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THE EFFECTS OF JAPANESE INVESTMENT ON DOMESTIC PRODUCTION AND IMPORTS

○ Tohoku U. Stu. Mem. L.L. Y. Mendoza
Tohoku U. Member   Hajime Inamura

1. Introduction

This research has as its objective the development of a method to measure the effects of foreign direct investment on the amount of trade flow. This study is an improvement over the one previously done in that depreciation allowances replaced the arbitrarily-set 10 percent rate of depreciation. Moreover, this study tried to look into the effect of a displacement in imports and/or sales caused by the affiliate firms' production. A study along the same line was conducted by Peter Petri (1992) to estimate the trade effects of direct investment in Thailand. Based on actual data, a model of sales displacement and estimates of procurement effects were fed into an international input-output system to determine effects on output. This study is quite different inasmuch as data on the behavior of Japanese-affiliated firms in the Philippines are not available. Several assumptions had to be made simplifying the study to a certain extent. Moreover, given the available data, only the effects of investment to the Printing and Publishing and Other Fabricated Metal Products subsectors were examined.

2. Data Used

Data on Japanese equity investment for year 1991 were obtained from the Securities Exchange Commission of the Philippines. In that year, Japan invested $1,188,500 in the Other Fabricated Metal Products subsector and $36,390 in the Printing and Publishing subsector. These represent 55 percent of total investment poured into the manufacturing sector. Data on depreciation allowances were lifted from Publication No. 173 of the Philippine Internal Revenue Service. The breakdown of investment according to the various fixed assets were based on the financial tables of Japanese firms which manufacture products similar to those produced by the foreign affiliates. All other data needed for this study were taken from the 1985 Philippine-Japan Input-Output table.

3. Methodology

The effects of investments to the two subsectors were studied using input-output analysis. The investment to a particular sector was assumed to go only into the procurement of fixed assets. Annual depreciation of these assets was arrived at using information on depreciation allowances. Table 1 gives the depreciation rates used. Amount of production added by the project was then determined by dividing annual depreciation by the coefficient of depreciation given in the 1985 Japanese Input-Output table. On the assumption that the foreign firm's production function resembles that of its parent, the additional production was distributed to the producing sectors and primary inputs (value added) following the breakdown of technical coefficients in the Japanese Input-Output table. It was assumed in this study that the size of the coefficients in the 1985 table remain unchanged. The table was again used to determine the amount of input to be imported as against that which will be purchased from the domestic market.

Table 1. Depreciation Rates of Fixed Assets

Fixed Assets	Printing and Publishing (in %)	Other Fabricated Metal Products (in %)
Buildings	2	2
Structures	2	2
Machinery and Equip.	6	5
Vehicles	10	10
Fixtures, furnitures	5	5
Land	0	0

In the case where the project would procure its raw materials from both the domestic market and foreign market, additional domestic production and imports required were computed using the analytical scheme discussed below.

Total production was computed as:

$$X_j = \sum x_{ij} + \sum v_{kj}$$

$$x_{ij} = {'x_{ij}} + \Delta x_{ij} \, , \quad v_{kj} = {'v_{kj}} + \Delta v_{kj}$$

where:

X_j : Total production of industry j

x_{ij} , v_{kj} : input and value added of industry j

$'x_{ij}$, $'v_{kj}$: input and value added of industry j without project

Δx_{ij} , Δv_{kj}: additional input and value added by the project

The new input and import coefficients are computed as follows:

$a_{ij} = x_{ij}/X_j$

$m_i = M_i/X_i$, $M_i = {}'M_i + \Delta M_i$

where:

a_{ij} : input coefficient

m_i : import coefficient

${}'M_i$: imports before the project

ΔM_i: imports added by the project

Additional domestic production is computed as:

$\Delta X = (I-A+M)^{-1} \Delta f$

$\Delta f_i = \sum_j \Delta X_i * b_{ij}$

where:

I : identity matrix

A : input coefficient matrix

M : import diagonal matrix

Δf: procured from domestic market

ΔX_i: input of sector i added by proj.

b_{ij}: ratio of amount procured from Phil.'s sector i to total amount procured by Japan's sector j

Total additional imports was calculated using:

$\Delta X * M + \Delta M$

where:

$\Delta X^* M$: import resulting from additional domestic production

ΔM : import required as a direct result of investment

Computations were done for two levels of production. The first at 25 percent and the second at 100 percent. For each of these cases, the effect on the level of imports and the amount of sales of domestic firms were studied depending on whether the investment was one of import substitution or if the firms' sales displaced those of domestic firms.

4. Results and Discussion

With investment to import substitution projects totalling $1,224,890, the net annual gain to the economy will be $108,470 at the early stages of production, eventually reaching $ 433,920. In the case where additional production displace sales, the annual loss initially totals $351,350 reaching $1,405,420 when the firms reach 100 percent production.

Additional domestic production generated by direct investment should be considered for a more accurate picture of the effect on the economy. In this particular study, however, the amount of additional domestic production is estimated to be not even 1 percent of the level of imports generated and thus does not have any impact on the overall effect of the investment. This is because Japanese firms,

at least as of 1985, hardly procured anything from the Philippine market. This amount procured may of course change if procurement patterns change over time.

5. Further Study

In this study, several assumptions had to be made in the absence of actual data. For one, the coefficients and values in the 1985 Input-Output table were assumed to still hold true. Secondly, it was assumed that all investment went to the

Table 2. Effects of Direct Investment
(Printing & Publishing/Other Fab. Metal Products)

	25% Prodn	100% Prodn
	(in $ '000)	
Import Substitution		
Imports generated by project	-121.44	-485.75
Amount of import substituted	229.91	919.67
Net gain/loss	108.47	433.92
Displacement of sales		
Imports generated by project	-121.44	-485.75
Amount of sales displaced	-229.91	-919.67
Net gain/loss	-351.35	-1405.42

procurement of capital goods. Two cases were considered with regards the sales of foreign affiliates. The first was that all produce will substitute imports, and the second, that all produce will displace sales of domestic firms. With actual time series data, a more accurate picture of displacement of imports or domestic production would have been possible.

References

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