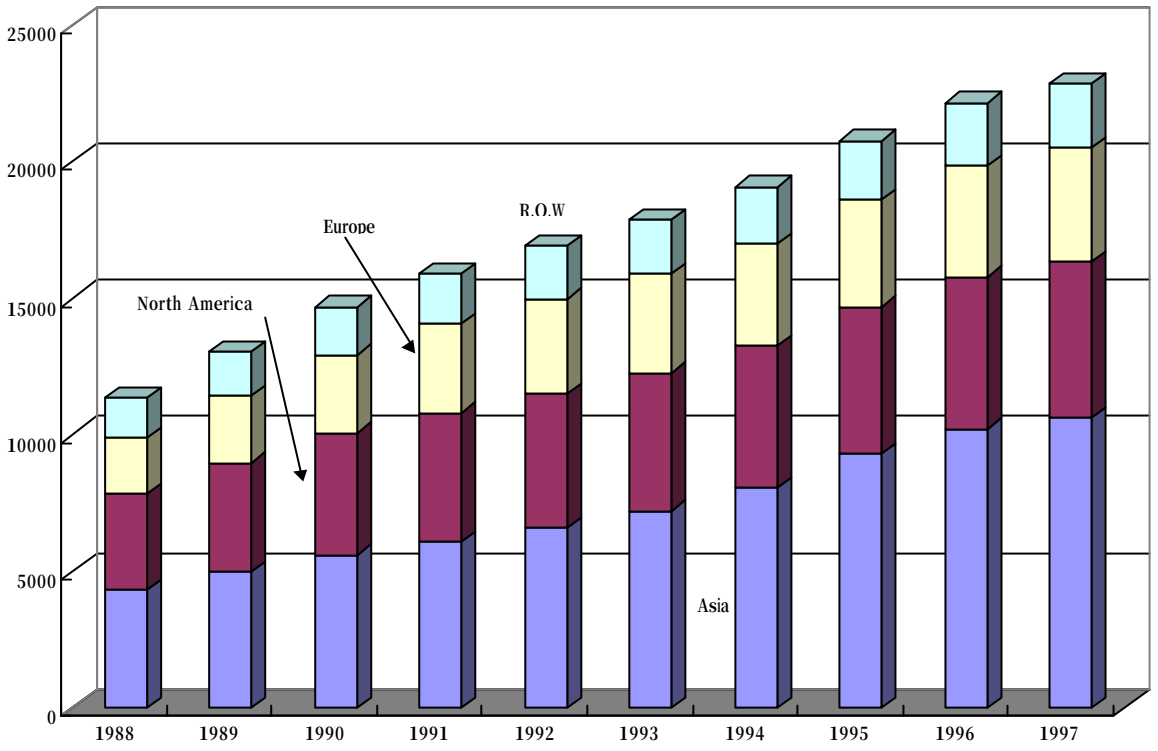
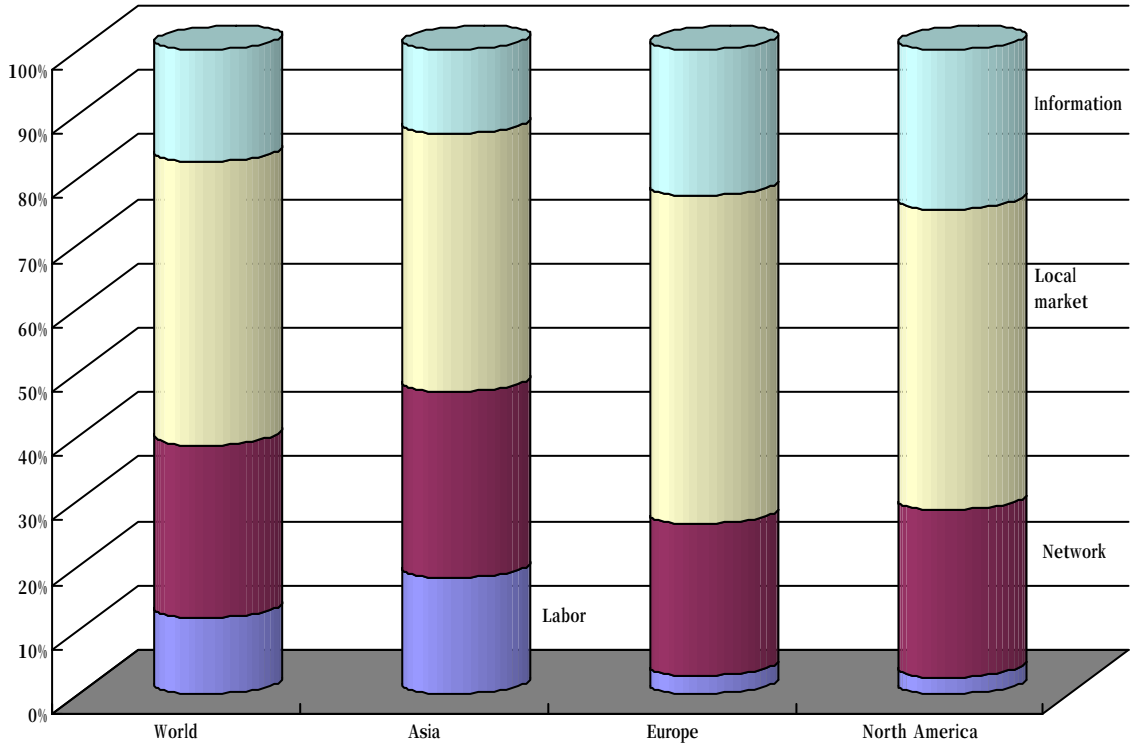
Figure1: Number of Local Subsidiaries



Source: Overseas Japanse Companies Data

Figure2: Investment Purpose by Geography



Source: Overseas Japanse Companies Data

Table 1: Summary Statistics

		mean	std. dev.	min	max
FDIINDS		85.83	87.63	1	372
Video					
	FDIDEAL1	0.42	0.49	0	1
	FDIDEAL2	0.35	0.47	0	1
	FDIDEAL3	0.86	1.48	0	6
	FDIPLANT1	0.41	0.49	0	1
	FDIPLANT2	0.41	0.49	0	1
	FDIPLANT3	0.69	1.02	0	5
Copier					
	FDIDEAL1	0.36	0.48	0	1
	FDIDEAL2	0.31	0.46	0	1
	FDIDEAL3	0.42	0.69	0	2
	FDIPLANT1	0.36	0.48	0	1
	FDIPLANT2	0.36	0.48	0	1
	FDIPLANT3	0.53	0.88	0	3
IC					
	FDIDEAL1	0.56	0.50	0	1
	FDIDEAL2	0.48	0.50	0	1
	FDIDEAL3	0.92	1.28	0	5
	FDIPLANT1	0.78	0.42	0	1
	FDIPLANT2	0.63	0.49	0	1
	FDIPLANT3	1.12	1.30	0	4

Note: Sample countries for video are Australia, Canada, China, Germany, Hong Kong, Netherlands, Saudi Arabia, Singapore, UAE, UK, US; for copier, Australia, Belgium, Canada, France, Germany, Hong Kong, Italy, Netherlands, Singapore, UK, US; for IC, Canada, Germany, Korea, Malaysia, Philippine, Singapore, Thailand, US.

Table2: Estimated Pass-Through of Video Price

Independent variable:	Specification (i)	(ii)	(iii)	(iv)	(v)	(vi)
ER	0.72*** (2.96)	0.80* (1.71)	1.01*** (2.50)	0.67*** (2.54)	0.79* (1.93)	0.85*** (3.46)
FDIINDS*ER	0.00* (-1.92)					
FDIDEAL1*ER		-0.02 (-0.06)				
FDIDEAL2*ER			-0.20*** (-4.51)		-0.21*** (-4.32)	-0.20*** (-4.74)
FDIDEAL3*ER				-0.04* (-1.76)	0.01 (0.31)	
FDIPLANT1*ER		0.05 (0.12)				
FDIPLANT2*ER			0.07 (0.22)		0.06 (0.18)	
FDIPLANT3*ER				-0.04 (-1.50)	-0.05** (-2.24)	-0.05** (-2.25)
Adj-R2	0.98	0.97	0.98	0.98	0.98	0.98

Note: Figures in parenthesis are t-values; ***, **, and * indicate that the coefficient is significant at the 1, 5, and 10 percent, respectively

Table3: Estimated Pass-Through of Copier Price

Independent variable:	Specification (i)	(ii)	(iii)	(iv)	(v)	(vi)
ER	0.18 (0.60)	0.31 (1.06)	0.34 (1.20)	0.39 (1.43)	0.37 (1.39)	0.35 (1.32)
FDIINDS*ER	0.00 (1.43)					
FDIDEAL1*ER		0.16 (0.44)				
FDIDEAL2*ER			0.00 (-0.18)		-0.13*** (-2.32)	-0.10* (-1.92)
FDIDEAL3*ER				0.02 (0.90)	0.13*** (2.49)	0.10** (2.11)
FDIPLANT1*ER		-0.18 (-0.44)				
FDIPLANT2*ER			-0.07 (-0.21)		0.54 (1.50)	
FDIPLANT3*ER				-0.22*** (-3.10)	-0.34*** (-3.98)	-0.29*** (-3.67)
Adj-R2	0.99	0.99	0.99	0.99	0.99	0.99

Note: Figures in parenthesis are t-values; ***, **, and * indicate that the coefficient is significant at the 1, 5, and 10 percent, respectively.

Table4: Estimated Pass-Through of IC Price

Independent variable:	Specification (i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
ER	0.57 (1.30)	0.66 (1.19)	0.42 (1.21)	0.92** (2.36)	0.40 (1.01)	0.43 (1.26)	0.74*** (3.28)
FDIINDS*ER	0.00 (0.98)						
FDIDEAL1*ER		0.36 (0.80)					
FDIDEAL2*ER			-0.52*** (-2.95)		-0.57*** (-3.24)	-0.56*** (-3.27)	-0.57*** (-3.69)
FDIDEAL3*ER				-0.01 (-0.27)	0.00 (0.18)		
FDIPLANT1*ER		0.04 (0.07)					
FDIPLANT2*ER			0.26*** (2.89)		0.34*** (3.49)	0.33*** (3.51)	0.34*** (3.83)
FDIPLANT3*ER				-0.03 (-0.81)	-0.07** (-2.02)	-0.07** (-2.03)	-0.07** (-2.19)
Adj-R2	0.97	0.97	0.97	0.97	0.97	0.97	0.97

Note: Figures in parenthesis are t-values; ***, **, and * indicate that the coefficient is significant at the 1, 5, and 10 percent, respectively.