FOREIGN DIRECT INVESTMENT

IN THAILAND

BY

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DECLARATION

None of the material contained in this thesis has been used before.

ABSTRACT

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This study of foreign direct investment (FDI) in Thailand fills a gap since no such studies exist for Thailand. After an introduction to Thailand's economy, the thesis presents a brief survey of the theories of FDI with reference to the less-developed countries. It is followed by a study of the country-wise and sector-wise pattern of FDI in Thailand. The next two chapters carry out empirical tests of the capital-intensity hypothesis and the raw-material availability hypothesis respectively. Both the hypotheses are found to be statistically acceptable in the case of Thailand. This is followed by a simple test of the tariff-jumping hypothesis which does not explain FDI in Thailand. This should be viewed with caution as only nominal rates (as opposed to effective rates of protection) are used. Then, a test of a joint hypothesis (capital intensity, raw-material availability, and tariff rates) confirms the relative prominence of the capital-intensity hypothesis. The relative wage-cost hypothesis (i.e., Thai wage-rates relative to the Japanese and West German wage-rates) is found to be statistically unacceptable in the case of Thailand. Lastly, welfare effects of FDI are examined. A brief survey of the literature and a critical appraisal have been presented. So far as Thailand is concerned, the general weight of the various arguments leans to the conclusion that foreign direct investments have ameliorative effects. This conclusion is based on (i) an analytical examination of the welfare implications of Thailand's over-all pattern of FDI, (ii) a statistical analysis of the macroeconomic effects, (iii) an analysis of the environmental issues by examining the chemical properties of the products produced by foreign firms in the Chemical Sector, and (iv) a study of the desired pattern of investment in the Thai economy as envisaged in the Five Year Plans and the ex post sectoral pattern of FDI.

ABBREVIATIONS

BOI	Board of Investment, Thailand
DC	Developed Country
EEC	European Economic Community
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IMF	International Monetary Fund
ISI	Import Substitution Industrialisation
ITT	International Telephone & Telegraph Company
LDC	Less Developed Country
MITI	Ministry of International Trade and Industry, Japan
MNC	Multinational Corporation
MNE	Multinational Enterprise
OLS	Ordinary Least Squares Method
OPEC	Organisation of Petroleum Exporting Countries
POI	Private Overseas Investments
R & D	Research and Development
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development

INTRODUCTION

INTRODUCTION

This thesis is a study of some aspects of foreign direct investment in Thailand. Our studies include 'pattern', 'causes' and 'welfare effects' of foreign direct investment. To the best of our knowledge, no such studies on Thailand hitherto have been done; and it is hoped that this work will fill a gap. However, Panchareon (1980) and Lecraw (1977, 1979) have done some work on specific issues of multinational firms in Thailand. Panchareon (1980) studied three industries (viz., textiles, food processing and electronics) and found that a statistically significant difference existed between the technology used by local firms and that used by foreign firms. Lecraw (1979) found that the foreign-owned firms in Thailand do not choose less "appropriate" technology than the domestically owned firms. In connection with the FDI from the LDCs to Thailand, Lecraw (1977) found evidence that the LDC firms tended to use relatively more labour-intensive technologies than the local firms.

It is generally believed that Thailand's extensive natural resources and low-cost labour make it an attractive proposition for foreign investors. The Thai government welcomes foreign investment and through the Board of Investment (BOI) encourages it, particularly in import-substitution industries, export-oriented ventures, especially those whose labour-intensive technology is beneficial to the agriculture sector. The Investment Services Centre (ISC) of the Board of Investment in Bangkok

can help investors to obtain all necessary licences and permits for setting up or expanding business in Thailand. The BOI has three investment promotion centres abroad in New York, Frankfurt and Sydney. It has major discretionary powers in granting relief on import duties, exemption from taxation and other benefits.

This introduction summarises the findings and conclusions of the thesis. The first chapter presents a brief outline of Thailand and her economy. The second chapter presents a brief survey of the theories of foreign direct investment, namely, those theories which deal with the determinants of foreign direct investment. An attempt is made to highlight the aspects of the theories which are relevant to the less-developed countries. Furthermore, the survey includes a discussion of the relevant empirical tests of the theories. The state of the literature is such that nothing specifically can be pin-pointed as the cause of foreign direct investment although a host of 'determinants' jointly explain foreign direct investment.

The third chapter analyses the pattern of foreign direct investment in Thailand. Using time-series aggregate flow of foreign direct investment, we have found that a statistically significant trend exists. So far as aggregate flow from a specific country is concerned, we could (because of data non-availability) examine only the flows from Germany and Japan. There is a significant trend for the flow of German investments to Thailand, although a similar result does not hold for the Japanese flow. By using the

BOI cross-section cumulative data (1961-1981), we have analysed the sector-wise and country-wise pattern of investment. Eight per cent of the firms from the less-developed countries are in the 51-100% foreign-ownership category while twenty-five per cent of the firms from the developed countries are in the 51-100% foreign-ownership category. About thirty-one per cent of the firms (LDC & DC) are in the 41-49% foreign-ownership category which is by far the most popular category. The largest proportion (twenty-eight per cent) of the foreign direct investments has been channeled to the mineral sector which is not surprising in view of the relative abundance of mineral resources in Thailand. The second largest proportion (nineteen per cent) has gone to the "Other Industries' sector which includes natural resources-based industries such as Wood Products and relatively labour intensive industries such as spinning, weaving and knitting. The leading investors in Thailand are Japan, USA and Taiwan. About twenty-seven per cent of the total investments in the agricultural sector, about thirty-nine per cent of the total investments in the mineral sector, and about sixty-nine per cent of the total investment in the mechanical sector comes from Japan. (Similar figures are calculated for other countries such as USA, Taiwan, UK, India, Hong-Kong, Singapore, Netherlands and West Germany.) Ranking the propositions of investments going to different sectors for the DCs and LDCs separately, we find that they are different except for the mineral sector. The hypothesis that a country with higher per capita income will have a larger share of foreign direct investment in a less-developed country is not statistically significant for Thailand.

The fourth chapter carries out an empirical test of the capital-intensity hypothesis in the case of Thailand. For various reasons, as discussed in the chapter, foreign direct investments are associated with projects using relatively a larger quantity of capital. We have analysed the country-wise and sector-wise capital-labour ratios. Our study shows that the capital-labour ratios differ greatly between sectors and also between investing countries. Most of the capital-labour ratios of the DCs are larger than those of the LDCs. Also, we have found significant differences in the capital-labour ratios between the primarily foreign-owned firms and the primarily Thai-owned firms. However, in two sectors, viz., Mineral and 'Other Industries' sectors, high capital-labour ratios are observed in the primarily Thai-owned firms. The conclusions regarding the firms in 0.1-49% foreign-ownership category having a lower capital-intensity than the firms in 51-100% foreign-ownership category have been further reinforced by our simple econometric tests. It is empirically acceptable that sectoral capital-labour ratios are associated with sectoral foreign direct investments in Thailand, although no causal relationship is implied.

The fifth chapter tests the raw-material availability hypothesis in the case of Thailand. Here a distinction is made not only between the primarily Thai-owned firms but also between the use of domestically available raw-materials and the use of imported raw-materials. The analysis here is carried out in terms of the raw-material/labour ratios. In the Agricultural sector, the domestically available

raw-material/labour ratios (r) of the DCs are generally higher for the primarily foreign-owned firms than those for the primarily Thai-owned firms. But in the case of LDCs, the domestically available raw-material/labour ratios (r) for the primarily Thai-owned firms are in general relatively higher than those for the primarily foreign-owned firms. In the mineral sector, the r ratios in the primarily foreign-owned firms from the DCs are in general lower than the r ratios of those from the LDCs. In general, we find that firms (51-100% foreign-ownership category) from the LDCs use less raw-materials per unit of labour relative to the firms (in the same category) from the developed countries. The pattern of the imported raw-material/labour ratios are remarkably similar to that of the domestically available raw-material/labour ratios. There is a problem here. Why should foreign firms import raw-materials if they are abundantly available in Thailand? In order to answer this question, we examined some specific firms which import raw-materials. It is revealed that most of the raw-materials are imported from the neighbouring countries (e.g. Malaysia) and not from the investing developed countries like USA or Japan. Therefore, the hypothesis still holds although an additional hypothesis is required to explain why a foreign firm invests in Thailand and imports from Malaysia while the same firm would have invested in Malaysia. This aspect is beyond the scope of our present work. Simple econometric tests have been carried out, and these simply reinforced the importance of raw-materials. Our conclusion is that the availability of raw-materials does play a crucial role in explaining foreign direct investment in Thailand.

The sixth chapter carries out a simple econometric test of the tariff-jumping hypothesis by regressing sectoral investments on nominal rate of tariffs. The hypothesis is rejected in the case of Thailand. In saying so, we should emphasize that results could be different if effective rates of tariff are used. This proved impossible because of lack of data. However, we note that our conclusion is in line with several other studies.

The seventh chapter tests a joint hypothesis by regressing sectoral foreign direct investments on capital-labour ratio, raw-material/labour ratio and tariff rates. The conclusion is that capital-labour ratio is by far the most significant variable. Tariff rates are again found to be insignificant.

The eighth chapter tests the hypothesis that foreign direct investment in Thailand is explained by relatively abundant labour (hence, relatively low labour wage-rates). This is done by using time-series data for two countries, viz., Japan and West Germany. It is found that relative wage rates do not explain the flow of direct investment either from Japan or from West Germany to Thailand. It may be because foreign direct investment (which brings new technology with it) requires skilled labour which is relatively scarce in Thailand.

The ninth chapter carries out a brief survey of the literature on welfare effects of foreign direct investment with reference to the LDCs. We also present a critical appraisal of the various arguments put forward in favour of

foreign direct investment. So far as Thailand is concerned, we apply some of the arguments on a broad basis. It appears that, on a 'broad-brush' basis, Thailand obtains benefits from foreign direct investment. However, it is also fairly clear from our study that there are environmental problems in so far as many foreign firms investing in the Chemical sector use poisonous, dangerous, hazardous materials. Considering aggregate flow of foreign direct investment, we found evidence that foreign direct investments have some impact on exports. However, comparing the desired pattern of investment in the economy as laid out in the Five Year Plans with the ex post pattern of foreign direct investment for four Five Year Plans, we found that there are considerable differences in each Plan period. There are, thus, favourable and unfavourable effects of foreign direct investment. We venture the judgement that the over-all effects of foreign direct investments in Thailand are ameliorative.

CHAPTER 1

A BRIEF OUTLINE OF

THE ECONOMY OF THAILAND

SECTION 1.1: THE COUNTRY

The Kingdom of Thailand means 'Land of Freedom'. Previously the country was known to the West as 'Siam'. Thailand is strategically situated in South Asia in the middle of the Indo-China Peninsula. Its border adjoins Kampuchea 'Cambodia' to the east, Laos to the north-east and Burma to the west. The Peninsula of Thailand faces the Gulf of Thailand with the South China sea to the east and on the west by the Indian Ocean, while to the extreme south lies Malaysia.

SECTION 1.2: GEOGRAPHY

Thailand covers an area of 209,411 square miles (542,373 square kilometres), approximately the same size as France. It has over 2,600 kilometres of coastline. The country can be divided into four regions. The central plain, with its fertile alluvial soils, is dominated by the largest river, the Chao Phya river, on which lies the capital city of Bangkok. Also it is in the central plain that most of the country's grain crops are grown. The northern region is mountainous and has valuable teak forests. The north-east region has many plantations and is an important area for the production of cash crops such as kenaf, cassava and cotton. The southern peninsula is an area important for fruits agriculture, mining and coastal fisheries.

Thailand has a tropical climate with temperatures ranging

from 13°c to 38°c according to the season. There are three distinct seasons: the winter or cool season from November to February, summer from March to May, and the rainy season or monsoon period from June to October, which brings heavy rain to the central part causing occasional widespread flooding.

SECTION 1.3: POPULATION

The population in 1983 totalled about 49 million with a growth rate of 2.1% per annum. The United Nations estimates the Thai birth rate at 39.6 per 1,000 in 1970-1975 and the death rate at 10.5 in the same period. The death rate in 1983 is 5.1% - a considerable fall. More than 4 per cent of the population live in Bangkok and this is the most populous province. The majority of the population belongs to the Thai ethnic group with 4 million Chinese representing the largest minority but generally well assimilated. There are also 700,000 Moslem - Malays in the far south and about 300,000 scattered hill people in the northern region. The predominant religion is Buddhism but there is a Muslim minority concentrated in four southern provinces and one per cent of the people belong to various Christian Sects. The national language is Thai. But in some parts of the south and north of the country, related dialects are spoken. All education is carried on in formal Thai. English is taught as a second language and is widely used in government and commercial circles.

SECTION 1.4: GOVERNMENT

Thailand is a constitutional monarchy similar to the United Kingdom, the reigning monarch being King Bhumiphol Adulyadej. The King is head of state and head of the armed forces. He exercises his legislative power through the National Assembly, executive power through the council of ministers and judicial power through the courts. In terms of government, the country is principally ruled by strong bureaucratic institutions. The national interest operates in terms of the National Assembly which consists of an elected house of representatives and senate overseen by the military.

An uneasy situation prevails along the Thai-Kampuchean border, with periodic outbreaks of fighting reported between Vietnamese-led troops and Khmer Rouge guerrillas. Thai troops remain on full alert to discourage the spread of such incidents into Thai territory. The threat posed by Vietnamese troops in Kampuchea remains and the presence of an estimated (1982) 100,000 Kampuchean refugees in holding centres just within Thai territory, and a further 200,000 along the frontier, is both a drain on Thailand's resources and a factor heightening its sense of vulnerability.

SECTION 1.5: INTERNATIONAL LINK

Thailand is a member of the United Nations and of several regional organisations such as the Colombo Plan, the Asian

Development Bank, the IMF and a founder member of The Association of South East Asian Nations (ASEAN). Bangkok is the headquarters of the Economic and Social Commission for Asia and the Pacific (ESCAP).

SECTION 1.6: RELATIONS WITH THE UNITED KINGDOM

Thailand has had a long economic relationship with the UK since the 17th century. Thai exports to the UK are primary products such as silver and agricultural produce. In return the UK exports to Thailand electrical machinery, power generating machines, and industrial machinery. Over the last 10 years the volume of trade between Thailand and the UK has been increasing. But the balance of trade between the two countries has always been in deficit from Thailands' point of view. Also the UK, by far, is the largest European investor in Thailand and UK ranks fourth in the league table of all foreign investment in Thailand. Most of the British companies in Thailand are engaged in the following industries:- chemical and pharmaceutical products, industrial machinery, primary products and metallic mineral manufacturing. In October 1980 the EEC arranged for quotas to be imposed on imports of certain Thai garments into the UK. Thai exports of tapioca to EEC are also regulated under this agreement.

SECTION 1.7: TRANSPORT AND COMMUNICATION

Thailand has some 25,000km of highways and provincial roads. Road building has been given high priority under the development plans, a project to improve highways with assistance from the World Bank is underway. Roads now play an important part in the country's transport and communication system. In 1980, Thailand has a railway consisting of 5,186km of track, connecting Thailand with Malaysia and Singapore. All lines are state-owned. The state railways has drawn up a plan for the expanding of the rail network over the five-year period ending in 1986. Navigable waterways are about 1,100km long in the dry season and 1,600km in the wet season. Rivers, particularly the Chao Phya and its tributaries are used for the carriage of a large proportion of inland traffic. The port of Bangkok, at the mouth of the Chao Phya River, handles 95 per cent of the country's exports, despite the fact that it is unable to accommodate vessels exceeding 10,000 tons. Larger vessels must anchor in deep water and have their cargoes loaded and unloaded by lighters ones. The government is negotiating with the Asian Development Bank for a loan for the construction of deep-sea ports in the south of the country. In addition, a new deep-water port is being developed in conjunction with the development of the eastern seaboard as a major industrial zone.

Bangkok has a modern airport which caters for more than thirty international airlines operating over 800 flights into Bangkok each week. There is also an international air

network serving 16 provincial destinations. Expansion is taking place at two major airports, which will, when finished, be upgraded to international airports. Thailand has a modern worldwide telex, telegraph and telephone facilities. There are, also, radio and television stations carrying commercial advertising.

SECTION 1.8: ECONOMIC PLAN

The Thai economy from the post-war period into the 1950's was poorly developed. Plans for economic development were virtually non-existent. Before the first economic plan was officially launched in 1961, the country developed very slowly. Without a definite national policy and framework each ministry and governmental unit carried out their tasks under their own direction. There was little connection or commitment among each unit. In addition to economic difficulties, the country was faced with political turmoil until 1957 when finally there was a coup led by Sarit. The new government approved an institutional framework for economic growth. In 1961 the First National Plan was promulgated and development planning in Thailand has continuously been improved since then. The first Plan (1961-1966) dealt exclusively with public sector expenditure. The Second Plan (1966-1971) was expanded to include planning for man-power and private sector development. The Third Plan (1971-1976) attempted to improve the economic and social systems especially in rural areas. It also put forward policies concerning population and

employment, as well as promoting the role of the private sector in Thailand's economic development. The Fourth Plan (1976-1981) was geared to the development and conservation of critical economic resources eg. land, forests, water, mineral and the environment. At the same time the plan sought to raise rural output and income and to develop industrialisation, foreign trade and tourism in the country.

The Fifth Economic Plan (1982-1986) was officially launched on 1st October 1981, being designed to build up economic order through amending and enacting laws concerning financial institutions, insurance companies, and by introducing fiscal monetary reforms. The plan also gives special attention to major economic objectives including Thailand's financial stability, energy policy, agricultural productivity, domestic economic stability, improvement of industrial development policies, income and employment policy, regional economic programme and economic monopoly.

During the 20 years of planned development from the first plan up to the fourth plan (1961-1981), Thailand has sustained impressive economic growth with structural changes in production. On the whole during this period the country's economy grew at an average rate of more than 7 per cent per year. This was accomplished by expanding the agricultural sector and diversifying production and exports of both agricultural and industrial goods. However, the high growth rates have been accompanied by rapid deterioration of forests, land, water and marine resources. At the same time the benefits of growth have not been evenly spread among all

areas and sectors of the economy. Some areas have enjoyed high growth while other areas have not experienced any growth at all. Thus, this pattern of growth has led to income disparity.

SECTION 1.9: ECONOMIC GROWTH

The annual average rate of real economic growth has been 9.5% over the period 1977-1980 despite year-to-year fluctuations due largely to drought, flood etc. But growth has not spread evenly in the regions and this has led to wide regional disparities in incomes. Rapid economic expansion, particularly in the manufacturing and mining sectors, has also led to an acceleration of imports which, coming on top of oil price increases, has resulted in balance of payment deficits. This will be taken up in Section 1.14.

Table 1 presents figures on real GDP, per-capita income, export performance, and inflation. Real per-capita income has increased consistently during the seventies. Prices have increased by almost 60% during the five year period (1975-1980). There has been a steady increase of exports during the decade 1970-1980. The rate of growth of exports is somewhat uneven. This is further discussed in Section 1.14.

TABLE 1.1

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
GDP BILLION $ (1975 =100)	9.85	10.49	10.98	11.67	12.93	13.64	14.61	15.89	18.81	19.87	20.94
RATE OF GROWTH OF GDP		6.5%	4.7%	6.3%	10.8%	5.5%	7.1%	8.8%	18.4%	5.6%	5.4%
PER CAPITA INCOME ฿ (1975 = 100)	3613	3701	4034	5445	6640	7079	7713	8879	10300	11843	14475
EXPORT PERFORMANCE MILLION US $ (1975 =100)	930	1039	1293	1712	2577	2177	2722	2964	3153	3847	4482
EMPLOYMENT (THOUSAND)	16477	16618	16058	16754	17159	18182	18411	20308	21738	21230	22523
CONSUMER PRICES INDEX (1975 = 100)	62.8	63.1	66.2	76.4	95.0	100.0	104.2	112.1	120.9	139.9	159.1

SOURCE: United Nations Year Book.

SECTION 1.10: INCOMES AND LABOUR

The estimated figure for the labour force in 1980 put the total at about 23.88 million with unemployment officially estimated at 5.7%. It should be noted that 70% of the employed work force was in agriculture, 6% in manufacturing and the remainder in construction, trade and services. However, figures released recently by the Ministry of Agriculture and Cooperatives reveal a more disturbing picture. In 1979, 45% of the work force in the agricultural sector was fully employed, 24.9% underemployed, 28.8% were seasonally unemployed (ie. for up to 8 months of the year) and 0.8% unemployed throughout the year. In the non-agricultural sector only 36.1% was fully employed, 55.3% suffered seasonal unemployment, 7.6% was under-employed and 1% unemployed.

The Trade Union movement is not very militant in Thailand; and strikes have been permitted by the Ministry of Interior since 1980. Minimum daily wage rates are 54 Bahts in the Bangkok City, 47 Bahts in the south and central provinces, and 44 Bahts for those in the north and north-east. A compensation programme has been enforced since 1974. Employers are required to contribute to the Fund at rates varying from 0.2% to 4.5% of total payroll depending on the risks of the job. If the employee suffers injury, sickness or death in the course of employment, the employer must pay compensation. Medical expenses, compensation for injury and disability must be paid according to a notification of the Ministry of the Interior. However, this regulation has not been adequately exercised.

Incomes within Thailand vary greatly between urban and rural workers and from region to region as can be seen from the figures given below.

Per Capita Income in 1979 (baht: ฿)

By region.		By Employment	
Northeast	4,491	Agriculture	7,113
North	8,781	Manufacturing	44,215
South	12,683	Commerce	70,339
Central (excluding Bangkok)	14,706	Service	32,665
East	23,774		
Bangkok	30.161		
National average	12,067		

SECTION 1.11: AGRICULTURE

Thailand's economy is primarily based on agriculture. It is self-sufficient in most basic foodstuffs and the country is one of the world's leading net exporters of food products. In 1980 the agricultural sector accounted for 25% of GDP, and employs 70% of the labour force. Some 27 million acres, a quarter of the total land area, are under cultivation and this sector is the most important for the country's prosperity. It should be emphasised that the increase in agricultural production was due almost entirely to extensions of the area under cultivation rather than increases in yields per acre. Yields per acre of rice, maize, tapioca have in fact remained virtually static since 1960. The main crops are rice, tapioca, maize, sugar, rubber

and tobacco. Rice growing in Thailand is very labour-intensive employing about 10 million people. The country is a main supplier of rice to many parts of South-East Asia, The Middle East and Africa. Rice remains the country's most important export crop. Cassava (tapioca) production has increased five times over the last 10 years. In 1980 Thailand was the largest exporter of tapioca products in the world. Moreover, Thailand is the world's third largest exporter of rubber after Malaysia and Indonesia. A fifth of the rubber plantations have been replanted with high-yielding plants. Sugar is also a major export earner, fluctuating widely in line with world prices. Maize is a comparatively new crop for the country, but it could become a major export item in the future, the USSR and Japan being the main importers.

SECTION 1.12: MINING

Mining has been making an increasing contribution to the economy in recent years. Thailand is the most important tin producer in the world after Malaysia. Plans have recently been announced for the construction of a large tantalum processing plant in the Phuket province in the south-west. Thailand also produces lignite, fluoride, iron, lead and wolfram.

Main Mineral Production (tonnes):	1978	1979	1980
Tin concentrates	41,210	46,366	45,986
Fluorite	175,531	177,730	172,784
Barite Ore	274,564	378,654	305,057
Gypsum	280,904	352,398	411,977
Iron Ore	88,121	103,101	84,966
Manganese	65,498	29,496	51,583

SECTION 1.13: INDUSTRY

The industrial sector of Thailand is comparatively small and is involved primarily with processing of agricultural commodities and production of textiles and garments with relatively small-scale plants. But over the last decade 1970-1980, there has been a trend towards large scale production. Textiles led the earlier period of growth but world recession hit the industry hard. At present the textile industry is returning to its former peak. The other industries which play an important part in the economy are paper, chemical, metal, glass, cement, electrical appliances, and automobile spare parts and accessories. In common with many other countries Thailand, with its growing process of industrialisation, has felt the effects of rising oil prices. However, there have been extensive natural gas finds in the Gulf of Thailand, which when fully developed will have an important impact on the country's balance of payments. The supply of natural gas is now being used by electricity generating plants. Plans have been approved by the government to develop the eastern sea-board into a major industrial area to include downstream gas-dependent

industries such as ethylene, soda ash, and sponge iron plants. Encouraging discoveries of oil of a high viscosity have also been made recently in inland areas, although it is too early to assess the size and commercial potential of the field. Thailand is heavily dependent on oil with a total consumption of 86 million barrels in 1980. So far no substantial oil reserves have been found but completion of the natural gas pipeline in 1981 brings gas onshore from the Gulf of Thailand that should last about 50 years. This can provide some relief from oil imports and also stimulate progress on several other major projects, including a new deep-sea port, a railway extension, a sponge iron plant, and oil refinery expansion.

SECTION 1.14: BALANCE OF PAYMENTS AND TRADE

Thailand has experienced a growing trade deficit over the past few years, which is due largely to the rise in oil prices. Since the country has also run a deficit on invisible account, there has been a parallel deterioration in the current account balance, although this has been mostly offset by net capital inflows as can be seen from the following figures:

Balance of Payments (US $: Million)

	1978	1979	1980	1981	1982
Export; f.o.b.	4045	5233	6449	6902	6835
Imports; c.i.f.	-4913	-6828	-8364	-8931	-7565
Trade balance	-868	-1595	-1915	-2029	-730
Services (net)	-329	-558	-584	-1185	-1076
Transfers: private	6	23	77	526	693
official	35	39	133	119	108
Current account balance	-1156	-2091	-2298	-2569	-1005
Direct investment	50	52	188	288	189
Portfolio investment (nie)	76	180	96	44	68
Other long-term capital (nie)	527	1240	1819	1553	1131
Other short-term capital (nie)	714	503	-105	594	58
SDR allocation	-	24	25	23	-
Net errors and ommissions	-237	25	88	133	-521
Total of above items	-26	-67	-178	-66	-80

nie = not included elsewhere

The rate of exchange has not fluctuated widely as can be seen from Table 1.2. It has been about ฿20 to one US dollar throughout the seventies. A similar picture does not hold against the pound sterling the Baht price of which has fallen from about ฿50 to ฿31.

Thailand has long been one of the world's leading exporters of rice, rubber, and tin. Primary products still account for over half of total Thai exports. However, recent years have seen the rise to prominence of new items as diverse as tapioca products and integrated circuits.

TABLE 1.2

Rates of exchange:

	Buying one $	Selling one $	buying one £	Selling one £
1970	20.83	21.00	49.89	50.31
1971	20.83	21.00	50.89	51.31
1972	20.83	21.00	52.12	52.56
1973	20.49	20.72	50.23	50.84
1974	20.25	20.45	47.36	47.88
1975	20.26	20.45	45.00	45.48
1976	20.35	20.45	34.34	36.65
1977	20.35	20.44	35.32	35.63
1978	20.24	20.38	38.80	39.16
1979	20.33	20.46	43.09	43.46
1980	20.38	20.53	47.34	47.80
1981	21.72	21.87	43.84	44.35
1982	22.90	23.05	40.03	40.44
1983	20.90	23.05	34.69	35.02
1984	23.54	23.69	31.33	31.65

SOURCE: Bank of Thailand. Monthly Bulletin, 1978-1984.

Published by The Department of Economic Affairs.

Value of Principal Exports (฿ million)

	1978	1979	1980	1981	1982	1983
Rice	15360	15592	19508	26366	22510	20135
Tapioca products	10892	9891	14887	16446	19752	15387
Rubber	8000	12351	12351	10841	9490	11822
Tin	7229	9250	11347	9091	7773	5263
Maize	4275	5643	7299	8349	8330	8485
Sugar	3969	4797	2975	9572	12932	6331
Crude materials	10469	15193	16681	16722	15134	16270

The increase in the value of exports is explained more by increases in prices than quantities. This is especially true of rice and rubber exports. Japan is still the most important market for Thailand's exports. Trade with Netherlands has shown a marked expansion. The United States is a purchaser of a wide range of Thai products, particularly tin and ready-made garments. Indonesia, Singapore, Hong-Kong and Malaysia buy most of Thailand's exported rice.

Principal Destinations of Exports (฿ million)

	1978	1979	1980	1981	1982
Japan	16866	22901	20098	21704	21948
Netherlands	12185	12260	17639	18674	21014
United States	9153	12106	16834	19794	20257
Singapore	6723	9222	10292	11991	11652
Hong-Kong	4436	5260	6754	6968	8343
Malaysia	4296	4769	5990	7350	7933
West Germany	3441	4391	5516	4934	5354
Indonesia	1394	3862	4835	2958	4251

United Kingdom	1283	1989	2493	2464	3041
Saudi Arabia	1161	1810	2320	3118	3388
France	1638	2009	2192	2833	3030

Among imports, the fuels and lubricants category records by far the largest rise, due primarily to price increases.

Value of Principal Imports (₿ million)

	1978	1979	1980	1981	1982	1983
Fuels & Lubricants	22851	32647	58667	65100	60765	53741
Non-electric machinery	15894	18648	20386	25842	21172	26379
Base metals	11607	16133	16184	18804	17134	18681
Chemicals	9573	14856	14919	18011	16138	13362
Electrical machinery	5836	7355	11169	10867	11008	17940
Vehicles & Parts	7500	7126	6888	9568	7687	13539
Food & beverages	3104	4263	6227	6447	5638	6888
Fertilizers & pesticides	2937	3972	4304	5180	4723	5473
Metal manufacturers	2272	2987	3198	5147	2986	4133
Total, including others	108899	146161	188686	179334	161593	178731

Thailand's leading source of imports is Japan, followed by the United States and Saudi Arabia. The near doubling of imports from Saudi Arabia was accounted for by the rise in oil prices; Saudi Arabia supplies half of Thailand's oil requirements.

Licences are required for certain imports, including all kinds of wood and wood conversions, used motor vehicle bodies, certain paper products, electronic games, all kinds of sugar, motor cars and motorcycles for private use. At present, ten categories of 'luxury goods' are banned

including certain fresh and dried fruits, pastries, building materials, porcelain, and motor vehicles and motorcycles other than for private use. The customs tariff is based on the Customs Cooperation Council Nomenclature.

Principal Sources of Imports (₱ million)

	1978	1979	1980	1981	1982
Japan	33461	37636	39984	52521	46086
United States	14831	22754	27208	28087	26220
Saudi Arabia	6076	9403	19103	29395	29819
Singapore	4419	6848	12261	14949	12455
West Germany	6300	7936	8237	9336	7624
United Kingdom	4164	4708	5033	5851	5023
Netherlands	1314	1749	4676	na	na
Taiwan	3690	4072	3955	4589	5501
Australia	2457	3268	3549	4223	4338
Malaysia	1367	2491	3383	5891	10214
France	na	na	1911	3918	2917
Hong-Kong	na	na	1792	1942	2059

CHAPTER 2

A SURVEY OF THE THEORIES OF FOREIGN DIRECT INVESTMENT

SECTION 2.1: INTRODUCTION

Foreign direct investment occurs when a firm of one country carries out production in another (host) country instead of exporting to the latter. The objective of this chapter is to explain (a) the characteristics of the firms who invest in a foreign country, (b) the determinants of foreign direct investments and the various hypotheses which high-light these determinants, and (c) the findings of various empirical studies.

Foreign direct investment has become a major phenomenon during the post-war years, particularly during the sixties and the seventies. Edwards (1977) estimated that the value of the output of the multinational corporations (other than American) in host countries was $300b in 1975. The output figure increases to $550b if the U.S multinationals are included. The sheer magnitude of the output is brought home when it is realised that, $550b in 1975 was about a ¼ of world gross production and about ½ of world volume of trade. Furthermore, the economic power wielded by the multinational enterprises is understood when it is realised that about six multinationals control about ¾ of the entire oil trade in the world market.

The increasing importance of foreign direct investment in the world economy has stimulated economists to carry out various theoretical and empirical studies. These studies are important (a) in terms of government policy of the host country towards direct foreign investment, and (b) in terms

of expansion of world trade, and (c) in terms of North-South dialogue. The investing as well as the recipient countries have become more aware of the impact of outward and inward flow of foreign direct investment on their economies as the volume of international investment increases. Naturally, therefore, research on the causes and effects of foreign direct investment is thriving.

Foreign direct investment takes place through the activities of the multinational firms. Litvak and Maule (1969) attempted to define a multinational firm. According the the authors:

> "A company is multinational when it no longer distinguishes between domestic and international business. Domestic business is subordinated to and fully integrated with a global plan of action. The head office management staff becomes multinational in outlook and responsibility. Such a company would be receptive to moving towards both international ownership and control of the corporate structure" (P.318).

SECTION 2.2: FORMS OF INTERNATIONAL OPERATIONS AND TYPES OF INVESTMENTS

The forms of international operations can be divided into (a) economic forms and (b) ownership forms. On the economic forms of multinational firms, we have vertical integration, horizontal integration and conglomerates. A multinational firm is vertically integrated if its foreign branch produces inputs required by the firm, and it is horizontally integrated if its foreign branch produces and sells the same product. It is a conglomerate if the foreign branch produces

entirely a different product. For example, a large U.S. firm in the electronic industry can invest in Malaysia to produce high-quality rubber. Regarding the ownership forms. Hymer (1976) points out that 'the forms we observe are branch plant, wholly owned subsidiary, majority-owned subsidiary, joint venture majority interests, licensing arrangement, and tacit collusion' (P.65).

On a different conceptual level, one can also distinguish between various types of direct investment. Following Reuber (1973) we can divide foreign direct investments into three types, viz., export-oriented investment, market-development investment, and government-initiated investment. Most export-oriented investment is made to produce inputs or component parts which, then are exported to the parent company or elsewhere. This fits into the vertical integration form. So far as the market-development investment is concerned, Reuber (1973) says:

> "The distinguishing features of this type of investment are (i) the output of the project is intended primarily for sale in the host country, and (ii) the investment is made primarily in response to underlying economic considerations such as the size of the local market and its long-run potential, local production costs, and so on. Such investment is usually based on long-term considerations and implies a long-run commitment to the country. In the short and medium term, it is frequently unprofitable" (P.74).

From the above statement we can clearly see that market-development investment fits into the horizontal integration. The third type of investment is the government-initiated investment, the main feature of which

is that foreign investment takes place as a result of the initiative taken by the host-country government. Multinational corporations respond to government subsidies, tax benefits etc. Reuber (1973) points out that LDCs do promote foreign investment in this manner with the objectives of (a) encouraging particular industries, (b) developing specific regions or (c) improving the balance of payments situation. In many situations, the home- country government may also take part in the negotiations between the multinational firm and the host-country government.

Empirical studies carried out by Reuber (1973) show that the degree of foreign control is highest in the export-oriented investments. Ownership is normally shared with a host country's firm. There is evidence that the policies of the investing companies towards investments in the LDCs have changed in that "there has been a widespread shift away from insisting on 100 per cent ownership and absolute control by investors" (P.99). This is most prevalent in market-oriented investments and in government initiated investments. Investing firms still try to keep 100 per cent control in the case of export-oriented investment.

SECTION 2.3: TRADE VERSUS FOREIGN DIRECT INVESTMENT

The question about why a firm invests in a foreign country instead of exporting its products to the host country is not easy to answer. It depends on a whole set of factors ranging from a firm's long-run strategy, objectives and motives to

beating the tariff walls built by the host country. Clearly, the question of trade versus direct investment does not arise in the case of direct investment which is an extension of a corporation in the shape of vertical integration. If a Japanese firm invests in Thailand to procure much-needed raw-materials for its own use, then the question of trade versus direct investment becomes redundant. However, in the case of horizontal investment, the question is quite relevant. Hirsch (1976) has discussed this problem in terms of a simple model where he compares the costs of two alternatives for a firm. Assume that a firm in country A wishes to supply its product to country B. The following conditions must be met if the firm in A produces (and invests) in B instead of exporting to B. These are:

$$P_b + C \leq P_a + M \qquad (1)$$

$$P_b + C < P_b + K \qquad (2)$$

In (1) and (2), P_a and P_b are the unit costs of production respectively in country A and B, C is the cost of operating a foreign concern, M is the excess of international over domestic marketing costs ($M \geq 0$), and K is the investment required to have the know-how so that the firm can produce and market the products. Inequalities (1) and (2) simply imply that foreign direct investment takes place if the host country can be supplied at a lower cost by producing on location than by exporting from the firms production unit in the home country. Agmon and Hirsch (1979) have extended this model to include "specific conditions of LDCs by replacing parameters K, M and C by K^*, M^* and C^*

respectively where the starred parameters relate to the original parameters plus LDC cost premium" (P.335)

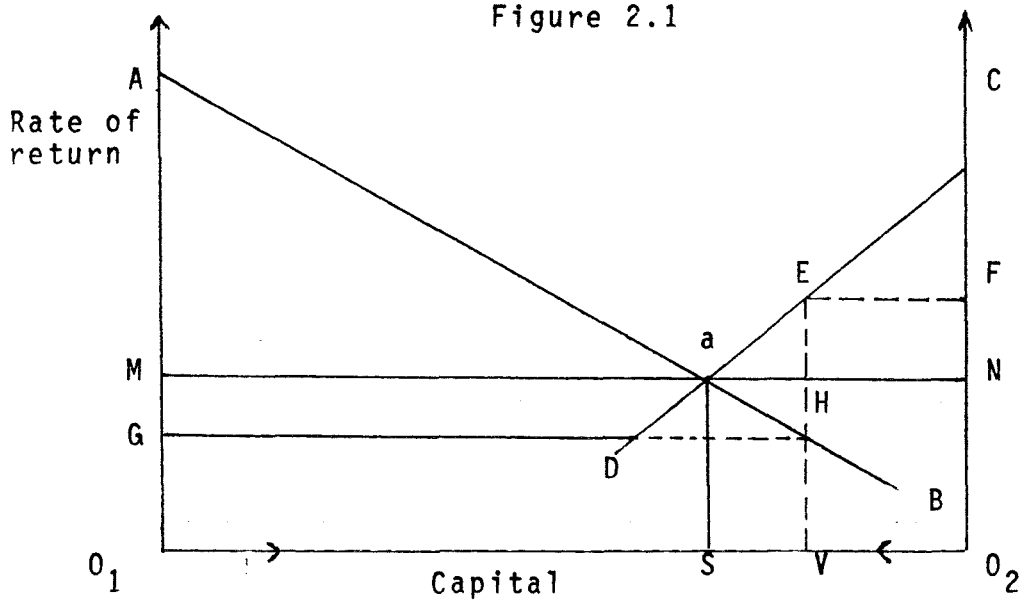
The existence of profitable (low cost) investment opportunity in the host country via the lower cost factors such as labour or raw-materials are presumably available to local entrepreneurs as well as foreign investors. The question which then arises is: Why do local producers not exploit these low cost advantages themselves? One explanation put forward is that it is not comparative cost advantage alone which brings a high rate of return to multinational firms. Firms combine the cost advantage with other specific advantages (to be discussed later in this chapter) which are not available to the local entrepreneurs.

Related to the above discussion is the question about licensing. If a firm has specific advantages over firms of other countries, it may decide to license a local firm in the host country instead of investing in the host country. Hymer (1970) thinks that local firms may have their own advantages which could help towards building up a more profitable and efficient local unit producing products under license. It also avoids "problems of long-distance co-ordination" (Hymer (1970), P.53). Hymer (1976) provides some empirical evidence that the total receipts of the U.S. companies from rents, royalties etc., from unaffiliated foreign firms is only marginally significant ($128.4m) as compared to the earnings from direct investments ($3.13 b) in 1956.

SECTION 2.4: MACROECONOMIC APPROACH

The earlier work of MacDougall (1960) and Kemp (1961) used a macro-economic approach by making movement of capital from country to the other country a function of the differential rates of return on capital. Assuming perfect competition and a single commodity produced by capital and labour, capital will move from the country with a relatively lower rate of return to the country with a relatively higher rate of return. This can be seen easily from Figure 2.1 where AB and CD are the marginal product of capital curves for country 1 and 2 respectively. The initial stocks of capital in country 1 and 2 are GH and EF with the rate of return of country 2 (viz., O_2 F) being higher than that (viz., O_1G) for country 1. Given this difference between the rates of return, capital moves from country 1 to country 2. This process will go on till the rates of return are equalised at $O_1M = O_2N$ so that SV amount of capital has moved from country 1 to country 2. This is a simple but a powerful argument.

Figure 2.1



MacDougall (1960) then attempts to assess the benefits and costs of private investment from abroad. He wishes to discover the effects of an increase in the foreign owned capital stock but only by examining relatively small changes in the stock of foreign capital. The study ignores certain dynamic considerations that may be important and assumes that the economy involved have had time to adjust itself in the long run.

Although MacDougall's analysis makes drastic assumptions, he nevertheless in the course of his article, examines the implications by eschewing the imposed assumptions viz., (1) the government maintains full employment, (2) there is no taxation; (3) there are no external economies; (4) production functions exhibit returns to scale; (5) perfect competition prevails. Additionally the balance of payments is assumed to be always in equilibrium and the terms of trade effects are ignored. Finally, the size of the labour force and the stock of the domestically owned capital are assumed to be independent of the stock of foreign capital.

Using the Cobb-Douglas production function, we have the following model:

$$Y = K^{\alpha} L^{1-\alpha} \qquad (1)$$

$$r = \alpha K^{\alpha-1} L^{1-\alpha} \qquad (2)$$

$$w = (1-\alpha) K^{\alpha} L^{1-\alpha} \qquad (3)$$

$$P = rK \qquad (4)$$

$$W = wL \qquad (5)$$

$$Y = rK + wL \qquad (6)$$

Equation (1) states that output Y is produced by using capital (K) and Labour (L). Equation (2) states that rental (r) paid for capital services is equal to the marginal product of capital. Equation (3) similarly, equates wage-rate (w) to the marginal product of labour. Equation (4) and (5) respectively give profits (P) and wage-income (W). Lastly, equation (6) states that total income (Y) is the sum of profits and wages.

We treat (K) and (L) as exogenous variables. There are, therefore, five endogenously determined variables, viz, (r), (w), (Y), (P) and (W) in terms of which there are six equations. However, equation (3) follows from (1), (2) and (6). Therefore, there are five equations to determine five unknowns. We are interested in finding the effect of an exogenous increase in (K) on the endogenous variables. Differentiating (1), (2), (3), (4), (5), and (6) with respect to (K), holding (L) constant, we get the following:

$$\begin{vmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & -K & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -L \\ 1 & -K & 0 & 0 & -L \end{vmatrix} \begin{vmatrix} \partial Y/\partial K \\ \partial r/\partial K \\ \partial P/\partial K \\ \partial W/\partial K \\ \partial w/\partial K \end{vmatrix} = \begin{vmatrix} \alpha \frac{Y}{K} \\ \alpha(\alpha - 1)\frac{Y}{K^2} \\ r \\ 0 \\ r \end{vmatrix} \qquad (7)$$

Using Cramer's rule and denoting the determinant in the coefficient by |D| we get

$$\left.\begin{aligned} \partial Y/\partial K &= \frac{|Y|}{|D|} \\ \partial r/\partial K &= \frac{|r|}{|D|} \\ \partial P/\partial K &= \frac{|P|}{|D|} \\ \partial W/\partial K &= \frac{|W|}{|D|} \\ \partial w/\partial K &= \frac{|w|}{|D|} \end{aligned}\right\} \quad (8)$$

We find $D = -L < 0$ (9)

Using (8) and (9) appropriately, we get,

$$\partial Y/\partial K = \frac{\frac{-\alpha Y L}{K}}{-L} > 0 \quad (10)$$

Thus (10) states that if change of capital (K) is increased, income (Y) will increase.

$$\partial r/\partial K = \frac{\frac{-L(\alpha - 1)Y\alpha}{K^2}}{-L} < 0 \quad (11)$$

The result is that the marginal productivity of capital (r) will decrease if capital (K) is increased.

$$\frac{\partial W}{\partial K} = \frac{\alpha Y(\alpha - 1)}{K} < 0 \quad (12)$$

Thus (12) states that if capital increases, the total wage income will decrease.

$$\frac{\partial w}{\partial K} = \frac{\alpha(1-\alpha)Y}{L} > 0 \quad (13)$$

And in (13) shows that if capital changes the wage rate will change in the same direction. It should be noticed that the results of this mathematical analysis are formally similar to those derived in diagramatic form by MacDougall (1960). Thus, while foreign investment does prove to be profitable in the investing country we must be able to observe more specific reasons behind direct investment in order to derive appropriate explanations as to why capital movement (in terms of technological knowhow and managerial expertise etc.) takes place initially.

SECTION 2.5: MODELS OF OLIGOPOLISTIC FIRM WITH SPECIFIC ADVANTAGES

Clearly, capital can 'move' from one country to another only if an economic agent or a firm of one country invests in the other. Here we go away from the perfectly competitive macro world to a micro world with oligopolistic market structure and product differentiation.

The recent major attempts to explain international investment are based on the 'oligopolistic' concept. It is characteristic of oligopolistic theory that it covers many areas of analysis including the new theory of the firm, monopolistic competition, industrial organisation structure, capital theory, location theory and international trade theory. The oligopolistic theory it is hoped, will give a more realistic picture and a more adequate explanation of international investment. This theory has been built on micro-economic foundations. It seeks to explain direct foreign investment in terms of market imperfections, oligopolistic interdependence, and the possession of monopolistic advantages. Recent work in this field has been led by Hymer (1960, 1976) and followed by Kindleberger (1969, 1984), Johnson (1968), Caves (1971, 1973), Dunning (1971), Knickerbocker (1973), Horst (1972, 1973), and Hirsch (1976) among others.

Oligopolistic theory starts with the fact that firms operate across national boundaries; and they are confronted with several difficulties and additional costs. These include

communication, culture, language, law, poor knowledge of local market conditions, and the risk of production in foreign countries. For a foreign firm to operate profitably, it must possess some sort of advantage which could offset the high cost of information, communication, organisation and management. Thus it is emphasised that direct investment firms must have some monopolistic and/or oligopolistic advantages not possessed by potential foreign or local competitors.

The very nature of oligopolistic structure entails product differentiation, large scale production and economies of scale. The firm which is said to possess these advantages will rely firstly on product differentiation in terms of slight variations in presentation, appearance and performance in products manufactured by itself or by its rival firms. Caves (1974) gives a clear view of 'product differentiation' and says it is simply a collection of functionally similar goals produced by competing sellers, but with each seller's product distinguishable from its rivals by minor physical variations, brand name, or differences in terms of conditions of sale. Competition among sellers occurs primarily through advertising. As an industry grows more oligopolistic the market-oriented R & D becomes more important. R & D with the purpose of product differentiation is an obvious practice in many oligopolistic industries (Automobile industry, drugs industry).

Large-scale production can bring certain advantages to the firm and lead to economies of scale. In general, economies

of scale can bring down the cost of production, e.g. by reducing the cost of input per unit of output. They also lower the cost of external finance, as financial institutions usually offer loans to large corporations at a lower rate of interest and often accompanied by favourable terms. Lower advertising costs may be obtained when a firm advertises on a large scale. Transport costs are often lower if the volume of commodities transported is large. Large scale production allows division of labour and specialisation at the managerial level, e.g. sales, finance and personel managers. The divisions of managerial tasks increases experience and leads to a more efficient working of the firm. Furthermore, larger firms use high level technical innovation and mechanisation, e.g. high capacity machinery, telex machines, computers etc. It may be added that economies of scale is a source of market power for large firms. For, with sound finance and market expertise, whoever can set up and operate at a large scale will enjoy these advantages as barrier to entry of new competitors in the potential market.

Thus we need to look at the nature of oligopolistic advantages that foreign firms may have over local firms. These could be called 'ownership specific' advantages. The source of oligopolistic advantages may lie in such factors as superior technology, management, and organisational enterprise, marketing skills, capital availability and financial skills, economies of scale, bargaining and political power. But these advantages will carry differential levels of potential usefulness. The most

decisive are usually taken to be superiority in technology and marketing skills. With the former the firm can function as an innovating leader in the market while the latter aids expansion opportunities and acts as a barrier to entry.

The characteristics of a typical firm or corporation deciding to invest abroad then can be tested against the real world data. Vernon (1971) carried out a study of 187 U.S. manufacturing corporations and found that typical multinational firms exhibit (i) large size, (ii) high R & D intensity, (iii) high advertising expenditure, (iv) high profitability and (v) a high degree of diversification. By using regression analysis, Horst (1972) found that the "size' of the firm and "type of industry" was the most important determinants. He regressed 'probability' of becoming a multinational interprise on profitability, R & D, Advertising, vertical integration, product diversification in addition to size and type of industry. However, Horst (1972) thinks that size 'absorbs' the power of the other explanatory variables so far as the oligopolistic firms tend to be of large 'size', these empirical studies do lend support to the oligopolistic character of a multinational.

Caves (1974) carried out an interesting cross-section study by taking 64 Canadian industries and 52 U.K. industries. He regressed foreign direct investment explicitly on 'specific advantages' in addition to size, tariffs and (comparitive) cost advantages. The 'specific advantages' considered by Caves were (i) product differentiation, as measured by R & D intensity and advertising intensity, (ii) relatively lower

cost finance, (iii) economics of scale, (iv) multi-plant economies, and (v) managerial skill advantages. Caves (1974) found 'specific advantages' and 'size' to be significant determinants of FDI, and the variables insignificant. Although relative cost was found to be significant in the matter of choosing between exporting and direct investment. Among the 'specific advantages', product-differentiation advantages are found to be significant both for Canada and U.K. Managerial advantages were found to be insignificant.

From the empirical work discussed above, it appears that oligopolistic theories of FDI have reasonable empirical validity. However, critics point out that most of the empirical work is limited to the U.S. multinationals. These characteristics exhibited by the U.S. multinationals may be different from the multinationals of other countries. This indeed is shown by the work of Kojima (1977, 1978a, 1978b). They argue that the 'American type' of multinationals are oligopolistic with ownership advantages. The Japanese type of multinationals have other features, mainly, that (i) firms investing abroad are often small and medium-sized and (ii) the firms belong to a market structure which is close to 'competitive' market structure. This problably is explained by Japan's unique industrial situation and geographical location. To quote from Ozawa (1979_a).

> "In short, Japan's needs for low-cost labour, industrial sites, and natural resources and her neighbouring countries' need for industrialisation coincided with each other, and a closer and ever-deepening economic interdependence has developed between Japan and each of those Asian countries that adopted an outward-looking strategy for economic development"(P.109-110).

Although the Kojima-Ozawa's hypothesis does carry some truth, it must not be concluded that the all the Japanese multinational firms do not belong to the 'American type'. However, casual observation of Japanese investments in the U.K. and Europe show that the 'American type' Japanese oligopolistic firms do exist. Despite the Kojima-Ozawa hypothesis it is fair to say that the oligopolistic model with specific advantages is generally acceptable on the basis of empirical evidence.

SECTION 2.6: NECESSARY CONDITION, INTERNALISATION THEORY AND ECLECTIC THEORY

It is important to note that the 'specific advantages' hypothesis tells us only about the likely nature of a multinational firm. This is a necessary condition but not a sufficient condition for foreign direct investment. The fact that a foreign firm possesses some monopolistic or oligopolistic advantage over the indigenous or foreign competitors gives the firm its unique character but does not explain why the production process need be located abroad. The multinational firm could exploit its advantage through producing at home and exporting or by licensing a foreign producer. To explain why firms should invest in foreign markets therefore, given the same degree of advantage, other factors need to be considered, such as the cost of production, foreign governments' policies, marketing strategy, and oligopolistic reaction or barrier to entry etc. These factors can be classified as location specific.

Several motivational hypotheses can emanate from location theory. While low costs of production provide an obvious motive for foreign investment, (host) government intervention is also an important motive to be considered. This may take the form of import tariffs and other strategies employed by the LDC governments largely for inducing firms to set up local manufacturing. Threat of restrictions and loss of market can be a strong motive guiding firms to establish foreign affiliates. As Dunning (1973) says:

> "The answer to these questions to my mind, provides one of the keys to the unique character of the ME and lies at the core of the industrial structure approach to 'why international production?' For, rephrased, the question asks 'why is a market of a particular country served by the affiliates of foreign owned firms producing in that country rather than by indigenous firms?
>
> Location theory tackles this question from the viewpoint of individual firms; like capital and trade theory, however, it takes as data the imformation on costs and market size and structure. And, as we have suggested, given this data, it can not only explain actual location patterns, but can also indicate optimal patterns, subject to the uncertainties surrounding particular markets and future events" (P.401).

The other related but major attempt is to extend the 'ownership specific' hypothesis, which constitutes a necessary condition, to what is sometimes known as the internalisation theory. The work of Penrose (1961) and Buckley and Casson (1976) have made significant contributions. This theory states that motivation of foreign direct investment is the internalisation of the imperfect markets. A firm's act of investing abroad implies that markets are internalised across international boundaries.

This theory asserts that benefits from internalisation arise because of being able to avoid imperfections in external markets. For example, if a future market does not exist to coordinate interdependent activities involving time lag, considerable benefits can be generated by internalising markets for interdependent activities. If a host country has location-specific advantages (e.g., low wages), then the ownership-specific advantages can be exploited by internalising the host country's labour market by investing in the host country. Internalisation may be triggered by government intervention, opportunity to use transfer pricing in the case of internalisation of markets for knowledge production. Magee's (1977) appropriability theory of foreign direct investment asserts that the multinational firms succeed in transferring technology (ownership-specific advantage) by internalising the market for production of information.

Dunning (1977, 1979, 1980, 1981) summarised and synthesised various theories of foreign direct investment in an approach known as the eclectic theory of foreign direct investment. This appears to be a more elaborate version of the internalisation theory. How the different theories may be linked up is shown by Dunning (1981) in the following matrix form:

	ADVANTAGES		
	OWNERSHIP SPECIFIC	INTERNALISATION	LOCATION
FDI	YES	YES	YES
EXPORTS	YES	YES	NO
CONTRACTS, LICENSING, AGREEMENTS	YES	NO	NO

The above shows that ownership-specific advantages make FDI, exports, and licensing equally feasible. If ownership-specific advantages are internalised, then licensing is ruled out. If internalisation across international boundaries takes place because of location-specific advantages, then FDI will be the clear choice.

Dunning (1979, 1980) has also taken into account country-specific advantages. Ownership-specific advantages are not independent of country-specific advantages. As economic growth takes place in a country, her country-specific factors are likely to change and it will lead to a change in her ownership-specific and location-specific advantages.

SECTION 2.7: MOTIVATIONAL HYPOTHESES

The theoretical approaches, discussed in the previous section, do not put forward any causal hypotheses as such; they try to bring together various approaches to foreign direct investment. These approaches subsume various specific hypotheses based on preferred motives of multinational firms. We call these hypotheses motivational hypotheses which are often discussed separately, or which are used to justify inclusion of explanatory variables in regression analysis, or which are themselves subjected to empirical test. Some of the motivational hypotheses explain vertical foreign direct investment and some explain horizontal foreign direct investment. These hypotheses include: (i) the 'Barriers to Entry' hypothesis, (ii) the 'Raw-materials Availability' hypothesis, (iii) the 'Capital intensity' hypothesis, (iv) the 'Relative-wage' hypothesis, (v) the 'Tariff'hypothesis , (vi) the 'Currency Area' hypothesis, (vii) the 'Risk and Uncertainty Minimisation' hypothesis, (viii) the 'Host Country Government Initiative' hypothesis, (ix) the 'Avoidance of Environmental Restrictions' hypothesis. A brief discussion on each hypothesis will be in order although some of the above hypotheses receive further treatment in the chapters to follow.

(i) The 'Barriers to Entry' hypothesis:

The 'Barriers to Entry' hypothesis emphasises the possibility that a foreign firm, possessing no

ownership-specific advantages as compared to the host country firms, can invest in the host economy where there are barriers to entry. Clearly, barriers to entry are expected to remain for the foreseeable future. If the investing firm is as efficient as the host country firms, it will have the same advantages that create the barriers to entry in the host country. The above assumes that the firm incurring foreign direct investment has enough spare liquid funds, excess technological knowledge, and excess managerial talents. These, if employed in an economic environment protected by barriers to entry, will earn higher return. Therefore, foreign direct investment is likely to take place.

(ii) The 'Raw-materials Availability' hypothesis:

This hypothesis is specifically relevant to the foreign direct investment in the LDCs. (See, for example, Turner (1973)). There are three ways in which availability of raw-materials in a host country may trigger a decision by a multinational firm to invest in the host country. First, the investment may be vertically integrated to the parent company so that raw-materials will be produced at the host country and exported to the parent company. Second, the investment may be a form of horizontal extension so that the parent company can now produce by using the raw-materials (available at a lower price) at the host country. This is particularly relevant for products with a high content of raw-materials. Third, the foreign direct investment can also take place in the horizontal form so that a parent company

(engaged, say in mining) can produce 'materials' in the host country to supply to the world market. A brief discussion about the empirical findings on this hypothesis is presented in Chapter 5.

(iii) The 'Capital-Intensity' hypothesis:

Technological innovation identified with capital intensive techniques has been gradually recognised as one of the main components of growth in foreign direct investment. Multinational firms are often engaged in transferring high-technology and capital-intensive manufacturing industry to developing countries. Ideally, foreign investment should concentrate on investing in labour-intensive industries in developing countries which will be appropriate to the relative factor-endowments of a country. Nevertheless it is capital and high-technology intensive industries which are often introduced by multinational firms.

Most researchers are aware of these circumstances and in fact attempt to search for a 'rational' explanation of the close association between high-technology, capital-intensive investment and multinational enterprise. As Pavitt (1971) says, it is difficult to disassociate any decision of the multinational firm from technology and vice versa. Kindleberger (1971) also thinks that technology and the multinational firms are interdependent and interwoven from the beginning. Mansfield (1974) put forward the notion that technology and the multinational corporation are bound together, both because firms often become multinational to

exploit their techological superiority on a wider scale and because the multinational firm is an important agent in the production and diffusion of technology.

Capital-intensity hypothesis is related to what is sometimes called the 'Research and Development' hypothesis. Some argue (e.g. Gruber, Mehta and Vernon (1967)) that the cause of foreign direct investment is the research intensity. Gruber et al (1967) found that sectoral R & D expenditure was highly correlated with the share of the subsidiaries of the parent company in those sectors. Horst (1972) also found similar evidence.

It is fair to say that capital-intensity or R & D intensity hypothesis is subsumed in the 'ownership-specific' advantages. A further discussion of this hypothesis is carried out in Chapter 4.

(iv) The 'Relative-Wage' hypothesis:

This hypothesis is relevant specifically in the context of the less-developed countries most of which are characterised by excess supply of unskilled labour. Therefore, labour is expected to be relatively cheaper. It is likely that the multinationals will transfer production to the LDC host countries if the production process requires relatively more of unskilled or semi-skilled workers. However, the multinationals are mostly involved in high-technology industries so that the availability of unskilled workers will have limited effect, although this effectiveness could

be enhanced by on the job training ect.. A further discussion about this hypothesis appears in Chapter 8.

(v) The 'Tariff' hypothesis:

This hypothesis again has special relevance to the less-developed countries who often practise the strategy of import-substitution industrialisation. This, of course, implies a high tariff wall. If profitability is high in the host country and its market is relatively large (or if the market is expected to be growing in the future), then the (oligopolistic) multinationals incur direct foreign direct investment so that the market shares in the host country via exports are retained. Whether high tariffs will enhance the flow of foreign direct investment depends on whether profitability in the industry is increased or decreased in the host country. Empirical evidence is found in the earlier work of Eastman and Skykolt (1967) and Brash (1966). A further discussion is carried out in Chapter 6.

(vi) The 'Currency Area' hypothesis:

This hypothesis emphasises the role of exchange rate as a factor of which influences the direct investment decision. Aliber (1970, 1971) put forward the proposition that the flow of foreign direct investment can be explained in terms of hard currency areas and weak currency areas. Aliber (1970) asserts that portfolio investors tend to ignore the exchange rate risk on foreign earnings of a firm. This enables firms from harder currency areas to borrow at lower

costs in the weak currency area. The multinationals can capitalise the earnings on their foreign direct investments in weaker currency areas at relatively higher rates than the local firms. The foreign investors thus enjoy on advantage over the indigenous firms. This hypothesis has fair backing from various empirical work, e.g., Boataright and Renton (1975), and Alexander and Murphy (1975) among others. Alexander and Murphy (1975) concluded that devaluation discourages outflow of foreign direct investment and encourages inflow.

(vii) The 'Risk and Uncertainty Minimisation' hypothesis:

In this oligopolistic market structure there are various risk and uncertainties which a firm has to face involving price comptetition and non-price competition. This may increase a oligopolistic firms desire to invest abroad, given ownership-specific advantage, so that the risk and uncertainties arising from competition are cushioned. A strong motive for vertical integration is to minimise uncertainty regarding supply conditions of raw-materials which may be affected by action of a firms rival. Furthermore, many raw-materials do not have close substitutes. This leverage on supply of raw-materials may be used to increase barriers to entry. Furthermore, firms may try to minimise uncertainty and risk by diversifying their products either by increasing the range of products or by increasing the number of various products produced. Foreign direct investment is one way out to introduce new products or a new variant of an old product in a foreign country away

from the domestic competitors. It is because the 'firm-specific' advantages are likely to be more similar for firms in the same country than for the firms in the host country. The investing firms will normally have relative advantages over the host country firm.

(viii) The 'Host Country Government Initiative' hypothesis:

This hypothesis emphasises the impact of policies of the host country government of the decision making process of a foreign firm. It is generally agreed that the lead taken by the LDCs in granting special privileges, is an attempt to promote foreign direct investment. Under careful control foreign direct investment can have beneficial impact - a subject discussed in Chapter 9. The advantages given by the LDCs to multinational firms are: (a) tax concessions, (b) facility to repatriate profits or to import capital goods in the presence of foreign exchange control, (c) favourable credit conditions and interest rates. Many LDCs, including Thailand, have separate government departments to promote foreign direct investment. In many LDCs, government also helps the multinational by creation favourable labour-market conditions by making sure that trade unions are weak. The work of Krause Dam (1964) and Polk (1966) in the case of the U.S. and of Brash (1966) in the case of Australia, find only minor influence of government policies on the decision process of the multinationals. This is not surprising since the U.S. or Australia do not try to promote foreign direct investment with the same favour as the LDCs. It is true that government policies alone would not succeed in persuading a

foreign firm to invest in a LDC host country. However, given the other motives, LDC government's discriminatory treatment of the multinational firms would have some significant effect. Lall and Streeten (1977) do point out the role of government policies in inducing FDI to the LDCs.

(ix) The 'Avoidance of Environmental Restrictions' hypothesis:

It is hypothesised that, as the developed countries have become more aware of the need to curb pollution and limit environmental damage, some firms of the industrialised world are inclined to locate production in a host LDC where the strict restrictions imposed by the home country do not exist. There is an example of this in the case of Japan; and Ozawa (1979) has discussed these issues. A further discussion of this hypothesis is presented in Chapter 9.

SECTION 2.8: THE 'PRODUCT-CYCLE' HYPOTHESIS

The product-cycle hypothesis is a dynamic theory which explains how international trade is generated by 'lead and lag' of industrial innovations and which also explains why location of production might change from one country to another. A good deal of research and development undertaken by industrial firms result in new and/or improved products which cater to the needs of the high-income consumers. Once a firm establishes a technological lead in a new product and introduces it into the market, multinational enterprises

will have to make a series of decisions. As production develops and becomes standardised, the pattern of production and input requirements is likely to change over time. This pattern is referred to as 'product cycle'.

Vernon (1966, 1971, 1979), and Hirsch (1967) developed the product cycle model which appropriately attempts to find a sequence leading to foreign direct investment. Vernon (1966) studies the changes in the pattern of trade and investment in the following way. The life of a new product can be divided into three stages proceeding first from the 'new' to the 'mature' stage and then to be a 'standardised commodity'. His thesis relates these stages to the locational decisions made by firms and to the choice between exports and overseas production.

In the new stage, the product is produced when the firm is already located. At this stage, the role of scientists and engineers is important and cost considerations are relatively less important. In the maturing stage, a certain degree of standardisation is obtained, products become known in the foreign countries, cost considerations bring in the question of location. Standardisation leads to economies of scale, and also leads to exports. Profitability leads to the consideration of foreign direct investment. In the last stage, when the product becomes a 'standardised commodity', direct investment becomes inevitable. Once exports reach a certain level, several other factors come into play so that FDI becomes inevitable. These factors include tariffs, exhaustion of economies of scale at home plant, need to

provide prompt back-up service. There is a fourth stage, when foreign subsidiaries will supply not only the host country but will also export to other countries (including the country of the parent company).

Later, in 1979, Vernon comes up with a new theory that, as the world's environment was changing rapidly, the product cycle might not be appropriate to explain international trade and direct investment activities. He assumed that the product cycle would be less useful in explaining the relationship of the U.S. economy to other advanced industrialised countries, and would lose some of its power in explaining the relationship of the advanced industrialised countries to developing countries. But a strong trace of sequences is likely to remain.

In terms of the product-cycle, new technology and products are developing first in the industrial countries with high levels of income. In due course, the production saturates the domestic markets, and so the next step is for the firm to start to export to foreign markets. In the meantime, production gradually shifts from the home country, to host country through direct investment and other means e.g., licensing, or joint-venture. The firms that develop multinationally tend to be well-endowed with capital, and they are in general large in size. Being a large corporation, having the ability to mobilise large amounts of capital, and having a high level of efficiency in organisation, enable these large corporations to concentrate in the high-technology industries.

Through access to knowledge about new products or technology the firms have an edge over their rivals. This means the first firm in the field often possesses temporary monopoly advantage. Then, the innovating firms may have power to control and supply the domestic market. Thus, the leading firms are likely to be in an oligopolistic market structure when supplying the foreign markets. The first firm in the field creates barriers to entry, as has been pointed out by Dunning (1970).

It is thus clear that, once a firm has established a technological lead in some products, certain characteristics are likely to reveal themselves as the product grows more mature. Vernon (1971) makes the point that as the new product reaches the mature stage, overseas investment comes into existence. This is partly because the firm will be confronted with growing demand in the foreign market for highly technological and sophisticated products which require facilities and services; and also partly because of the need to protect the oligopoly position of the leading firm which is threatened by competition in the market. The threat may come from local firms or firms from the other countries.

As the original technological know-how becomes more well-known, imitation begins to take place and so the temporary monopoly position of the leading producer for any given product begins to crumble. The acute problem which the firm now faces is how best to exploit the advantage of being an innovatory leader; and at the same time, what should the

firm do to protect and prolong a temporary monopoly position which was originally based on a technological lead.

The studies done by Vernon and Wells (1981) suggest that there are two different patterns in the creation of foreign links which are adopted by various firms. The firm with very narrow product lines such as IBM or a motor-car company, may lean strongly towards wholly-owned subsidiaries. Firms with broad production lines such as Singer, Pepsi-Cola make greater use of joint-venture of licenses. Their goal is to obtain market information via the local share owner. Thirdly, there are firms which produce very sophisticated high-technology products (such as aero-space) or firms which produce military equipment. These firms need highly skilled labour and require continuous research and development; such firms are most likely to prefer to export. According to Hood and Young (1978) U.S. firms prefer to serve foreign markets by means of wholly-owned subsidiaries in order to retain control of key areas of decision making and to preserve proprietary technology. Also firms prefer direct investment over licensing when the technology is sophisticated; and foreigners lack the know-how to assimilate it. Also the firm is concerned about protecting quality standards. It is clear from the studies of Vernon and Wells that the firms with a narrow product line, which prefer to hold their technological skill and innovation know-how inside the firm and to maintain tight control over market strategy are likely to invest abroad. Again direct foreign investment with wholly owned subsidiary firms is likely to be favoured whenever the oligopoly advantage is of a kind that cannot be

easily handed over to a licensing agreement.

Many studies have described the pattern of foreign investment by using 'product cycle theory'. But in one way or another some types of Japanese direct investment and investment from LDCs are distinct from those of the western world particularly, U.S. overseas investment. Studies of foreign direct investment have either ignored those firms from the less-developed countries or put them together with other multinational enterprises. In the so-called 'catching-up-product-cycle' theory, multinationals from Japan and LDCs are looked at as imitators rather than innovators. In addition, these firms have tended to use labour-intensive technology.

In the 'catching-up' theory, the product cycle starts from the importation of a new product with superior quality. When demand increases, domestic production follows. By learning from practice and imitation and also from the importation of technological know-how, output expands and it leads to exploitation of economies of scale, increases in productivity, improvements in quality and reduction in costs. At this point, output is exported to the foreign markets as the cost becomes competitive. When exports expand, the domestic demand grows and encourages industrial development. At this stage, the firms from the LDCs will attempt to locate production in a foreign country.

SECTION 2.9: CONCLUSIONS

The apparent conclusion from our brief survey is simple: there is no general theory of foreign direct investment. The firm likely to be a multinational is typically an oligopolistic firm with certain ownership-specific advantages. This is a necessary condition and not a sufficient one. There is a host of 'motivational' hypotheses which explain, singly, or jointly, why a firm invests. The 'Product cycle' hypothesis is a dynamic one and has the potential to develop into a more general theory of trade and investment. We note here that our survey is not intended to be a comprehensive survey of the literature in the area of foreign direct investment. Materials are chosen to build a comprehensive structure of the work dealing mainly with the economic aspects. The literature dealing with the politics of FDI (including Marxist approach) are not discussed.

CHAPTER 3

PATTERN OF FOREIGN DIRECT INVESTMENT IN THAILAND

SECTION 3.1: INTRODUCTION

During the last two decades (1960-1983) Thailand has been attracting foreign investment both from the developed and the developing countries. This flow of foreign investment involves several factors, e.g., Thailand's mineral resources, her relatively abundant labour supply, oligopolistic and monopolistic characteristics of the firms of the investing countries, Thailand's tariff structure, etc.

The Thai government is increasingly aware of the need to develop appropriate national policies regarding foreign investments and to coordinate these in planned programmes in order to achieve a higher rate of economic growth and a better distribution of benefits so accrued. The government encourages foreign investment through the Board of Investment (BOI). The BOI is Thailand's central investment planning authority. It has wide discretionary powers to promote both foreign and domestic investment. The BOI is attached to the office of the Prime Minister, (who is also the Chairman of the Board). Seven members of the Board are Cabinet Ministers. This makes the BOI a politically powerful agent in Thai commercial and industrial affairs. It was established in 1959 with the objective of stimulating industrial expansion in Thailand. Above all the BOI's primary role is to regulate and direct foreign and domestic investments into sectors most appropriate according to the priorities of the Five Year Plans for Thailand's economic development.

Under the 1977 Investment promotion Act, BOI is empowered to grant various fiscal and other incentives to enterprises to which it issues promotion certificates after having approved their investment projects. Thus industrial investment may be promoted in projects which (a) are efficient in utilization of natural resources, (b) are consistent with Thailand's comparative advantage, and (c) are consistent with the emphasis placed by the government on the reduction of regional disparities.

The target areas for foreign investment are clearly marked by the government. The agricultural base industries, the labour-intensive industries and the export-oriented industries are the prefered sectors into which foreign investments are channelled. Within this framework, investment opportunities are categorized into various sectors, viz; (a) Agro-products and commodities, (b) Mineral, Metal and Ceramics, (c) 'Other Products' (plastic, watches, toys, musical instruments etc.) (d) Chemical and Chemical products, (e) Mechanical and Electrical equipment, (f) Services Industries, (g) 'Other Industries' (i.e. industries which have not been classified elsewhere). Furthermore BOI helps investors to obtain all the necessary licences and permits for setting up or expanding business in Thailand. However, it should be noted that it is compulsory for investment applications to pass through this channel only if fiscal and other incentives are sought. Aliens may carry out any legitimate business which is not specifically preferred in the Alien Business Law N.E.C. Announcement No. 281 (see Appendix 1) without having to apply for permission

from the BOI. (Although aliens, like indigenous investors have to apply for appropriate permits to set up in business.)

The investment incentives and tax concessions which the BOI offer to investors can be summarised as follows. The government provides a guarantee against nationalisation and against various types of government intervention in the enterprise. BOI offers import protection when there is fair justification and provides special fiscal measures which are highly beneficial to the foreign investors. They also give special permission to bring in foreign nationals and to own land. (For full details of promotion incentives, see Appendix 2). Since 1960, over 600 companies involved in foreign investment have been granted promotion certificates.

SECTION 3.2: TREND

We first examine whether a statistically significant trend of the aggregate foreign direct investment in Thailand is discernible. Table 3.1 presents the aggregate time-series data. Chart 3.1 presents the same in graphics.

Table 3.1 (in millions of U.S. dollars at 1975 prices)

	$M		$M
1960	6.96	1971	50.33
1961	16.53	1972	84.06
1962	19.12	1973	86.99
1963	48.45	1974	202.49
1964	39.93	1975	86.00
1965	58.07	1976	74.51
1966	49.19	1977	89.24
1967	72.69	1978	38.97
1968	93.50	1979	37.48
1969	73.64	1980	129.95
1970	58.31	1981	185.99

Source: Statistical Year Book for Asia and the Pacific 1982

Regressing foreign direct investment (I_t) on times (T) and dummy variable (with pre-1973 D=0 and from 1973-1981 D=1), we get the following results:

(1) $I_t = 5.26 + 0.08\ T + 1.42\ D \quad R^2 = 0.37$

$\quad\quad\quad (2.64) \quad\quad (3.38) \quad\quad (0.26) \quad DWS = 0.48$

(2) $\log I_t = -1.31 + 0.14\ T + 0.08\ D \quad R^2 = 0.66$

$\quad\quad\quad\quad (2.24) \quad\quad (6.10) \quad\quad (0.16) \quad DWS = 0.48$

It is fairly clear from regression equations (1) and (2) that a statistically significant positive trend exists although it is stronger in non-linear form. The dummy variable, purported to capture the effect of the oil crisis, is not significant. These results should be viewed with care as there is evidence of autocorrelation.

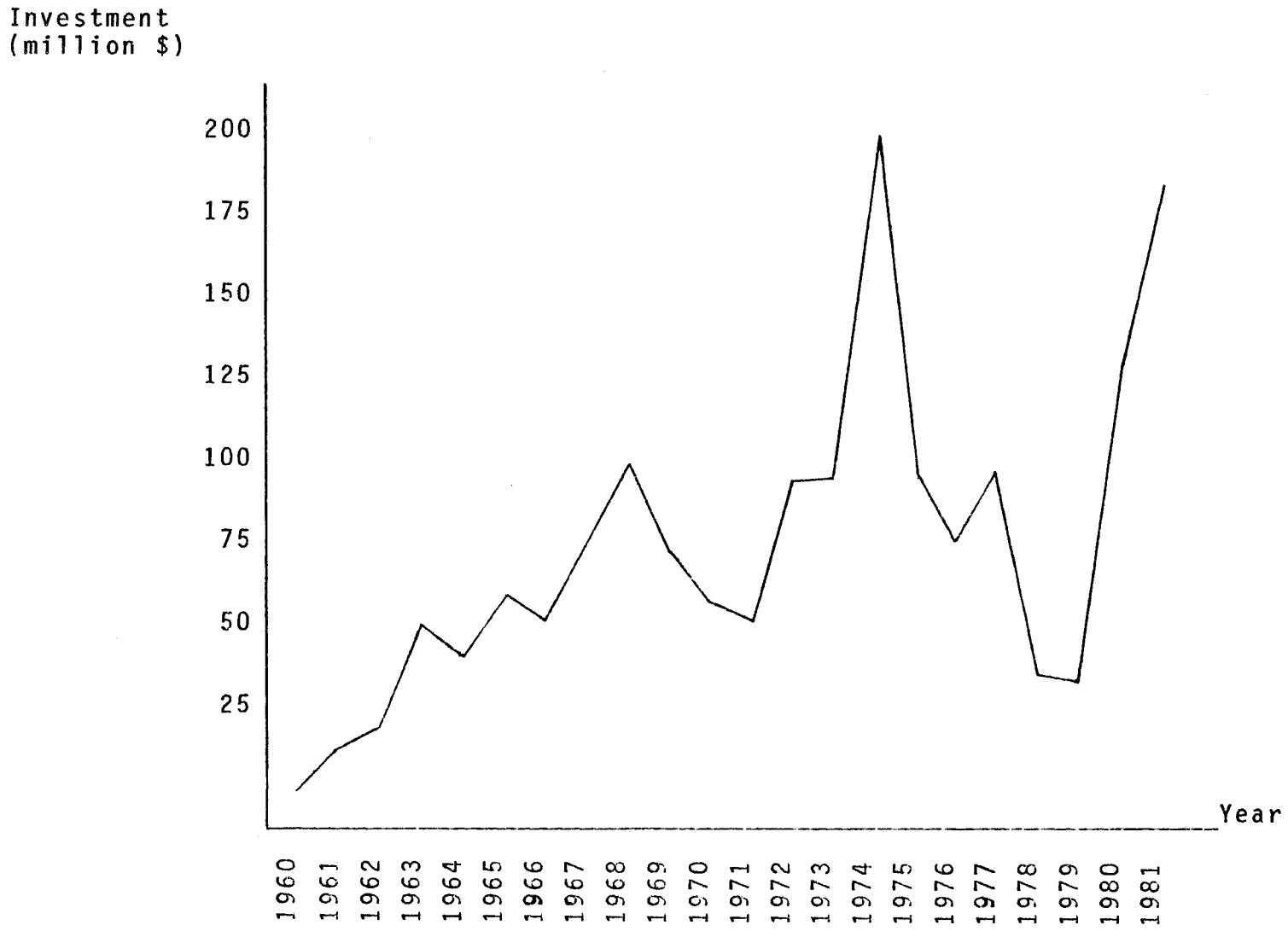

Investment
(million $)
200
175
150
125
100
75
50
25
Year
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981

Chart 3.1

It will be interesting to examine outflow of foreign investment from various countries to Thailand. We are fortunate to get reasonable data for Germany and Japan as shown in Table 3.2. For the U.S.A., we have got data only for six years. Regressing investment outflows from Germany and Japan to Thailand on time and a dummy (as before), we get the following regression equations.

$$(3)\quad I_t^{Germany} = \underset{(0.16)}{0.09} + \underset{(1.91)}{0.19\,T} - \underset{(0.16)}{0.79\,D} \qquad R^2 = 0.32,\ DWS = 1.97$$

$$(4)\quad \log I_t^{Germany} = \underset{(3.37)}{-1.23} + \underset{(3.12)}{0.21\,T} - \underset{(-1.81)}{1.16\,D} \qquad R^2 = 0.49,\ DWS = 1.95$$

$$(5)\quad I_t^{Japan} = \underset{(3.81)}{45.0} - \underset{(1.63)}{2.54\,T} + \underset{(0.41)}{8.5\,D} \qquad R^2 = 0.13,\ DWS = 1.38$$

$$(6)\quad \log I_t^{Japan} = \underset{(10.82)}{3.53} - \underset{(-0.85)}{0.06\,T} + \underset{(0.60)}{0.34\,D} \qquad R^2 = 0.07,\ DWS = 1.55$$

It is once again clear that a non-linear positive trend exists for Germany, although the R^2's are low for time series data. On the logarithmic run for Germany, the trend coefficient is significant. For Japan again a weak non-linear negative trend is seen. This negative trend is determined by high real investment in 1968 and low real investment in 1980 and 1981. It may be because Japan invested in the sixties in sectors like mineral, chemical etc., of Thailand. But in the late seventies and early eighties, outflow of Japanese foreign investment perhaps is relatively channelled more to manufacturing (car, electronic equipment etc.) and perhaps, therefore, are flowing

TABLE 3.2 Outflows of investment from U.S.A., Japan and West Germany into Thailand. (in Million dollar, at 1975 prices)

YEAR	W. GERMANY[1]	JAPAN[2]	U.S.A[3]
1966	0.13	-	-
1967	0.46	-	-
1968	0.98	92.80	-
1969	0.66	29.10	-
1970	1.15	17.04	-
1971	1.19	11.21	-
1972	1.35	36.57	-
1973	1.34	38.40	-
1974	0.29	33.19	-
1975	0.57	14.31	-
1976	1.17	17.76	-
1977	0.77	43.18	203.36
1978	4.54	24.67	188.62
1979	2.53	40.08	146.98
1980	1.42	22.44	250.87
1981	1.52	20.02	355.85
1982	-	-	383.62

Sources: 1. Deutsche Bank, Frankfurt

2. The Bank of Tokyo, LTD. (Trade and Investment service office)

3. U.S. Department of Commerce (Bureau of Economic analysis)

relatively more to the developed countries (Europe, and North America) rather than to the less-developed countries like Thailand. From Table 3.2 there appears to be a positive trend for the U.S.A., as far as we can see from the six observations. Unfortunately, outflow figures of the U.S. foreign investment to Thailand for the earlier years are not available.

SECTION 3.3: DATA

In this section we discuss the data of foreign direct investment in Thailand. We have nine industrialised countries (namely U.S.A., U..K., West Germany, Japan, Switzerland, Netherlands, Australia, France, and Italy) and nine developing countries (viz., Taiwan, Hong-Kong, Singapore, Portugal, India, Malaysia, Panama, Korea and Philippines). These countries are selected because they are the leading foreign investors in Thailand. The analysis of the pattern of foreign direct investment will be based on data published by the Board of Investment. In 1982, the BOI published data of foreign and Thai firms which received promotion certificates from 1960 to 1981. The BOI data provides information about each firm's registered capital, capital assets, labour employed and raw-materials used (both domestic and imported). There are of course foreign firms who set up business in Thailand without the BOI promotion certificates, as mentioned earlier. Our analysis is thus limited to the sample of foreign firms registered with the BOI, some of whom register in order to obtain certain privileges. Other foreign firms do not register, being deterred by bureaucratic red-tape and cumbersome administrative processes.

According to the BOI data, different foreign investors have different shares in the firms in the sample. We have analysed these firms in Table 3.3. Table 3.3 shows the number of firms in each category of foreign ownership from 0.1-100% share of investment. It also gives the value of registered capital (at constant prices 1975 = 100) in each foreign-ownership category. It is interesting to note that the number of investing firms from the developed countries in the 31-100% group is larger than the number of firms from less-developed countries. But the number of firms from the less-developed countries in the 0.1-30% group is larger than from developed countries.

Charts 3.2 and 3.3 are constructed from Table 3.3. Chart 3.2 shows the number of firms in each 10% category of foreign ownership starting from the 0.01-10% group and ending with the 91-99% group with the exceptions of two groups viz., 50% group and the 100% group. Chart 3.3 gives the value of registered capital involved in each similar category.

The BOI data is our sample, and it is taken as representative of the population of foreign firms. The number of firms in the sample is large (n=576 firms). Therefore we assert that there are no good reasons to suspect a systematic and significant difference (with respect to technology, labour market, etc.,) between the BOI registered firms and firms not registered with the BOI. Furthermore, the BOI data are very useful as they are classified into seven main industrial sectors. These are:

Table 3.3

SHARES OF FOREIGN INVESTORS	DC		LDC		ALL COUNTRIES	
	NUMBER OF FIRMS	REGISTERED CAPITAL (1000฿)	NUMBER OF FIRMS	REGISTERED CAPITAL (1000฿)	NUMBER OF FIRMS	REGISTERED CAPITAL (1000฿)
100%	28 (7.6%)	812,100 (4.4%)	2 (1.0%)	10,120 (0.14)	30 (5.2%)	822,220 (3.2%)
91-99%	11 (3.0%)	266,108 (1.5%)	2 (1.0%)	52,532 (0.73)	13 (2.2%)	318,640 (1.3%)
81-90%	9 (2.5%)	285,157 (2.1%)	1 (0.5%)	2,240 (0.03%)	10 (1.7%)	287,397 (1.5%)
71-80%	15 (4.1%)	463,990 (2.5%)	4 (1.9%)	88,918 (1.24%)	19 (3.3%)	552,908 (2.2%)
61-70%	14 (3.8%)	668,046 (3.8%)	3)1.4%)	34,496 (0.48%)	17 (2.9%)	702,542 (2.8%)
51-60%	11 (3.0%)	383,570 (2.1%)	2 (1.0%)	38,713 (0.54%)	13 (2.2%)	422,283 (1.7%)
50%	14 (3.8%)	579,612 (3.2%)	3 (1.4%)	82,154 (1.14%)	17 (2.9%)	661,766 (2.6%)
41-49%	128 (34.9%)	6,704,305 (36.5%)	50 (23.9%)	1,366,577 (19.09%)	178 (30.9%)	8,070,882 (31.6%)
31-40%	51 (13.9%)	2,324,636 (12.6%)	34 (16.3%)	1,037,941 (14.35%)	85 (14.7%)	3,362,577 (13.2%)
21-30%	31 (8.4%)	3,326,989 (18.1%)	37 (17.7%)	1,212,194 (16.87%)	68 (11.8%)	4,539,183 (17.7%)
11-20%	20 (5.5%)	627,528 (3.4%)	26 (12.4%)	738,160 (10.27%)	48 (8.3%)	1,365,688 (5.3%)
0.1-10%	35 (9.5%)	1,801,797 (9.8%)	45 (21.5%)	2,523,513 (35.11%)	80 (13.9%)	4,325,310 (16.9%)
TOTAL	367 (100%)	18,243,838 (100%)	209 (100%)	7,187,558 (100%)	576 (100%)	25,431,396 (100%)

Sources: Compiled from The Board of Investment data.

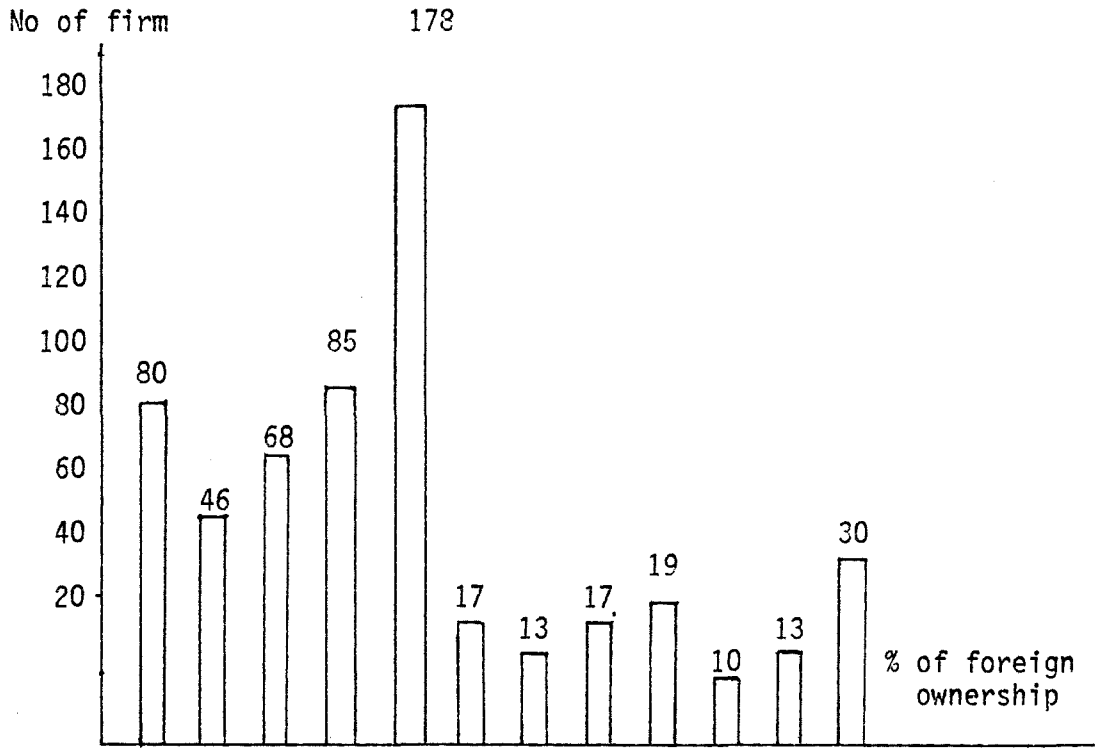


Chart 3.2

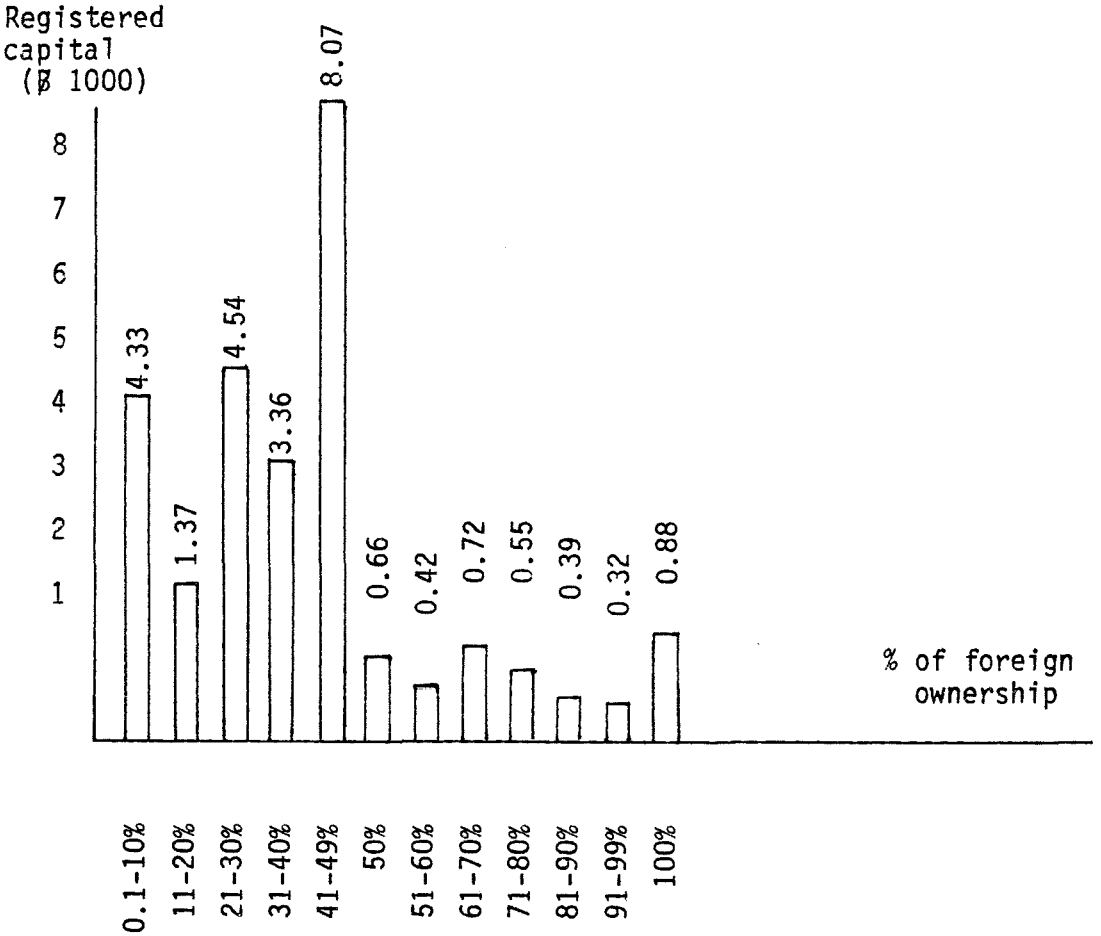


Chart 3.3

1) Agricultural products (large scale cultivation, animal feed, corn products, rubber products, animal products, fishing, etc.)

2) Mining and Metal (processing of metal, smelting, mining or dressing of ores, and ceramic products industry, etc.)

3) Chemical (chemical products, pharmaceutical products, fertilizer, petrochemicals, petroleum products, etc.)

4) Mechanical and Electronic products (production or assembly of engines, production or assembly of electronic goods.)

5) Textiles, plastic, and Other Products (Production or assembly of cameras, watches, manufacturing of sporting equipment, musical instruments or toys, synthetic fibre products, printing of textiles etc.)

6) Services (comprising hotels, hospitals, international trading enterprises, silo and drying modern packages of vegetable and fruit for export, cold storage, transport etc.)

7) Unclassified products (e.g., spinning, weaving, dyeing, knitting, assembly of vehicles industry, veneer industry, wood parquet products, gypsum products, etc.)

(The complete lists of these seven main industrial sectors can be found in Appendix 3).

In our study of the pattern of foreign investment we are using each firm's registered capital with the BOI at constant prices (1975 = 100). The figures presented in Tables 3.4 and 3.5 are computed from constant registered capital. Table 3.4 shows each country's sectorwise pattern of foreign direct investment in Thailand. Columns 1 to 7 in the table give the result of each country's share of their investment in each sector, e.g., agricultural sector. The figures will add up to 100% for each country along each row. Column 8 shows the results of each country's share of the total of foreign investment in Thailand. The results of this analysis will portray each developed or less-developed country's pattern of investment in Thailand.

It should be pointed out here that the empty cells in Table 3.4 do not necessarily imply that the investing countries concerned have never invested in those sectors. This is simply because our sample does not contain observations on these sectors. This does imply that investments by the relevant countries in the relevant sectors (i.e. the empty cells) are either small or negligible in the population. There may, however, be another explanation. It is the following. If there is a firm jointly owned by two or more countries, then that foreign direct investment is listed as coming from the country which owns the highest share. There are several firms in the sample with multiple ownership as shown in Chart 3.4. Furthermore, we should note that 'Other DCs' include Canada, Norway, Denmark, Israel, Sweden, Belgium, Luxembourg, New Zealand and South Africa. And 'Other LDCs' include Kenya, Bermuda, Romania and Indonesia.

TABLE 3.4

INDIVIDUAL COUNTRY'S SECTOR-WISE PATTERN IN FOREIGN DIRECT INVESTMENT

SECTORS / COUNTRIES	SUM OF COLUMNS 1 to 7	1 AGRICULTURAL	2 MINERAL	3 CHEMICAL	4 MECHANICAL	5 OTHER PRODUCTS	6 SERVICES	7 OTHER INDUSTRIES	8 EACH COUNTRY'S SHARE
	%	%	%	%	%	%	%	%	%
JAPAN	100	7.85	12.05	16.60	12.85	11.65	3.22	35.78	36.36
U.S.A	100	12.06	53.42	14.44	4.75	2.59	5.62	7.12	12.00
TAIWAN	100	12.06	20.55	29.52	3.78	20.61	6.11	7.37	10.65
U.K.	100	4.17	10.92	4.09	3.60	1.24	33.53	42.45	6.86
INDIA	100	0.34	59.21	23.52	-	8.65	-	8.28	5.37
HONG-KONG	100	2.49	4.89	5.09	-	21.27	64.93	1.33	3.99
SINGAPORE	100	28.31	19.48	-	10.04	11.31	30.86	-	2.75
NETHERLANDS	100	18.22	64.45	6.63	5.32	-	4.38	-	2.51
WEST GERMANY	100	12.09	40.11	20.12	2.78	12.69	3.40	8.81	2.30
PORTUGAL	100	-	-	64.71	-	35.29	-	-	2.14
MALAYSIA	100	39.06	30.92	-	-	9.17	11.69	9.16	1.93
SWITZERLAND	100	60.98	0.97	18.57	2.63	3.46	0.39	13.00	1.49

(Cont.)

TABLE 3.4 (Cont.)

INDIVIDUAL COUNTRY'S SECTOR-WISE PATTERN IN FOREIGN DIRECT INVESTMENT

		1	2	3	4	5	6	7	8
SECTORS	SUM OF COLUMNS 1 to 7	AGRICULTURAL	MINERAL	CHEMICAL	MECHANICAL	OTHER PRODUCTS	SERVICES	OTHER INDUSTRIES	EACH COUNTRY'S SHARE
COUNTRIES	%	%	%	%	%	%	%	%	%
FRANCE	100	2.77	-	-	-	97.23	-	-	1.41
AUSTRALIA	100	48.31	6.85	23.88	13.05	-	-	7.91	1.22
KOREA	100	-	35.55	-	14.17	25.23	25.05	-	0.54
PANAMA	100	83.64	-	-	16.36	-	-	-	0.31
PHILIPPINES	100	-	67.30	-	-	15.79	-	16.91	0.23
ITALY	100	-	70.20	-	29.80	-	-	-	0.13
OTHER DC	100	4.42	90.54	3.95	-	0.83	0.26	-	7.59
OTHER LDC	100	3.40	-	-	-	96.60	-	-	0.25
									100
ALL	100	10.40	28.20	15.54	6.73	11.56	8.80	18.87	
DC	100	10.02	29.44	13.28	8.24	8.92	6.07	24.03	
LDC	100	11.37	25.01	21.32	2.86	18.29	15.83	5.32	

TABLE 3.5

SECTORS / COUNTRIES	MINERAL	OTHER INDUSTRIES	CHEMICAL	AGRICULTURAL	OTHER PRODUCTS	MECHANICAL	SERVICES	
	1	2	3	4	5	6	7	
DCs	(29.44%)	(24.03%)	(13.28%)	(10.02%)	(8.92%)	(8.24%)	(6.07%)	100%
	1	6	2	5	3	7	4	
LDCS	(25.01%)	(5.32%)	(21.32%)	(11.37%)	(18.29%)	(2.86%)	(15.83%)	100%
	1	2	3	5	4	7	6	
ALL	(28.20%)	(18.87%)	(15.54%)	(10.40%)	(11.56%)	(6.73%)	(8.80%)	100%

SECTOR	a	b	Total
Agriculture	29	83	112
Mineral	25	66	91
Chemical	18	50	68
Mechanical	13	71	84
Other Products	24	74	98
Services	16	33	49
Other Industries	20	54	74
Total	145	431	576

a : No. of firms with multiple ownership

b : No. of firms with single ownership

Chart 3.4

SECTION 3.4: SECTOR-WISE PATTERN

Considering the developed and the less-developed countries together (Table 3.4, last row), we find that the largest sector accounting for foreign direct investment in Thailand is Mineral products (28.20% of total foreign investment) followed by 'Other Industries' (18.77), Chemical sector (15.54%), 'Other Products' (11.56%), Agricultural sector (10.40%), Services (8.80%). The Mechanical sector accounts for only 6.73% of total investments. The fact that foreign investment in the mineral sector is relatively high needs some explanation. This could be the result of abundant availability of minerals in Thailand. Therefore, it is likely that countries with scarce indigenous mineral resources (like Japan or the Netherlands) will seek an external source of raw-materials supply. There are countries with an abundant supply of raw-materials, e.g., U.S.A. and Australia. Their investments in the mineral sector in Thailand could be explained by the hypothesis that their own pattern of mineral endowments is different from that of Thailand. An additional important consideration is the lower cost of mining in Thailand relative to that in the home country, even after the cost of transportation etc. has been taken into account. Furthermore, countries like the U.S.A. may wish to preserve their own mineral resources for the future and yet guarantee a smooth flow of output by utilising the mineral resources from other countries.

The 'Other Industries' sector lies second in attracting foreign investments. We may note that the nature of the

products in this sector (e.g. spinning, weaving, veneer industry and wood parquet products etc.) is such that these products use natural resources intensively. Moreover, the industries which use wood or cotton as primary raw-materials are also relatively labour-intensive. The natural resources and unskilled labour are available at a relatively lower cost in Thailand. Therefore the developed countries with relatively higher labour cost and dearer natural resources are expected to invest in this sector in Thailand. It is interesting to note that 24.03% of the foreign investment from the developed countries and only 5.32% of the foreign investment from the less-developed countries have gone into this sector.

The third largest sector of foreign investment is Chemical products. While it might seem superficially surprising to see foreign investment in this sector, nevertheless non-economic factors may be regarded as primarily responsible. These are related to the nature of the product. Thailand may have been used by foreign firms to produce toxic and hazardous chemicals because production is more strictly regulated and restricted in the home country. (Note that this aspect is discussed in detail in Chapter 8). This may also be regarded as an economic factor due to the increased cost of production resulting from such regulations. Furthermore, labour unions in Thailand are weak so that unions fail to prevent investors from exposing workers to health hazards. The 'Clean House' policies of investing countries (like Japan) make Thailand an attractive ground for their overseas investment (in addition to the low

cost of employing Thai skilled labour in this area, e.g. laboratory technicians). For the rest of the investment sectors, the aim of foreign investors generally may be either to take advantage of cheap labour, local raw-materials or to exploit land for cultivation. Now we proceed to discuss the pattern of investment for each country.

Japan is the biggest investor in Thailand. It is evident from Table 3.4 (Column 8) that the Japanese foreign direct investments account for 36.36% of the total foreign direct investments. Japan concentrates her investments in 'Other Industies' sector which accounts for 35.78% of her total investments in Thailand. Relatively low-cost and natural resources are the main attractions. It is generally accepted that during the last ten or fifteen years, Japan's textile industry has largely lost its competitiveness due to relatively high domestic wage costs, so that Thailand becomes a useful low cost new location. The Chemical sector attracts 16.60% of Japan's direct investments. The 'Clean House' policy of Japan probably makes a substantial impact on the relatively high investment in this sector. The Japanese Government has been strongly criticised by Ozawa (1979) in their 'Clean House' policy. This policy emphasises a shift from 'pollution-prone' and 'resource-consuming' industries towards 'clean' and 'knowledge-intensive' industries, using overseas investment in a new role to serve as a device to 'houseclean' the economy.

U.S.A., the second largest investing country with 12.00% of total foreign investment in Thailand, presents a picture remarkably different from that of Japan. The U.S. investments are concentrated in the Mineral sector with 53% of her total Thai investments going into this sector. As a highly industrialised country, mineral products form an important input for the U.S.A.. Therefore, it is reasonable to assume that the U.S.A. will try to procure her input supply by investing in countries with an abundant supply of mineral resources as in Thailand (despite U.S.A.'s own supply of minerals as explained earlier). On the other hand, the U.S.A. has a smaller level of investments than Japan in the 'Other Industries', Mechanical sector and the 'Other Products' sector. But she has a higher level of investment than Japan in the Agricultural sector. Like Japan though, its level of investment in the Services sector is less than 6% of its investment.

Taiwan, although a developing country, is one of the principal investors, accounting for 10.65% of total foreign direct investment (the third largest). The pattern of her investment resembles that of the U.S.A., in so far as the proportions of total investment going to the Agricultural, Mechanical, Services and 'Other Products' sectors are concerned. These proportions are roughly similar. But Taiwan's pattern differs significantly from that of the U.S.A. in having a relatively larger proportion of her investment in Chemical with 29.52% (her largest sectoral investment) and 'Other Products' with 20.61%, and in having less investment in the Mineral sector.

The U.K. is the fourth largest investor, accounting for 6.86% of the total foreign direct investment. The U.K. pattern of investment differs from those of the U.S.A. and Taiwan. Nearly 75% of total investment by the U.K. is concentrated in two sectors, viz., 'Other Industries' (42.45%) and Services sector (33.53%). It is interesting to find that the U.K. investments are not directed towards the natural-resource-based industries. Given the historical dominance of London in insurance and banking services (in many less-developed countries), we are not surprised that a large part of the U.K. investments have gone into the Services sectors. However, in Thailand, U.K. investments in the Services sector are not in Banking and Insurance, but are mainly in the hotel, cold storage, silos and Coastal Oil Tank business.

India is the fifth largest investor with 5.97% of total foreign direct investment. Her investment being concentrated in the Minerals sector (59.20%) and in Chemicals (23.50%). It should be noted however, that the data for the Chemical sector contain a substantial proportion of shares held by other foreign investors. In many cases, the proportion of the Indian contribution to ownership of the firm is low, tending to be below 50%. As for example, a Chromium Sulphate firm with joint venture investment, contains 40% of Thai ownership, 35% of Indian share, the remaining 25% being Canadian share.

The shares of investment in Thailand by Hong-Kong and Singapore ar 3.99% and 2.75% respectively. The biggest area

of their investments is the Services sector. Hong-Kong's pattern of investment is similar to that of the U.K. except for the 'Other Products' and 'Other Industries' sectors. While the U.K. investment in the 'Other Products' is only at 1.24% of investment, Hong-Kong's investments in this sector is at 21.27%. The opposite is that for the 'Other Industries' sector where the U.K. investment is as high as 42.45% and the Hong-Kong investment is as low as 1.33% of her total investment in Thailand. As both Hong-Kong and U.K. have close economic contact with one another, it is not surprising to note that their pattern of investment in Thailand is similar in the Services sector.

The rest of the developed countries (viz., Netherlands, Italy and other DCs) concentrate their investment in the Mineral sector. Chemicals sector is an important target for Australia, Switzerland and Portugal. Switzerland, Australia, and Netherlands have a high level of investment in the Agricultural products sector. France and Portugal concentrate their investment in 'Other Products' sector.
Among the less-developed countries, Malaysia, Korea and the Philippines have a high level of investment in the Mineral sector. The 'Other Products' sector attracts investments from Korea and 'Other LDCs'. Malaysia and Panama have a high level of investment in the Agricultural products sector.

On examining each country's share of foreign direct investment in Thailand, in column 8 of Table 3.4, we find that Japan occupies the leading position followed by U.S.A.,

Taiwan, and U.K.. These four countries' share of investment accounts for 65.87% of the total foreign direct investment in Thailand during the twenty year period (1960-1981). A comparison of the pattern of investment between DCs, LDCs and DCs + LDCs, is shown in Table 3.5. The table presents the data for these groups in descending order of sectoral proportions. As previously mentioned, the foreign investment pattern in Thailand is concentrated in three main sectors, viz. Mineral, 'Other Products' and Chemical sector; the value of investment in these three sectors accounting for 65.61%, or about two-thirds of the total foreign direct investment. The Services and Mechanical sectors, are the least attractive sectors for foreign investors. There are differences between the DC and LDC pattern of investment except for the Minerals sector, which has the largest share of both the DC and LDC investments in Thailand.

SECTION 3.5: COUNTRY-WISE PATTERN

In this section we discuss the country-wise sectoral pattern of foreign direct investment in Thailand. Consider Table 3.6; Japan plays a dominant role in the Agricultural products sector, since her investments in this sector account for 27.45% of the total investment in this sector by all countries. Most of her investments are in Canned food, Preserving products and Animal food. U.S.A. is second highest investor (13.92%) followed by Taiwan (12.63%). Most of the U.S. investments are in Tobacco leaves, Canned food and wheat products, while Taiwan's investments are Rubber and leather products and Canned food (fruit, sea-food and

TABLE 3.6

COUNTRY-WISE SECTORAL PATTERN OF FOREIGN DIRECT INVESTMENT IN THAILAND

SECTORS / COUNTRIES	AGRICULTURAL %	MINERAL %	CHEMICAL %	MECHANICAL %	OTHER PRODUCTS %	SERVICES %	OTHER INDUSTRIES %
JAPAN	27.45	15.54	38.83	69.42	36.65	13.30	69.32
U.S.A	13.92	22.72	11.15	8.48	2.69	7.66	4.55
TAIWAN	12.63	7.76	20.23	5.99	18.99	7.39	4.18
U.K.	2.75	2.66	1.80	3.67	0.74	26.10	15.52
INDIA	0.18	11.27	8.12	-	4.01	-	2.37
HONG-KONG	0.96	0.69	1.32	-	7.35	29.42	0.28
SINGAPORE	7.49	1.90	-	4.10	2.69	9.63	-
NETHERLANDS	4.39	5.82	1.07	1.98	-	1.25	-
WEST GERMANY	2.67	3.28	2.98	0.95	2.53	1.89	1.08
PORTUGAL	-	-	8.91	-	6.53	-	-
MALAYSIA	7.26	2.12	-	-	1.53	2.56	0.94
SWITZERLAND	8.74	0.05	1.78	0.58	0.45	0.06	1.03

(Cont.)

TABLE 3.6 (Cont.)

COUNTRY-WISE SECTORAL PATTERN OF FOREIGN DIRECT INVESTMENT IN THAILAND

SECTORS / COUNTRIES	AGRICULTURAL %	MINERAL %	CHEMICAL %	MECHANICAL %	OTHER PRODUCTS %	SERVICES %	OTHER INDUSTRIES %
FRANCE	0.37	-	-	-	11.89	-	-
AUSTRALIA	5.68	0.29	1.88	2.37	-	-	0.52
KOREA	-	0.67	-	1.13	1.17	1.52	-
PANAMA	2.47	-	-	0.75	-	-	-
PHILIPPINES	-	0.54	-	-	0.31	-	0.21
ITALY	-	0.33	-	0.58	-	-	-
OTHER DC	3.23	24.36	1.93	-	0.54	0.22	-
OTHER LDC	0.08	-	-	-	1.93	-	-
TOTAL	100	100	100	100	100	100	100
DC	69.22	75.05	61.43	88.03	55.48	49.48	92.02
LDC	30.78	24.95	38.57	11.97	44.52	50.52	7.98

meat). In the Mineral sector, the U.S.A. holds the dominant position with 22..72% of total investment in this sector, followed by Japan (15.54%) and India (11.27%). It is interesting to note that the 'Other DCs' group has a big share of investment (24.36%) in this sector.

Japanese investments in 'Chemicals' account for 38.83% of total foreign direct investment in this sector. This is more than three and a half times as large as that of Taiwan (20.23%), Portugal (8.91%) and India (8.12%) have the similar levels of investment in this sector after Taiwan. Again Japan has the highest share of investments in 'Mechanical' sector (69.42%), followed by the U.S.A. (8.48%). Japan also plays the dominant role in the 'Other Products' sector with her 36.65% share of investment. Taiwan is in the second highest position with 18.99% share. This is the sector where France concentrates her investments with 97% (see Table 3.4). France is the third highest investor (11.89%) followed by Hong-Kong (7.35%) and Portugal (6.53%). Hong-Kong and U.K. with 29.42% and 26.10% share of investment in this sector, are by far the largest investors in the Services sector followed by Singapore (9.63%) Taiwan (7.39%) and U.S.A. (7.66%). Lastly, we have the 'Other Industries' sector, where Japan is the main investor accounting for 69.32% of the total investment in this sector. U.K. plays the second role (15.52%) followed by Taiwan (4.1%) and U.S.A. (4.55%). An interesting finding is that in all sectors of investment, except in the Services sector, DCs investors play a dominant role as shown in Table 3.7. In 'Other Products', the share of the DCs is about 11

TABLE 3.7

SECTOR	DCs + LDCs %	DCs %	LDCs %	DCs % / LDCs %
AGRICULTURAL PRODUCTS	100	69.22	30.78	2.2
MINERAL, METAL & CERAMICS	100	75.05	24.95	3
CHEMICAL	100	61.43	38.57	1.6
MECHANICAL	100	88.03	11.97	7.3
OTHER PRODUCTS	100	55.48	44.52	1.2
SERVICES	100	49.48	50.52	0.98
OTHER INDUSTRIES	100	92.02	7.98	11.5

times larger than that of the LDCs while in 'Agriculture' and 'Chemicals' the share is only about twice larger. It is only in the 'Services' sector that LDC and the DC shares are roughly equal.

SECTION 3.6: FOREIGN DIRECT INVESTMENT AND PER CAPITA INCOME

In this section we examine whether countries with higher per capita income invest relatively more in Thailand. We have seen in the previous section that the sectoral proportions of foreign direct investment differ between the LDC and DC countries. Furthermore, in most sectors the DCs invest relatively more than the LDCs. We assess that the primary differences between the LDCs and the DCs are reflected in one important variable, i.e., the level of per capita income. We have the following hypothesis: the higher the per capita income, the higher is the share of foreign direct investment in Thailand.

We have the sectoral proportions of individual countries in Table 3.6. We note that these shares are the results of cumulative investment from 1961-1981. Therefore, for per capita income, we use the following alternative definitions:

WA^i = i th country's weighted average of per capita incomes of 1960, 1970, and 1980, where the weights are the Thai population in 1960, 1970 and 1980 respectively.

AV_3^i = i th country's average per capita incomes of 1960, 1970 and 1980

AV_2^i = i th country's average per capita incomes of 1970 and 1980

AV_I^i = i th country's per capita income of 1980

The data on per capita income are easily available from the IMF Year Book and are expressed in constant 1975 prices. We now define the following variables:

SI^i = i th country's share of total foreign investment.

SI_J^i = i th country's share of total foreign investment in the Jth sector.

D = Dummy when D = 0 for LDC

D = 1 for DC

Regressing SI on WA, for a cross-section of 20 countries (as in Table 3.6) we get the following:

$$SI = 2.87 + 0.01WA + 0.93D + R = 0.17$$
$$(t=1.04)\quad (t=1.41)\quad (t=0.21)\quad DW = 1.39$$

These results do not improve if AV_3, AV_2 or AV_1 are run as independent variable. Logarithmic runs also did not improve these results. The evidence thus shows that per capita income does not explain share of foreign direct investment in Thailand. Then the question arises whether per capita income explains a country's share in a particular sector. Again WA performs relatively better than the other independent variables. We have the following results:

$$SI^i_{agriculture} = \underset{(t=1.44)}{3.23} + \underset{(t=1.41)}{0.008WA^i} + \underset{(t=0.39)}{1.4D} \quad R^2 = 0.19,\ DW = 1.89$$

$$S^i_{mineral} = \underset{(t=1.79)}{2.38} + \underset{(t=5.10)}{0.002WA^i} - \underset{(t=1.18)}{2.56D} \quad R^2 = 0.65,\ DW = 1.62$$

$$S^i_{chemical} = \underset{(t=1.21)}{4.05} + \underset{(t=1.19)}{0.1WA^i} - \underset{(t=0.16)}{0.85D} \quad R^2 = 0.10,\ DW = 1.59$$

$$S^i_{mechanical} = \underset{(t=0.95)}{5.65} - \underset{(t=1.45)}{0.003AV^i_1} - \underset{(t=1.80)}{32.34D} \quad R^2 = 0.19,\ DW = 2.86$$

$$S^i_{other\ products} = \underset{(t=1.66)}{6.64} + \underset{(t=0.82)}{0.002AV^i_2} + \underset{(t=0.88)}{10.10D} \quad R^2 = 0.22,\ DW = 1.60$$

$$S^i_{services} = \underset{(t=1.87)}{7.73} - \underset{(t=0.77)}{0.002AV^i_3} + \underset{(t=0.66)}{7.67D} \quad R^2 = 0.72,\ DW = 1.53$$

$$S^i_{other\ industries} = \underset{(t=1.10)}{6.90} - \underset{(t=1.62)}{0.005AV^i_2} + \underset{(t=2.0)}{36.7D} \quad R^2 = 0.22,\ DW = 1.60$$

It is clear from the above results that per capita income does not explain sectoral shares of an investing country in Thailand.

The only reasonably good result is for the 'Mineral' sector where WA is significant and R^2 = 0.65 although the β- value is very small. For the 'Mechanical', 'Other Products', 'Services', and 'Other Industries' sectors the results presented are AV_1 AV_2, and AV_3 respectively, except for 'Other Industries' sector is AV_2, as the independent variable. All of them (viz., AV_1, AV_2, AV_3) are

insignificant with the wrong sign. Lastly, we note that logarithmic runs did not improve these results.

SECTION 3.7: CONCLUSIONS

There exists a significant trend for the aggregate inflow of foreign direct investments to Thailand. The trend is made weaker by the large fluctuations between 1974 and 1981. We also found a significant trend for the flow of German investments to Thailand; although a similar result does not hold for the Japanese foreign direct investments in Thailand. Further analysis has been carried out by using the BOI data which give both the country-wise and sector-wise investments. Ninety-two per cent of the firms from the less-developed countries are in the 0.1-49% foreign-ownership category, while twenty-five per cent of the firms from the developed countries are in the 51-100% foreign-ownership category. The largest proportion (28%) of foreign direct investments has gone to the mineral sector. The second largest proportion (19%) has gone to the 'Other Industries' sector where industries are mostly natural-resource based. Japan, U.S.A. and Taiwan are leading investors in Thailand. About 27% of the total investments in the agricultural sector, about 39% of the total investments in the mineral sector, and about 69% of the total investments in the mechanical sector come from Japan. About 22% and 15% of the total investments in the mineral sector come, respectively, from the U.S.A. and Japan. The sectoral pattern for foreign direct investment differs between the developed and the less-developed countries except in the services sector. Lastly, we tested whether a country with higher capita income will have a larger share of foreign direct investment in Thailand. Our test has rejected the hypothesis.

CHAPTER 4

THE CAPITAL-INTENSITY HYPOTHESIS

SECTION 4.1: INTRODUCTION

Multinational firms, as we have noticed in Chapter 2, are oligopolistic firms with a degree of monopoly power in terms of firm-specific factors (e.g., technological superiority) and/or product differentiation. It is often argued that such firms are 'large' and are engaged in 'high technology' which are relatively capital-intensive. It is not surprising, therefore, that capital-labour ratio has featured as one of the various determinants of foreign direct investment in the work of Baldwin (1979), Juhl (1979), Lall (1980) among others. Caves (1974) alone has used capital to sales ratio to construct a variable which captures 'size' of firms.[1]

Following Hirsch (1976), let Z denote firm specific know-how and other intangible assets. Z may be the result of past investment in R&D leading to new products and/or processes or new managerial know-how. Since Z is intangible, it is 'neither depleted nor amortized', and, thus, takes the characteristics of a public good as pointed out by Johnson (1970). Now we note that Z "appears to be particularly important in high technology industries which manufacture new product-cycle goods" (Hirsch 1976, p.267). The transfer of Z by a multinational firm to another country involves a

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1 Caves (1974) defines a variable called KC which 'indicates the capital cost of constructing a simple plant of minimum efficient scale'. It is the size of the 'minimum efficient scale' plant multiplied by assets to sales ratio.

large amount of physical capital or tangible assets.[2] These transfers requiring relatively a large quantity of physical capital stock may take place from one country to another country which is relatively more abundant in capital or which provides other combinative factors (such as skilled and unskilled labour or raw-materials) cheaply. In these cases, the transfer is primarily motivated by the country-specific characteristic (e.g., availability of capital). However, this transfer may also take place to a country which is, say, relatively less endowed with capital, when the investing countries supply the required capital. In this case, the motive may be to capture the market or the 'expected' market before a competitor invades that country. It is, therefore, clear that capital labour ratio is strongly associated with foreign direct investment from one country to another. Thus, capital-intensity is a necessary condition. The purpose of this chapter is to test this capital-intensity hypothesis in the case of Thailand.

SECTION 4.2: COUNTRY-WISE AND SECTOR-WISE ANALYSIS OF THE CAPITAL-LABOUR RATIO

We begin by investigating the sectoral and country-wise capital-labour ratios and later use them to test the hypothesis that the foreign firms tend to invest in high-technology and capital intensive sectors of the

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2 In the case of licensing this need not be the case.

less-developed countries countries like Thailand. Let K stand for capital and L for labour and k = K/L is capital-labour ratio. A higher value of k implies that relatively more capital is used. In this study, capital is operationally defined as fixed assets net of depreciation plus current assets (viz. inventories). Lall (1980), for example, defines the total net fixed assets as capital. We have very little choice in this matter as the data are available only in this form. However, these figures are taken as a reasonably good estimate of capital in value terms.

The value of capital per worker embodied in foreign direct investment in Thailand is discussed with reference to eight principal investing countries and two 'groups' of countries which are 'small' investors. Four of the countries are developed countries (viz., U.S.A., U.K., West Germany, Japan) and the other four are developing countries (viz., Taiwan, Hong-Kong, India and Singapore). The rest of the investing countries are classified into two groups: (a) the 'Other developed countries' group which consists of 18 countries, viz., Denmark, Israel, Belgium, Canada, Italy, Australia, Netherlands, New-Zealand, Portugal, France, Panama, Norway, Switzerland, Luxembourg, Bermuda, Romania, South-Africa and Austria, and (b) the 'other developing countries' group which contains six countries, viz., Kenya, Korea, Philippines, Laos, Cambodia and Malaysia. We are using cumulative data from 1961-1981 from the BOI (as we have explained earlier in Chapter 3). From the sample data, we first take the cumulative figure for each of the eight

principal investing countries (as mentioned above) for the period of 1961-1981. Because of inflation the BOI data would not be appropriate if we were to use the cumulative total of capital assets at the current prices. We must, therefore, deflate to express the value of capital at constant baht. We have done so by taking 1975 as the base year. However, an exact deflator of the type we require does not exist. We have therefore decided to use the Thai GDP deflator which is readily available from the UN publications (1982).

To determine labour in the most accurate way we should consider the number of hours worked or man hours per year. However, this is not possible here because of lack of data. We have, therefore, used number of employees as labour. We should be aware that this accounts for quantity not the quality of labour. But this is a more difficult problem, and even Leontief (1953) could not take account of quality of labour. In practice it is very difficult to account for the differences in quality of labour input. We are taking number of employees as labour and thereby implicitly assuming homogenous labour. This seems to be acceptable as a first approximation.

We have computed, in Table 4.1, the country-wise sectoral capital-labour ratios of eight principal countries plus two groups of developed and developing countries. Then the figures for each country are classified into seven sectors, namely, Agricultural products, Mineral, Chemical, Mechanical, 'Other Products', Services and 'Other Industries'. The last row shows the over-all capital-labour

TABLE 4.1 (฿ 1000 at 1975 prices)

CAPITAL-LABOUR RATIO K/L = k	% OF OWNERSHIP	USA	UK	W.GERMANY	JAPAN	OTHER DCs	TAIWAN	HONG-KONG	INDIA	SINGAPORE	OTHER LDCs
1. AGRICULTURAL PRODUCTS AND COMMODITIES	51-100%	694.10	336.13	2097.66	1732.79	708.23	74.39	14.86	-	-	350
	01.-49%	295.38	261.68	178.64	572.29	688.82	136.72	173.42	126.44	857.68	216.05
2. MINERAL AND METAL, CERAMICS	51-100%	1895.62	-	246.31	2230.12	7877.08	205.89	-	-	667.79	238.14
	0.1-49%	567.81	458.99	609.37	1288.18	319.95	423.53	680.27	1183.42	461.97	507.77
3. CHEMICAL AND CHEMICAL PRODUCTS	51-100%	2000.76	830.69	1470.17	5850.11	1158.89	503.99	931.81	397.07	-	-
	0.1-49%	1746.20	431.02	-	1745.29	6460.69	825.80	393.82	532.70	-	-
4. MECHANICAL AND ELECTRICAL EQUIPMENT	51-100%	466.22	538.71	477.18	1059.88	209.02	-	-	-	-	-
	0.1-49%	679.56	721.14	178.18	605.29	215.98	146.50	-	-	3793.97	-
5. OTHER PRODUCTS TOYS, WATCH, CLOCK MUSICAL INSTRUMENTS	51-100%	-	340.99	-	330.02	1590.00	-	597.83	-	-	-
	0.1-49%	1013.07	123.83	407.13	840.33	1117.05	278.43	312.61	397.35	466.97	154.84
6. SERVICES	51-100%	-	-	-	-	789.81	-	-	-	-	-
	0.1-49%	448.71	1199.14	477.06	888.09	-	432.93	491.89	-	914.12	276.20
7. OTHER INDUSTRIES	51-100%	-	-	-	1940.48	-	279.03	-	-	-	120.21
	0.1-49%	434.06	241.24	281.66	938.77	376.79	125.72	62.51	334.25	-	212.75
OVER-ALL k	51-100%	650.51	540.37	942.17	1605.87	1852.56	273.41	130.47	397.07	667.79	317.89
	0.1-49%	542.69	292.39	371.78	918.48	1831.79	304.66	392.31	608.21	978.85	231.21

ratio of each individual investing country. Further, we have classified each sector of a country's investment into two categories: Primarily foreign-owned firms (with 51-100% foreign ownership) and primarily Thai-owned firms (with 0.1-49% foreign ownership). The share of ownership by a foreign firm depends largely on the degree of internalisation of the country-specific advantages desired by the investing firm. This is discussed in detail in the Survey Chapter (See Chapter 2, pp.45).

Table 4.1 presents the country-wise sectoral capital-labour ratios. It shows that the k ratios differ greatly between sectors and between countries. It also reveals that the majority of the k ratios of 'all developed countries' are larger than those of 'all developing countries'. Differences in k-ratios also exist between the primarily foreign-owned firms and the primarily Thai-owned firms. A detailed break-down of k-ratios shows that the k-ratios of 'all DCs' investors in the primarily Thai-owned firms category are relatively lower than those of the primarily foreign-owned firms category. This is not surprising. It confirms the expected. Since Thailand is relatively less abundant in capital, one would expect the primarily Thai-owned firms to be relatively less-capital-intensive. However, there are exceptions. For example, West Germany in the 'Agricultural' sector, the 'Other DCs' group in the Mineral sector. Other similar results also appear in the 'Mechanical' sector where the k-ratios of U.S.A., U.K. and 'Other DCs' are lower for the primarily foreign-owned firms category. A similar low k-ratio is again unexpected in the 'Other Products' sector for

Japan. But in the cases of the 'Services' and 'Other Industries' sectors, it seems unjustified to pursue any further comparisons because of insufficient observations.

The k-ratios of the developing countries lie in the opposite direction to those of the developed countries. That is, the k-ratios for the LDCs are relatively higher than those for the DCs in the primarily Thai-owned firms. Comparing the k-ratios of LDC firms between the categories of ownership, we find that, in seven cases out of twelve, the primarily Thai-owned firms have relatively lower k-ratios. The high k-ratios in primarily Thai-owned firms appear in the Mineral and 'Other Industries' sectors of the 'Other LDCs' group. It is unfortunate that we do not have more observations in our analysis in order to draw a more rigorous conclusion. However, the different results of the k-ratios between DC's and LDC's will become more apparent if we study over-all ratios for each country.

Nevertheless the results for the LDC ratios are not particularly surprising, because within the domain of the developing countries, Thailand, in general seems to be more technologically advanced in South-East Asia, with the exception of Singapore. Other countries such as Taiwan and Hong-Kong concentrate their advantage relatively more in the finance and banking areas rather than in the technical field. Therefore, it is not surprising to find that some of the firms in the primarily Thai-owned category, which have a greater element of Thai capital, tend to engage in relatively high-technology, capital intensive investment.

While at the same time some of the primarily foreign-owned firms (from the LDCs) may still prefer to choose the traditional labour-intensive methods of production.

According to the above discussion, if we are to test the hypothesis that foreign firms tend to concentrate on high-technology and capital intensive investment, the most appropriate method would be to compare the results of the firms from the DC group with those of firms from the LDC group. Thus we pay attention only to the results of the DC's sectoral capital-labour ratios in testing this hypothesis; and most of our attention will be given to the category of the primarily foreign-owned firms.

The first sector under consideration is the Agricultural sector, where West Germany has the highest k-ratio (2097.66), Japan is second with her k-ratio of 1732.79. 'Other DCs' group 708.23 and U.S.A. 694.10 share the same level of k- ratio. The U.K. (336.13) has the lowest ratio in all DCs group even lower than the 'Other LDC's ratio (350). Taiwan and Hong-Kong have low k-ratios (74.39 and 14.86 respectively.)

We find that the k-ratios of DCs are lower in the category of the primarily Thai-owned firms than those for the category of the primarily foreign-owned firms. But the results are in opposite direction for the LDCs except for the 'Other LDCs' group. The k-ratio for Singapore is surprisingly high (857.68); her ratio being the highest in both the DCs and LDCs group.

In the Mineral Sector in the category of 51-100% foreign ownership firms, the k-ratio for 'Other DCs' is exceptionally high with a value of 7847.08 followed by 2230.12 for Japan and 1895.65 for the U.S.A.. But the k-ratio for West Germany gives a very low value of only 246.31 in this sector. There is unfortunately no observation for the U.K. in this sample. In the LDC group, Singapore has the highest ratio of 655.96. While Taiwan and 'Other LDCs' share the similar low level of k-ratio at 205.89 and 238.14 respectively. The DC k-ratios are relatively lower in the category of the primarily Thai-owned firms than those in the primarily foreign-owned firms as we would expect according to the hypothesis under consideration. However, the k-ratio of Japan is still high at 1288.18; and surprisingly the k-ratio of India is as high as 1183.43. It can be explained by the fact that her investments in Thailand are carried out jointly with other industrialised countries viz., Canada and Britain.

In the category of the primarily foreign-owned firms the k-ratios of the DCs for the Chemical sector are relatively higher as compared to the k-ratios of the other sectors. Japan has the highest ratio (5850.11) followed by the U.S.A. with 2000.76, West Germany with 1470.17 and 'Other DCs' with 1158.89. The U.K. has a low value in this sector (k = 830.69). Her ratio is even lower than that of Hong-Kong (931.81), Taiwan ratio is 503.99. India has the lowest k-ratio of 397.07 compared to the other k-ratios in this sector. It can be seen that the k-ratios in primarily Thai-owned firms category in this sector are also high, in

particular, the ratio of 'Other DCs' with k = 6460.69 and U.S.A. with k-ratio = 1746.2. Taiwan also has a higher k-ratio in the Chemical sector relative to the other sectors with k = 825.80. Both 'Other DCs' and Taiwan k-ratios are much higher than the ratios for the primarily foreign-owned firms. This may be explained in terms of 'Other DCs' being a large group with various industries in the same sector. With a less heterogeneous group of industries and with data from more countries, this effect would probably disappear.

For the Mechanical sector in the category of the primarily foreign-owned firms the k-ratios are much lower than the k-ratios in the sector discussed so far. Japan has the highest k-ratio of 1059.88 followed by West Germany with k = 477.18. We have no sample observations for the LDC firms in this category. For the DCs in the category of the primarily Thai-owned firms, the k-ratio seems to be higher than for the primarily foreign-owned firms. This is true for the U.S.A., the U.K. and West Germany. Singapore has the highest k-ratio of 3793.97 in this category.

In the last three investing sectors; 'Other Products', Services and 'Other Industries', foreign direct investment of DCs and LDCs tend to be concentrated in the category of the primarily Thai-owned firms, in particular, in the Services sector where only the 'Other DCs' appear to invest in the category of the primarily foreign-owned firms.

In the 'Other Products' sector, there are only four countries involved in the primarily foreign-owned firms

category. There are 'Other DCs' with a k-ratio of 1590. In the primarily Thai-owned firms category, the 'Other DCs' has the highest ratio of 1117.05 and the U.S.A. has the second highest ratio of 1013.07.

Taiwan and Japan are the only two countries who invest in the 'Other Industries' sector in the primarily foreign-owned firms group. For the primarily Thai-owned firms group, Japan has the highest ratio of 938.77 in this category.

We conclude from our analysis that the sectoral capital-labour ratios of the four developed countries and the 'Other DCs' are consistently higher than the sectoral capital-labour ratios of the four less-developed countries and the 'Other LDCs' group in both 51-100% and 0.1-49% foreign ownership categories. Moreover, as mentioned earlier, the DC k-ratios in the category of primarily Thai-owned firms, in general, are relatively smaller than those in the category of the primarily foreign-owned firms. This means that a greater capital-intensity of investment is observed whenever a relatively larger element of foreign ownership is present. Furthermore, the capital-intensity of the LDC investments appear to concentrate in the category of the primarily Thai-owned firms. The data in the LDCs group show greater variability between the 51-100% and 0.1-49% foreign ownership category.

The data provide fairly clear evidence for accepting the capital intensivity hypothesis since the over-all k-ratios confirm that the k-ratios of DC investors involved in the

51-100% foreign-ownership category are larger than the k-ratios of those in the 0.1-49% foreign ownership category and are also larger that the k-ratios of the LDCs group. On the contrary, the LDC ratios for 0.1-49% foreign-ownership category are larger than the ratios in 51-100% foreign-ownership category except for the k-ratios of the 'Other LDCs'.

SECTION 4.3: A SIMPLE ECONOMETRIC TEST

Although we have found (in section 4.2) some empirical evidence which supports the capital intensity hypothesis in the case of Thailand, further empirical analysis is likely to provide more rigorous support. This section presents some simple econometric results by using the OLS method.

Testing the capital intensity hypothesis by using econometric methods turns out to be tricky. Baldwin (1979), Lall (1980) and others have used capital-labour ratio as one of the several determinants of foreign direct investment. In a multiple regression model, this procedure perhaps is acceptable. We test a 'simple' hypothesis which relates capital-labour ratio to foreign direct investment. As explained in the Survey Chapter (pp.51), it is only a necessary condition that a firm investing in a foreign country has oligopolistic characteristics with monopolistic advantages. It is not a sufficient condition in that an oligopolistic firm with firm-specific advantages need not be a multi-national firm. Now, if capital-labour ratio

captures these characteristics, then we should find a strong correlation between sectoral foreign direct investment and sectoral capital-labour ratio. In testing a necessary condition, it is not possible to hypothesize which 'causes'what. In other words, we may say that either capital-labour ratio is a function of foreign direct investment or vice versa.

It is important to note that the above argument applies directly to horizontal expansion which leads to multi-plant economies. But the pattern of foreign direct investment in Thailand (Chapter 3) shows that a large percentage goes towards producing raw-materials (minerals, rubber etc.). In these cases, clearly the oligopolistic firm decides on vertical integration. But extractive industries, such as mining, require a large amount of capital. So, on both accounts (i.e. vertical and horizontal integration), one would expect sectoral capital-labour ratio to be directly related to sectoral investments.

Furthermore, there is a broad view regarding capital-labour ratio. This view is associated with the relative abundance of capital in the developed countries. Thailand being a less-developed country and the major investors in Thailand being the developed and semi-industrialised countries, one would expect a positive relationship between sectoral capital-labour ratio and sectoral investments.

We postulate a simple regression equation of the following type: $y = \alpha + \beta_0 x + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 D_4 + u$ where y

is the dependent variable, x is the independent variable, D_i, i = 1, 2, 3, 4 are the dummies, u is the error term. D_1 = 1 for all developed countries, D_1 = 0 for all less-developed countries. This is clear enough. We hypothesize that the capital intensity 'requirement' will vary from sector to sector. One would expect, in general, mechanical and chemical sectors to be more capital intensive than, say, the 'Services' sector. The second dummy D_2 is used to capture this difference. It takes a value of unity for the Mineral, Chemical and Mechanical sectors, and a value of zero for Agriculture, 'Other Products', Services, and 'Other Industries' sectors. We have a group of developed countries lumped together as 'Other DCs' and a group of less-developed countries lumped together as 'Other LDCs'. These countries grouped together are not homogeneous, and it is our considered opinion that these two groups may affect our empirical results. In order to take account of this, we use dummies D_3 and D_4 when D_3, = 1 for 'Other DC's' and D_4=1 for 'Other LDC's', D_3 = 0 and D_4 = 0 for the rest of the countries.

We have used three 'definitions' of capital-labour ratio based on foreign-ownership categories. These are:

k_1 = capital-labour ratio of 51-100% foreign-ownership category

k_2 = capital-labour ratio of 0.1-49% foreign-ownership category

k_3 = capital-labour ratio of 0.1-100% foreign-ownership category

The data for k_1 and k_2 are taken from Table 4.1 and the data for k_3 (calculated from the original BOI data) is presented in Table 4.2.

For foreign direct investments we have two alternative specifications: These are the following:

I_1 = level of foreign direct investments

I_2 = over-all share of investment for each country in each sector (i.e., sectoral investment as a percentage of total foreign direct investments).

Data for variables I_1 and I_2 are presented in Tables 4.3 and 4.4. These are calculated from the BOI data as discussed in Chapter 3. We note that Table 4.1 has 10 'countries' and 7 sectors.

Each figure in a cell is taken here as one observation. This requires an explanation. Consider the U.S.A. investments in the Agricultural sector. There are many American firms (say, preferring majority equity share, i.e., 51-100%.) who have invested in the Agricultural sector of Thailand. The figure 694.10 is derived by dividing the aggregate capital stock of all those firms by the aggregrate number of employees. The corresponding value of aggregrate investment (in % terms or levels) is available from Tables 4.3 and 4.4. Furthermore, we assume that the decision-making process of the American firms investing in the Thai Agricultural sector is independent of the same if the American firms invest in the Mechanical or Mineral sector. This is assumed to be true for all the countries including the 'Other LDCs' and 'Other DCs'

TABLE 4.2 (฿ 1000 AT 1975 prices)

K/L 0.1-100%	USA	UK	W.GERMANY	JAPAN	OTHER DCs	TAIWAN	HONG-KONG	INDIA	SINGAPORE	OTHER LDCs
1.AGRICULTURAL	490.99	276.66	469.59	686.95	695.78	137.03	63.25	126.45	857.68	225.95
2. MINERAL	998.09	458.99	507.91	1390.40	6015.04	422.47	680.27	1183.42	632.04	498.48
3.CHEMICAL	1833.23	788.79	1470.15	1796.84	5054.38	819.03	567.37	56.88	-	-
4.MECHANICAL	477.41	576.96	223.94	659.12	211.95	146.50	-	-	3793.96	-
5.OTHER PRODUCTS	1013.07	141.89	407.12	733.86	1122.78	278.43	318.66	397.35	466.97	154.84
6. SERVICES	448.71	1199.14	447.06	888.99	789.81	432.93	491.89	-	914.12	276.19
7. OTHER INDUSTRIES	434.06	241.24	281.66	1102.01	376.79	147.15	62.52	334.25	-	211.37

TABLE 4.3 LEVEL OF FOREGN DIRECT INVESTMENT (₱ 1000 AT 1975 prices)

	USA	UK	W.GERMANY	JAPAN	OTHER DCs	TAIWAN	HONG-KONG	INDIA	SINGAPORE	OTHER LDCs	TOTAL
1. AGRICULTURAL PRODUCTS AND COMMODITIES	3686880	185053	857936	5798525	4161557	690841	109428	22381	308764	917360	16738725
2. MINERAL AND METAL, CERAMICS	1707730	326342	1125024	8557940	4589472	1292750	100000	1394063	436743	564782	20094846
3. CHEMICAL AND CHEMICAL PRODUCTS	2513361	195620	346960	7153227	12843191	1985328	255316	908683	-	-	26191686
4. MECHANICAL AND ELECTRICAL EQUIPMENT	3804976	1144696	43893	6445580	88170	196455	-	-	527361	-	12251131
5. OTHER PRODUCTS	176275	295268	85903	4245353	1851469	1758580	706145	574564	133485	491631	10418763
6. SERVICES	367044	733874	76000	1048125	101096	887510	2120031	-	419582	228413	5981675
7. OTHER INDUSTRIES	1321279	2440167	172377	29043603	655616	608752	34696	207571	-	468613	34952674
TOTAL INVESTMENT	13577545	5321020	2708093	62292353	24290571	7420216	3325616	3107262	1925935	2670799	126629410

TABLE 4.4 OVER-ALL SHARE OF INVESTMENT FOR EACH COUNTRY IN EACH SECTOR

	% USA	% UK	% W.GERMANY	% JAPAN	% OTHER DCs	% TAIWAN	% HONG-KONG	% INDIA	% SINGAPORE	% OTHER LDCs
1. AGRICULTURAL PRODUCTS AND COMMODITIES	2.91	0.15	0.68	4.58	3.29	0.55	0.09	0.02	0.24	0.72
2. MINERAL AND METAL, CERAMICS	1.35	0.26	0.89	6.76	3.62	1.02	0.08	1.10	0.35	0.44
3. CHEMICAL AND CHEMICAL PRODUCTS	1.99	0.15	0.27	5.65	10.14	1.57	0.20	0.72	-	-
4. MECHANICAL AND ELECTRICAL EQUIPMENT	3.00	0.90	0.03	5.08	0.07	0.16	-	-	0.42	-
5. OTHER PRODUCTS	0.14	0.23	0.07	3.35	1.46	1.39	0.56	0.45	0.18	0.39
6. SERVICES	0.29	0.58	0.06	0.83	0.08	0.70	1.67	-	0.33	0.18
7. OTHER INDUSTRIES	1.04	1.93	0.14	22.93	0.52	0.48	0.03	0.16	-	0.37
TOTAL	10.72	4.20	2.14	49.19	19.18	5.87	2.63	2.45	1.52	2.10

groups. On this basis, we consider each cell in Table 4.1 as an independent observation.

In the Tables below, we present the results of our basic regression equations. In Table 4.5, the first column identifies the dependent variable. The second column shows the constant term. The next six columns show, mutatis mutandis, the estimated coefficients of the independent variables. The number in parentheses under the coefficients are the t-ratios. Those marked with three asterisks identify coefficients that are significantly different from zero at the 1% confidence level, while those with two and one asterisk are significant at 5% and 10% levels respectively.

Table 4.5 gives the results for capital-labour ratio, k_3 (0.1-100% foreign-ownership category). When we regressed I_i, $i = 1, 2$ on k_3, and k_3 on I_i, $i = 1, 2$ without the dummies, the results were not statistically significant with very low R^2s.

When we entered D_1 and D_2 together in our basic regression model the size of the coefficients remained almost the same, while the value of R^2 increased up to 0.22 (as given in equation 4) and the β-values become significant. We then added D_3 and D_4 as explanatory variables, and the coefficients of I_i, $i = 1, 2$. (as given by equations 5,6,10, and 11 in Table 4.5) were positive and significant. At the same time the value of R^2 increased to a range of 0.34 and 0.41. We also note that in equations 5 and 11, both D_2 and

TABLE 4.5 k ratio of 0.1 -100% foreign-ownership.

Dependent Variable	Independent Variables									
	Constant	I_i	log I_i	k_3	log k_3	D_1	D_2	D_3	D_4	
1. I_1	0.41 (2.32)**			204.77 (1.86)*		60774 (0.29)	-0.11 (-0.49)			n = 63 R^2 = 0.06
2. I_1	0.49 (2.46)**			164.21 (1.35)		-31379 (-0.14)	-96121 (-0.41)	0.27 (0.72)	-0.30 (-0.75)	n = 63 R^2 = 0.08
3. log I_1	9.51 (7.65)				0.40 (1.81)*	0.57 (1.45)	-0.05 (-0.14)	-0.15 (-0.26)	0.01 (0.02)	n = 63 R^2 = 0.15
4. k_3	143.68 (0.69)	$0.0003I_1$ (1.86)*				357.37 (1.49)	750.19 (3.10)**			n = 63 R^2 = 0.22
5. k_3	206.02 (0.95)	$0.0002I_1$ (1.35)				105.16 (0.43)	750.19 (3.28)***	1216.6 (3.23)***	-119.15 (-0.27)	n = 63 R^2 = 0.34
6. log k_3	3.91 (4.32)***		$0.14I_1$ (1.81)*			0.51 (2.28)**	0.64 (3.24)***	0.53 (1.65)	0.23 (0.65)	n = 63 R^2 = 0.36

(Cont.)

TABLE 4.5 k ratio of 0.1 -100% foreign-ownership. (Cont.)

Dependent Variable	Independent Variables									
	Constant	I_i	log I_i	k_3	log k_3	D_1	D_2	D_3	D_4	
7. I_2	0.72 (1.57)			-0.0007 (-2.59)**		0.63 (1.13)	-0.09 (-0.15)			n = 63 R^2 = 0.15
8. I_2	0.70 (1.38)			0.0009 (2.83)***		0.78 (1.29)	-0.21 (-0.35)	-1.19 (-1.19)	-0.13 (-0.12)	n = 63 R^2 = 0.17
9 log I_2	-4.83 (-4.19)***				0.73 (3.61)***	-0.009 (-0.02)	0.13 (0.38)	-0.14 (-0.27)	-0.17 (-0.31)	n = 63 R^2 = 0.26
10. k_3	143.46 (0.72)	136.51I_2 (2.59)**				269.39 (1.13)	696.56 (2.93)***			n = 63 R^2 = 0.26
11. k_3	171.85 (0.85)	136.03I_2 (2.83)**				-16.64 (-0.07)	389.37 (3.17)***	1308.6 (3.17)***	-141.64 (-0.34)	n = 63 R^2 = 0.41
12. log k_3	5.72 (33.01)		0.25I_2 (3.61)***			0.51 (2.52)*	0.51 (2.72)***	0.47 (1.58)	0.24 (0.74)	n = 63 R^2 = 0.45

D_3 are significant. The results of the coefficients of k_3 (as given by equations 1, 2, 7 and 8) are significant. Among the four dummy variables, D_2 gives the best performance with some high levels of significance.

In general, our regression tests using K/L ratio for the 0.1-100% foreign-ownership category does not give us good results. These unsatisfactory results for 0.1-100% foreign-ownership category could be explained in terms of the data used. The capital-labour ratio for 0.1-100% foreign-ownership category is simply a combination of two sets of data, i.e., the K/L ratio of 51-100% foreign-ownership category and K/L ratio 0.1-49% foreign-ownership category. Our method of combining these 2 sets of data could be misleading because the behaviour of these two ownership categories may not generally be homogeneous. According to our earlier analysis in this chapter we found that the firms in the 51-100% foreign-ownership category (the primarily foreign-owned firms) tend to prefer capital-intensive, high-technology investment. The firms of the 0.1-49% foreign-ownership category (the primarily Thai-owned firms) are expected to be involved in relatively less-capital intensive investments. If this explanation is valid, then we should expect to find better results if we use k_1 and worse results it we use k_2 than those given by k_3. The regression results arrived at by using k_2 and k_1 are presented in Tables 4.6 and 4.7 respectively. Consider Table. 4.6 where we present the regression results. Most of the results for the 0.1-49% foreign-ownership category are very poor. When we regress

TABLE 4.6 k ratio of 0.1 -49% foreign-ownership.

Dependent Variable	Independent Variables									
	Constant	I_i	log I_i	k_2	log k_2	D_1	D_2	D_3	D_4	
1. I_1	0.18 (1.53)			52.20 (0.81)		0.19 (1.28)	84955 (0.56)			n = 61 R^2 = 0.06
2. I_1	0.18 (1.41)			46.76 (0.70)		0.15 (0.99)	844.70 (0.55)	0.14 (0.56)	164.92 (-0.06)	n = 61 R^2 = 0.17
3. log I_1	9.42 (7.72)				0.40 (1.89)*	0.77 (2.13)**	0.06 (0.16)	0.08 (0.14)	0.05 (0.09)	n = 61 R^2 = 0.20
4. k_2	217.9 (0.90)	$0.0002I_1$ (0.81)				407.58 (1.38)	736.88 (2.48)**			n = 61 R^2 = 0.16
5. k_2	261.06 (0.98)	$0.0003I_1$ (0.70)				290.00 (0.89)	717.55 (2.38)**	503.97 (0.98)	-169.28 (-0.30)	n = 61 R^2 = 0.17
6. log k_2	3.85 (3.99)***		$0.15I_1$ (1.89)*			0.25 (1.06)	0.54 (2.67)**	0.22 (0.64)	0.13 (0.36	n = 61 R^2 = 0.25

(Cont.)

TABLE 4.6 k ratio of 0.1 -49% foreign-ownership. (Cont.)

Dependent Variable	Independent Variables									
	Constant	I_i	log I_i	k_2	log k_2	D_1	D_2	D_3	D_4	
7.	0.70			0.00004		1.15	0.64			n = 61
I_2	(1.46)			(0.11)		(1.99)*	(1.04)			R^2 = 0.09
8.	0.77			-0.00004		1.06	0.63	0.13	-0.32	n = 61
I_2	(1.44)			(0.12)		(1.62)	(1.00)	(0.12)	(-0.31)	R^2 = 0.09
9	-4.12				0.59	0.20	0.27	-0.004	-0.08	n = 61
log I_2	(-3.30)				(2.74)***	(0.53)	(0.77)	(-0.007)	(-0.14)	R^2 = 0.20
10.	324.57	6.12I_2				234.14	566.99			n = 61
k_2	(1.66)	(0.11)				(0.97)	(2.36)**			R^2 = 0.11
11.	239.06	0.00006I_2				178.90	545.43	825.03	435.17	n = 61
k_2	(1.14)	(0.87)				(0.69)	(2.33)**	(2.07)**	(1.07)	R^2 = 0.19
12.	5.80		0.20I_2			0.30	0.46	0.22	0.14	n = 61
log k_2	(31.84)		(2.74)***			(1.40)	(2.30)**	(0.65)	(0.42)	R^2 = 0.29

TABLE 4.7 k ratio of 51-100% foreign-ownership.

Dependent Variable	Independent Variables									
	Constant	I_i	log I_i	k_1	log k_1	D_1	D_2	D_3	D_4	
1. I_1	-173.08			0.0007		716.32	439.20			n = 36
	(-0.43)			(2.56)***		(1.76)*	(1.15)			R^2 = 0.28
2. I_1	0.00002			285.74		0.00002	-73276	-0.00004	-43972	n = 36
	(0.76)			(3.02)***		(0.09)	(-0.03)	(-1.17)	(-0.10)	R^2 = 0.29
3. k_1	587.15	$0.0009I_1$				0.34	0.17			n = 36
	(0.12)	(3.35)***				(-0.61)	(1.19)			R^2 = 0.25
4. k_1	-60.20	$0.0008I_1$				226.54	466.98	1164.8	-6.94	n = 36
	(-0.15)	(3.02)***				(0.15)	(1.30)	(2.30)**	(-0.009)	R^2 = 0.41
5. log k_1	5.57		$-0.15I_1$			0.75	0.59	0.45	-1.61	n = 36
	(10.38)		(-1.35)			(1.29)	(1.26)	(0.71)	(-1.93)*	R^2 = 0.42
6. I_2	0.75			0.001		0.68	-0.19			n = 36
	(0.90)			(2.88)***		(0.74)	(-0.23)			R^2 = 0.26

(Cont.)

TABLE 4.7 k ratio of 51-100% foreign-ownership. (Cont.)

Dependent Variable	Independent Variables									
	Constant	I_i	log I_i	k_1	log k_1	D_1	D_2	D_3	D_4	
7. I_2	0.83			0.001		0.86	-0.33	-1.49	-0.26	n = 36
	(0.87)			(3.09)***		(0.83)	(-0.39)	(-1.20)	(-0.16)	R^2 = 0.29
8. k_1	-54.69	202.86I_2				522.74	428.76			n = 36
	(0.14)	(2.86)***				(0.53)	(1.15)			R^2 = 0.31
9 k_1	-85.12	207.50I_2				235.77	474.00	1168.1	12.46	n = 36
	(-0.21)	(3.09)***				(0.53)	(1.33)	(2.32)**	(0.02)	R^2 = 0.41
10. log k_1	0.17		0.17I_2			0.44	0.66	0.47	-2.19	n = 36
	(0.55)		(1.00)			(0.80)	(1.35)	(0.71)	(2.95)***	R^2 = 0.38

I_1 on k_2 and I_2 on k_2, the estimated coefficients are statistically insignificant and the R^2s are low. When we regress and k_2 on I_1, and k_2 on I_2, as given by equations 4, 5, 10 and 11 in Table 4.6, the results are again poor. We now consider the results which use k_1, i.e., the capital-labour ratio in the 51-100% foreign-ownership category. It is apparent that our regression results have improved considerably. The regression equations of I_1 on k_1 and I_2 on k_1 (as given by equations 1, 2, 6 and 7) in Table 4.7, give us the best performance with estimates significant at 1% level. The values of R^2s are in the range of 0.26 and 0.28. Regressing k_1 on I_1 (equations 3, 4 and 5) and on I_2 (equations 8, 9, 10), we find the relevant coefficients are significant (except for the logarithmic runs). In this case, R^2s are higher and they range from 0.36 to 0.42.

The most satisfying results of our analysis are found by using the K/L ratio of the 51-100% foreign-ownership category. These results simply reinforce our previous analysis of the k-ratios. In this case, finally, the hypothesis that foreign firms invest in 'high-technology capital-intensive' sectors comes out reasonably well.

SECTION 4.4: CONCLUSIONS

We have established empirically that sectoral capital-labour ratios are associated with sectoral foreign direct investments in Thailand. This statistical association is

stronger for the 51-100% ownership category. No causality is implied in our analysis, and the reported association is taken as confirmation of a necessary condition i.e., the foreign firms (or 'countries', in this case, which is to be taken as 'aggregation' of firms) who invest in Thailand are oligopolistic with product differentiation and are integrating horizontally and vertically as the case may be. In 'causal' models of U.S. direct investment, both Lall (1980) and Baldwin (1979) did not find capital-labour ratio a statistically significant explanatory variable. This is not really surprising as these analyses consider total outflow of U.S. direct investments and most of these go to the developed countries. These studies are rather macro-type aggregative. If the U.S. direct investments in specific countries were analysed on a sectoral basis, we would not be surprised if a close association is established between U.S. sectoral investments and sectoral capital-labour ratios.

CHAPTER 5

THE RAW-MATERIALS AVAILABILITY HYPOTHESIS

SECTION 5.1: INTRODUCTION

This chapter discusses the importance of the availability of raw materials in a country in inducing inflow of foreign direct investment. The role of 'resources' or 'raw-materials' in explaining foreign direct investment has been recognized in the literature. For example, Caves (1971) considers production of raw-materials abroad as vertical integration. To quote his own words;

> "In the parlance of industrial organisation, oligopoly with product differentiation normally prevails where corporations make 'horizontal' investments to produce abroad the same lines of goods they produce in the home market. Oligopoly, not necessarily differentiated, in the home market is typical in industries which undertake 'vertical' direct investments to produce abroad a raw-material or other input to their production process at home" (p.1, 1971).

It is, however, not necessary that foreign direct investments in resource sectors be always vertically integrated to the parent company. As Dunning (1979) pointed out, such investments can also be horizontally integrated to the investing firms. To quote Dunning (1979),

> 'Countries may engage in resource based investment for two quite different reasons. The first arises where there are abundant domestic natural resources, which lead either to the exploitation of similar activities overseas or of secondary processing, and prompted by the need to internalize the markets. The second arises where backward integration is undertaken to manufacture end-products to which the home economy is particularly suited, but for which local resources are inadequate' (p. 281-282).

This, of course, is not surprising. If a giant American firm has technological expertise in mining, it is natural for

that firm, motivated either by profits or by global market share, to extend its activities to countries where such mining is possible. Earlier, Krainer (1967) established an interesting proposition: a country with limited natural resources has a higher proportion of its foreign direct investment in the 'vertical integration' form. In Chapter 4, this hypothesis is empirically confirmed for Japan in relationship to her foreign direct investment in Thailand since we found a large proportion of Japanese direct investment in Thailand is in the 'mining' sector. Kojima (1978) also found, by considering total Japanese outflow of foreign direct investment, that a major part of Japanese direct investments went towards 'natural resources' sectors. According to Kojima (1978), this is done in order to complement Japan's comparative advantage in the manufacturing sectors. Hence, Japanese foreign direct investments are termed 'trade oriented'. Using American data, (data of 1191 manufacturing corporations out of which 576 owned majority interest in Canada), Horst (1972) found that 'resource' as an explanatory variable[1] did not perform well. However, for the 'Canadian case' it worked fairly well. To our knowledge, no sectoral analysis has been carried out for any host country. Horst (1972) uses the U.S. sectoral 'outflow' data irrespective of the host countries except for the sectoral 'outflow' to Canada.

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1 Horst (1972) used a dummy variable to capture 'resource with a value of unity for five industries, viz., wood, paper, petroleum, non-metalic mineral products and basic metals.

SECTION 5.2: AN EMPIRICAL ANALYSIS

We use here the BOI data as discussed in Chapter 3. We are fortunate to have data on the use of domestically available raw-materials and imported raw-materials for each firm registered separately with the BOI.

Our analysis first considers the domestic raw-material/labour ratio and then the imported raw-material/labour ratio. The three variables, which are chiefly used in this study, are: RT which stands for domestically procured raw-material, RM which stands for imported raw-material and L which stands for labour (as defined in Chapter 4). Furthermore, r = RT/L is local raw-material/labour ratio and $\overline{TT}$ = RM/L is imported raw-material/labour ratio. A higher value of r relative to $\overline{TT}$ implies that relatively more local raw material is used. This procedure will enable us to examine empirically whether the investors are investing in Thailand for the purposes of using raw materials which are abundantly available in Thailand. But where $\overline{TT}$ is relatively higher, investors are using relatively more of imported raw-materials in their production. This procedure then gives us an indirect way of examining the same hypothesis empirically.

The two Tables which appear in this chapter are concerned with local raw-material/labour ratios and imported raw-material/labour ratios. Tables 1 and 2 show country-wise sectoral r and $\overline{TT}$ respectively for the eight principal investing countries plus 'Other DCs' group and 'Other LDCs' group. It also contains the relevant ratios for 'All DCs'

and 'All LDCs'. We have seven sectors as listed in the earlier chapter. In both the Tables, the ratios for each sector are calculated for two categories of firms, viz., primarily foreign-owned firms (with 51-100% foreign-ownership) and primarily domestically-owned firms (with 0.1-49% foreign ownership). The r and $\overline{\Pi}$ ratios of the primarily foreign-owned firms are then compared with the r and $\overline{\Pi}$ ratios of the primarily domestically-owned firms in all countries and sectors.

Both r and $\overline{\Pi}$ are calculated from the BOI cumulative data (1961-1981). We are using the same techniques and methods as discussed in Chapter 3 by deflating the raw-material data at constant prices and by using the same definition of labour.

It should be mentioned here that there are firms who use only domestically available raw-materials. There are a small number of firms who use only imported raw-materials. But the vast number of firms (about 75%) use both imported and domestic raw-materials. In this study, for reasons to be explained later, we calculate domestic and imported raw-material figures separately.

Table5.1 shows domestic raw-material/labour ratios. In terms of r, the results for 'All sectors' show that the primarily foreign-owned group of firms from West Germany has the highest ratio (1561.78), being nearly three times the Japanese ratio (541.78). However, on examining the data, it can be seen that r is exceptionally high for Germany in the Agricultural sector (6063.33) while in all other sectors in

the same category (51-100% ownership) the Germany ratio is relatively much lower and certainly lower than that of Japan. Given that the Agricultural ratio is calculated from data involving a relatively small number of German firms, such a ratio might therefore be taken as an exception rather than the rule. In this case, Japan emerges as having the highest ratio with 'Other DCs' and Singapore having ratios of 258.08 and 244.12 respectivily. The U.S.A. ratio is lower than that of any other developed country accounting for only 67.47.

In the primarily domestically-owned firms category, Singapore (658.28) emerges as having the highest ratio in 'All sectors', followed by 'Other DCs' (298.28), 'Other LDCs' (189.99) and Hong-Kong (172.67). The ratios of Japan, U.K., U.S.A. and West Germany are relatively lower in this category. These results lead us to conclude that, for the primarily foreign-owned (i.e., 51-100% foreign-ownership) firms, developed countries tend to employ more local raw-material in their production while the less-developed countries employ less local raw-material in the same category. For the primarily domestically-owned (0.1-49% foreign-ownership) firms, developed countries use relatively less domestic raw-materials than the less-developed countries do in the same category.

Examining each country's ratio in each sector of investment in Table 5.1, we find that the relative value of some countries is surprisingly much higher, even though in our hypothesis we would expect the r ratios to be high. Very

TABLE 5.1: DOMESTIC RAW-MATERIALS-LABOUR RATIO. (RAW MATERIALS IN ₿ 1000 AT 1975 PRICES)

SECTOR	% OF OWNERSHIP	USA	U.K.	GERMANY	JAPAN	OTHER DCs	ALL DCs	TAIWAN	HONG-KONG	INDIA	SINGAPORE	OTHER LDCS	ALL LDCs
1. AGRICULTURAL	51-100%	160.99	328.29	6063.33	302.79	443.86	1134.76	650.32	0.15	-	-	132.28	54.51
	0.1-49%	49.14	299.76	200.36	220.86	520.85	249.86	181.36	207.64	28.25	2308.20	289.31	299.09
2. MINERAL	51-100%	38.43	-	82.74	1161.83	48.24	362.59	-	-	-	244.12	-	244.12
	0.1-49%	6.20	7.29	68.69	290.29	35.94	188.09	131.69	2053.06	192.18	256.04	356.57	241.05
3. CHEMICAL	51-100%	162.16	347.07	353.03	-	103.16	172.24	107.39	492.14	73.80	-	-	229.99
	0.1-49%	308.82	102.61	-	163.55	178.65	188.22	125.62	41.02	71.17	-	-	99.55
4. MECHINICAL	51-100%	18.97	43.43	23.79	505.04	41.83	69.34	-	-	-	-	-	-
	0.1-49%	51.40	317.39	46.98	174.60	98.46	171.89	85.25	-	-	-	-	85.25
5. OTHER PRODUCTS	51-100%	-	290.56	-	175.64	919.50	84.43	-	75.60	-	-	-	75.60
	0.1-49%	55.80	63.03	7.87	47.63	56.98	51.95	91.42	10.93	42.70	30.45	99.67	71.35
6. SERVICES	51-100%	-	-	-	-	-	-	-	-	-	-	-	-
	0.1-49%	-	486.43	-	144.25	-	150.12	763.49	217.88	-	747.48	146.04	388.19
7. OTHER INDUSTRIES	51-100%	-	-	-	610.87	-	610.87	86.47	-	-	-	87.49	81.71
	0.1-49%	100.18	57.04	488.76	124.35	210.82	107.06	105.59	6.29	240.17	-	78.98	101.37
ALL SECTORS	51-100%	67.47	100.10	1561.78	541.78	285.08	190.88	142.37	43.67	73.80	244.12	115.27	69.77
	0.1-49%	79.89	86.89	34.47	159.97	298.28	151.18	140.55	172.67	111.14	658.28	189.99	193.87

high r ratios are found for both the primarily foreign-owned firms and the primarily Thai-owned firms. Both country-wise and sector-wise, in the 51-100% foreign-ownership category, Germany has a high r ratio of 6063.33 in the Agricultural sector. Japan has a high r ratio of 1163.83 in the Mineral sector. Again the Japanese r ratio (505.04) for the primarily foreign-owned firms, is relatively high in the Mechanical sector. The 'Other DCs' has an r ratio of 919.50 in the 'Other Products' sector. And again Japan has a relatively high ratio (610.87) in 'Other Industries' sector. In the 0.1-49% ownership category, most of the countries with relatively high r ratios are found to be less-developed countries. For example, in the Agricultural sector, Singapore has an r ratio of 2308.20. Hong-Kong's ratio is 2053.06 in the Mineral sector. Relatively high r ratios of Taiwan (763.39) and Singapore (747.48) are found in the Services sector. Let us now consider each sector separately. First consider the Agricultural sector.

In the Agricultural sector, the r ratios of DCs are higher for the primarily foreign-owned firms than those for the primarily Thai-owned firms with the exception of the 'Other DCs'. But in case of LDCs, the r ratios for the primarily Thai-owned firms are relatively higher than those for the primarily foreign-owned firms with the exception of Taiwan. Both DCs and LDCs investors have a similar level of r ratios for the primarily Thai-owned firms, but for the primarily foreign-owned firms the r ratios for the LDCs are much lower in comparison to those for the DCs.

Now we move to discuss the Mineral sector. We have mentioned earlier that Japan has a very high ratio in this sector. The reason for the high Japanese ratio can be explained in terms of paucity of Japan's domestic supply. Japan is relatively less endowed with mineral and natural resources. Therefore, Japan has to find her own mineral supply by investing in countries like Thailand with relatively high endowments of natural and mineral resources. The r ratios in the primarily foreign-owned firms from the DCs are relatively lower than the r ratios of those from the LDCs. In the category of the primarily Thai-owned firms, Hong-Kong has a very large r ratio of 2053.06 and generally the investors from the LDCs have relatively higher r ratios than those from the DCs, with the exception of the Japanese ratio.

For the Chemical sector there are unfortunately no observations in our sample for Japan in the 51-100% foreign-ownership group and for Germany in 0.1-49% foreign-ownership group. Hong-Kong has the highest ratio of 492.40 in 51-100% ownership group followed by the German ratio (353.03) and the U.K. ratio (347.07). The results of r ratio in the 01-49% foreign-ownership group show that the DC ratios in general are higher than the LDC ratios.

In the Mechanical sector, Japan by far has the largest ratio (505.04) for the primarily foreign-owned firms. There are no observations for 'All LDCs' in our sample. It should be noted that all the r ratios in the 0.1-49% ownership group of firms from the DCs are higher than those in the 51-100%

foreign-ownership group except for the Japanese ratio.

In the Services sector there are no observations in our sample for either the DCs or the LDCs in the group of primarily foreign-owned firms. We have poor observations also in the 0.1-49% foreign-ownership group for the DCs. It is noticeable that r ratios of Taiwan (763.49) and Singapore (747.48) are relatively high.

Again the observations in the 'Other Industries' sector appear to be poor in the 51-100% foreign-ownership category. There are only three results available and they are from Japan, Taiwan and 'Other LDCs'. Nevertheless, the Japanese ratio is fairly high with an r value of 610.87.

Given the limited size of our sample, it is perhaps advisable to take the results for 'All sectors' of specific countries and for 'All sectors' of 'All LDCs' and 'All DCs' as strong. The sectoral analysis according to countries does throw some light on the question but the exceptional results noted should be taken as weak results. We find that the firms from the developed countries (51-100% ownership) do use relatively more of local raw-materials. We also find that the firms (51-100% foreign-ownership) from the LDCs use less raw-materials per unit of labour relative to the firms (in the same category) from the developed countries. This is not surprising as the LDCs are usually more endowed with natural and mineral resources (relative to domestic demand and relative to the developed countries). Furthermore, we find that for 'All sectors' of all countries (developed +

less developed), the r ratio is 179.01 for the primarily foreign-owned firms and 165.99 for the primarily domestically-owned firms. We therefore conclude on the basis of this evidence that foreign firms invest in Thailand in order to make use of the abundant natural and mineral resources.

Table 5.2 gives the sector-wise and country-wise imported raw-material labour ratios. The pattern of Π ratios are remarkably similar to that of r ratios. We need not discuss these in detail. Suffice to note that, for 'All sectors' of the developed countries, the Π ratio (524.90) for the primarily foreign-owned firms (51-100% foreign-ownership) is higher than that (245.26) for the primarily domestically-owned firms (01-49% foreign-ownership). This result is also true for the less-developed countries with Π = 82.86 and Π = 61.32 respectively for the primarily foreign-owned and the primarily domestically-owned firms. Furthermore, we also find that for all sectors of all countries (developed + less-developed) the Π ratio is 481.57 for the primarily foreign-owned firms and 196.89 for the primarily domestically-owned firms. We note that both of these Π ratios are higher than the respective r ratios. These results appear prima facie to be unexpected if we hypothesise that foreign firms invest in Thailand to make use of her abundantly available raw-materials. Why should foreign firms import raw-materials if these are abundantly available in Thailand?

TABLE 5.2: IMPORTED RAW-MATERIAL/LABOUR RATIO. (RAW-MATERIALS IN ₱ 1000 at 1975 prices)

SECTOR	% OF OWNERSHIP	USA	U.K.	GERMANY	JAPAN	OTHER DCs	ALL DCs	TAIWAN	HONG-KONG	INDIA	SINGAPORE	OTHER LDCS	ALL LDCs
1. AGRICULTURAL	51-100%	245.68	70.76	83.33	820.10	291.46	308.99	-	0.71	-	-	4.58	0.93
	0.1-49%	132.52	52.68	0.28	170.24	333.09	179.08	29.00	102.31	-	7.99	43.04	39.01
2. MINERAL	51-100%	814.85	-	107.21	925.72	6.17	471.88	-	-	-	84.86	-	84.86
	0.1-49%	232.76	160.28	24.57	949.62	14.32	616.71	60.65	12.24	76.38	29.82	66.66	67.28
3. CHEMICAL	51-100%	1016.42	348.81	659.03	2199.24	496.84	684.88	-	281.92	802.29	-	-	380.09
	0.1-49%	465.51	206.79	-	851.54	365.43	657.54	237.73	87.69	22.41	-	-	141.5
4. MECHANICAL	51-100%	773.44	226.46	226.37	672.51	184.77	603.78	-	-	-	-	-	-
	0.1-49%	68.86	105.80	17.26	341.66	44.12	309.19	56.87	-	-	-	-	56.87
5. OTHER PRODUCTS	51-100%	-	-	-	22.42	-	8.14	-	250.31	-	-	-	250.3
	0.1-49%	157.72	149.76	36.61	347.33	254.21	272.87	119.02	100.89	128.21	-	40.97	98.13
6. SERVICES	51-100%	-	-	-	-	-	-	-	-	-	-	-	-
	0.1-49%	-	-	-	198.90	-	57.76	21.88	4.48	-	97.71	-	8.39
7. OTHER INDUSTRIES	51-100%	-	-	-	1054.98	-	1054.98	-	-	-	-	201.27	11.09
	0.1-49%	64.35	110.25	5.08	113.09	10.55	101.87	44.04	-	49.9	-	16.67	32.96
ALL SECTORS	51-100%	623.82	196.64	161.74	817.08	266.51	524.90	-	38.37	802.2	84.86	21.55	82.86
	0.1-49%	140.39	111.18	26.87	318.80	254.64	245.26	80 28	34.29	68.5	31.49	36.34	61.32

In order to answer this question, it is necessary to look at some specific firms which import raw-materials. It is clear that, if the foreign investors import raw-materials from their countries of origin, then raw-materials' availability does not explain foreign investment in Thailand. But is this the case? One Japanese firm (registered in June 1978) produces dried algae. The raw-material is sea weed which is available in Thailand and it does not import any raw-material. This is a clear case. Another Japanese firm (registered in January 1969) produces 'Tyres, flaps and Tubes'. This firm uses rubber as raw-materials but the proportion of domestic raw-material to imported raw-material is 1: 26. Now, clearly Japan does not export rubber to Thailand. Thailand produces rubber but her neighbour Malaysia also produces rubber (and relatively more rubber). It is not surprising that the Japanese investor imports rubber from Malaysia (because of the high quality rubber available there) to Thailand. It appears that the Japanese firm is clearly motivated by rubber availability in the 'region', although it is not clear why the Japanese investor came to Thailand instead of going to Malaysia. This does not, of course, imply that the raw-material availability hypothesis is not acceptable. It does, however, raise some concomitant questions about relative merits and demerits of Thailand and Malaysia in terms of tax benefits, availability of skilled labour, etc.. It is not possible here to come to any firm conclusions regarding this aspect of relative advantages of similar countries in the same region. We can take many other similar telling examples from the U.S.A., Germany, and the U.K.. But, the central issues are the same.

Keeping this in mind we argue that the high Π ratios do not reject the raw-material availability hypothesis. Thus from the analysis of the r ratios, it is fairly clear that there is empirical evidence to accept the hypothesis that foreign firms are attracted to Thailand because of abundant availability of raw-materials.

SECTION 5.3: A SIMPLE ECONOMETRIC ANALYSIS

The preceding section presented a fair degree of empirical corroboration of the raw-material availability hypothesis. This section attempts to test the hypothesis more rigorously by using simple econometric methods. We hypothesise that foreign direct investment (I) is a function of raw-material availability (R) so that we estimate a regression equation of the following form:

$$I = a + b_o R + b_1 D_1 + b_2 D_2 + b_3 D_3 + b_4 D_4 + u.$$

The dummies D_i, $i = 1,2,3,4$, have the same definitions as in Chapter 4. For direct investment we use two definitions, viz, I_1 which is the level of sectoral investment of a country, and I_2 which is the sectoral investment of a country as a percentage of the total foreign direct investment. These figures are presented in Chapter 4. For raw-material (R) we have the following definitions:

RT_1 = Domestic raw-materials/labour ratio for the 51-100% foreign ownership category

RTL_1 = Level of domestic raw-materials for the 51-100% foreign ownership category

RT_2 = Domestic raw-materials/labour ratio for the 0.1-49% foreign ownership category

RTL_2 = Level of domestic raw-materials for the 0.1-49% foreign ownership category

RT_3 = Domestic raw-materials/labour ratio for the 0.1-100% foreign ownership category

RTL_3 = Level of domestic raw-materials for the 0.1-100% foreign ownership category

RM_1 = Imported raw-materials/labour ratio for the 51-100% foreign ownership category

RML_1 = Level of imported raw-materials for the 51-100% foreign ownership category

RM_2 = Imported raw-materials/labour ratio for the 0.1-49% foreign ownership category

RML_2 = Level of imported raw-materials for the 0.1-49% foreign ownership category

RM_3 = Imported raw-materials/labour ratio for the 0.1-100% foreign ownership category

RML_3 = Level of imported raw-materials for the 0.1-100% foreign ownership category

RR = Total raw-materials/labour ratio, i.e. domestic plus imported raw-materials divided by the appropriate figure for labour (in the 0.1-100% foreign ownership category)

RRL = Level of total raw-materials, i.e., domestic plus imported raw-materials (in the 0.1-100% foreign ownership category)

The calculations of RT_1 , RT_2 , RM_1 , RM_2 are based on the data from Tables 5.1 and 5.2 of this chapter. The RTL_1 , RTL_2 , RML_1 , RML_2 , RTL_3 , RML_3 , RRL and the RM_3 , RT_3 and RR ratios are presented in Tables 5.3 - 5.10.

TABLE 5.3: LEVEL OF DOMESTIC RAW-MATERIALS (฿ 1000 at 1975 prices)

SECTOR	% OF OWNERSHIP	USA	U.K.	GERMANY	JAPAN	OTHER DCs	TAIWAN	HONG-KONG	INDIA	SINGAPORE	OTHER LDCs
1. AGRICULTURAL	51-100%	593116	43990	1679542	252523	953856	45523	183	-	-	105000
	0.1-49%	187964	160372	310550	1680100	1995904	909539	109636	5106	830953	108781
2. MINERAL	51-100%	23126	-	51213	776102	27737	-	-	-	139393	-
	0.1-49%	7167	5187	82764	1592849	6757	400999	301800	226398	16899	399932
3. CHEMICAL	51-100%	64866	47549	83315	-	69527	5477	71852	15130	-	-
	0.1-49%	299864	2668	-	642905	333544	298099	12469	110526	-	-
4. MECHANICAL	51-100%	143264	68100	714	584838	10080	-	-	-	-	-
	0.1-49%	21486	132035	7798	1505246	17231	114325	-	-	-	-
5. OTHER PRODUCTS	51-100%	-	50267	-	211993	18390	-	3553	-	-	-
	0.1-49%	9883	120268	493	218061	92827	577429	23697	61740	15225	316451
6. SERVICES	51-100%	-	-	-	-	-	-	-	-	-	-
	0.1-49%	-	247106	-	170101	-	1565158	939059	-	343093	120775
7. OTHER INDUSTRIES	51-100%	-	-	-	2623671	-	48942	-	-	-	3967
	0.1-49%	304958	576976	30303	274314	366833	378656	3492	149147	-	172485
ALL SECTORS	51-100%	822572	209906	1814784	4449127	1079590	99942	75568	1465721	139393	108967
	0.1-49%	831321	1244612	142528	8552370	2813096	3334695	1390153	15130	1206170	1118424

TABLE 5.4: LEVEL OF IMPORTED RAW-MATERIALS (฿ 1000 at 1975 prices)

SECTOR	% OF OWNER-SHIP	USA	U.K.	GERMANY	JAPAN	OTHER DCs	TAIWAN	HONG-KONG	INDIA	SINGAPORE	OTHER LDCs
1. AGRICULTURAL	51-100%	905087	9481	1500	644602	626342	-	85	-	-	1373
	0.1-49%	506894	28153	436	1295020	1276406	145449	54019	-	2879	161833
2. MINERAL	51-100%	452240	-	66360	618378	3545	-	-	-	48457	-
	0.1-49%	269072	113960	39217	5210568	2692	209025	1800	89977	1968	72923
3. CHEMICAL	51-100%	406568	47787	155532	109962	334868	-	41161	164469	-	-
	0.1-49%	432923	2668	-	3347411	682262	564142	26659	34797	-	-
4. MECHANICAL	51-100%	-	355084	7991	778768	44529	-	-	-	-	-
	0.1-49%	27443	44012	2865	2945469	7721	76258	-	-	-	-
5. OTHER PRODUCTS	51-100%	-	-	-	27065	-	-	11765	-	-	-
	0.1-49%	-	285735	2380	1590057	414102	751746	218835	185392	-	130080
6. SERVICES	51-100%	-	-	-	-	-	-	-	-	-	-
	0.1-49%	-	-	-	160511	-	-	19307	-	44850	-
7. OTHER INDUSTRIES	51-100%	-	-	-	4531128	-	-	-	-	-	6642
	0.1-49%	195874	1115200	3109	2494911	18355	157992	-	31043	-	36403
ALL SECTORS	51-100%	7604939	412352	231383	6709903	1009284	-	53011	164469	48457	8015
	0.1-49%	1460991	1992600	48007	17043947	3418022	1904612	320620	341208	49697	401239

TABLE 5.5: LEVEL OF DOMESTIC RAW-MATERIALS FOR THE 0.1-100% FOREIGN OWNERSHIP RTL_3 (฿ 1000 at 1975 prices)

SECTOR	% OF OWNERSHIP	USA	U.K.	GERMANY	JAPAN	OTHER DCs	TAIWAN	HONG-KONG	INDIA	SINGAPORE	OTHER LDCS
1. AGRICULTURAL	0.1-100%	781080	204362	1990093	1932624	2949760	955062	110838	5106	830953	213781
2. MINERAL	0.1-100%	28493	5187	133977	236895	34494	400999	301800	226398	156291	399932
3. CHEMICAL	0.1-100%	364730	50217	83315	642903	403071	303576	84321	125656	-	-
4. MECHANICAL	0.1-100%	164750	200135	8512	2090084	27311	114325	-	-	-	-
5. OTHER PRODUCTS	0.1-100%	9883	170535	493	430855	111217	577429	27251	61740	15225	316451
6. SERVICES	0.1-100%	-	247106	-	170071	-	1565158	939059	-	343093	120775
7. OTHER INDUSTRIES	0.1-100%	304958	576976	30303	2897985	366833	427598	3492	149147	-	176451

TABLE 5.6: LEVEL OF IMPORTED RAW-MATERIALS FOR THE 0.1-100% FOREIGN OWNERSHIP RML_3 (฿ 1000 at 1975 prices)

SECTOR	% OF OWNERSHIP	USA	U.K.	GERMANY	JAPAN	OTHER DCs	TAIWAN	HONG-KONG	INDIA	SINGAPORE	OTHER LDCs
1. AGRICULTURAL	0.1-100%	1411981	37635	1936	193962	1902747	145449	54104	-	2879	163206
2. MINERAL	0.1-100%	721312	113960	105577	5828946	6238	209025	1800	89977	50425	72923
3. CHEMICAL	0.1-100%	839490	50455	155532	3457373	1017130	564142	67820	199266	-	-
4. MECHANICAL	0.1-100%	5869829	399097	10856	3724237	52251	76258	-	-	-	-
5. OTHER PRODUCTS	0.1-100%	27443	285735	2380	1617121	414102	751746	230600	185391	-	130080
6. SERVICES	0.1-100%	-	-	-	160511	-	-	19307	-	44850	-
7. OTHER INDUSTRIES	0.1-100%	7800813	1115200	3109	7026038	18355	157992	-	31043	-	43044

TABLE 5.7: LEVEL OF RAW-MATERIALS FOR THE 0.1-100% FOREIGN OWNERSHIP (DOMESTIC & IMPORTED) RRL (฿ 1000 at 1975 prices)

SECTOR	% OF OWNERSHIP	USA	U.K.	GERMANY	JAPAN	OTHER DCs	TAIWAN	HONG-KONG	INDIA	SINGAPORE	OTHER LDCs
1. AGRICULTURAL	0.1-100%	2193061	241997	1992029	2126586	4852507	1100511	164943	5106	833832	376988
2. MINERAL	0.1-100%	749804	119147	239554	6065841	40732	610023	303600	316375	206716	472855
3. CHEMICAL	0.1-100%	1204220	100671	238847	4100277	1420201	867717	152141	324922	-	-
4. MECHANICAL	0.1-100%	6034579	599231	19368	5814321	79561	190583	-	-	-	-
5. OTHER PRODUCTS	0.1-100%	37326	456270	2873	2047976	525319	1329175	257850	247132	15225	446531
6. SERVICES	0.1-100%	-	247106	-	330582	-	1565158	958366	-	387943	120775
7. OTHER INDUSTRIES	0.1-100%	8105770	1692176	33412	9924023	385187	585590	3492	180189	-	219496

TABLE 5.8: DOMESTIC RAW-MATERIALS/LABOUR RATIO FOR THE 0.1-100% FOREIGN OWNERSHIP RT_3 (₱ 1000 at 1975 prices)

SECTOR	% OF OWNERSHIP	USA	U.K.	GERMANY	JAPAN	OTHER DCs	TAIWAN	HONG-KONG	INDIA	SINGAPORE	OTHER LDCs
1. AGRICULTURAL	0.1-100%	104.02	305.47	1087.27	228.96	493.19	187.82	155.89	28.25	2308.20	52.66
2. MINERAL	0.1-100%	16.65	7.29	60.49	384.88	45.21	131.69	2053.06	192.19	226.18	365.57
3. CHEMICAL	0.1-100%	266.03	202.49	353.03	163.55	158.63	125.24	187.38	71.48	-	-
4. MECHANICAL	0.1-100%	206.67	100.87	43.43	213.73	65.65	85.25	-	-	-	-
5. OTHER PRODUCTS	0.1-100%	56.80	81.95	7.87	74.34	67.45	91.42	12.30	42.70	30.45	99.67
6. SERVICES	0.1-100%	-	403.77	-	144.25	-	763.49	217.88	-	747.48	146.04
7. OTHER INDUSTRIES	0.1-100%	100.18	57.04	488.76	109.96	210.82	102.99	6.29	240.17	-	79.59

TABLE 5.9: IMPORTED RAW-MATERIALS/LABOUR RATIO FOR THE 0.1-100% FOREIGN OWNERSHIP (RM_3) (฿ 1000 at 1975 prices)

SECTOR	% OF OWNERSHIP	USA	U.K.	GERMANY	JAPAN	OTHER DCs	TAIWAN	HONG-KONG	INDIA	SINGAPORE	OTHER LDCs
1. AGRICULTURAL	0.1-100%	188.04	56.26	-	229.79	318.13	29.00	31.27	-	9.60	40.20
2. MINERAL	0.1-100%	421.57	160.28	47.66	947.03	8.18	68.65	12.24	76.38	72.97	66.66
3. CHEMICAL	0.1-100%	612.32	203.45	659.03	868.47	400.29	237.73	150.71	113.35	-	-
4. MECHANICAL	0.1-100%	736.49	201.16	55.39	380.84	125.60	56.87	-	-	-	-
5. OTHER PRODUCTS	0.1-100%	112.62	149.76	36.61	279.54	254.21	119.02	104.06	128.21	-	40.97
6. SERVICES	0.1-100%	-	-	-	198.90	-	21.88	4.48	-	97.71	-
7. OTHER INDUSTRIES	0.1-100%	64.35	110.25	5.08	266.59	10.55	44.06	-	49.99	-	19.42

TABLE 5.10: RAW-MATERIALS/LABOUR RATIO FOR THE 0.1-100% FOREIGN OWNERSHIP (DOMESTIC & IMPORTED) RR (฿ 1000 at 1975 prices)

SECTOR	% OF OWNERSHIP	USA	U.K.	GERMANY	JAPAN	OTHER DCs	TAIWAN	HONG-KONG	INDIA	SINGAPORE	OTHER LDCs
1. AGRICULTURAL	0.1-100%	292.06	361.73	1090.33	251.94	811.32	216.42	95.34	28.85	2316.20	92.85
2. MINERAL	0.1-100%	438.23	167.58	108.15	985.51	53.38	200.34	2065.31	268.57	299.16	432.23
3. CHEMICAL	0.1-100%	878.35	405.93	1012.06	1043.06	558.91	357.97	338.09	184.82	-	-
4. MECHANICAL	0.1-100%	757.16	302.03	98.81	594.57	191.25	142.12	-	-	-	-
5. OTHER PRODUCTS	0.1-100%	214.52	219.25	13.62	354.01	318.57	210.45	116.36	170.91	30.45	140.64
6. SERVICES	0.1-100%	-	403.77	-	280.39	-	763.49	222.36	-	845.19	146.04
7. OTHER INDUSTRIES	0.1-100%	535.56	167.29	54.59	376.55	221.37	141.04	6.29	290.16	-	99.01

We first regressed I_1 and I_2 both on RR and RRL without distinguishing (a) between imported raw-materials and domestically available raw-materials, and (b) between the primarily foreign-owned firms (51-100% foreign-ownership). These results are presented in Table 5.11. In equations (1) and (3) we note that RR is insignificant. However, for the logarithmic runs, RR is significant in equations (2) and (4).

The R^2s remain low although they are relatively better for the logarithmic runs. RRL in equations (5) and (6) are significant. The logarithmic run, viz., equation (7), also yields RRL as a significant variable. In this case, it is clear that RRL performs relatively better than RR as an explanatory variable. The dummy variables are not significant in any of the runs.

We then introduce the distinction between imported raw-materials and domestically available raw-materials but without distinguishing between the primarily domstically-owned firms and the primarily foreign-owned firms. That is, we regressed I_1 and I_2 on RT_3 , RM_3 , RTL_3 , and RML_3 .
These results are presented in Table 5.12. The domestically available raw-materials/labour ratio (RT_3) performs very poorly as is evident from (1),(2),(3) and (4) in Table 5.12. Imported raw-materials/labour ratio (RM_3) as an explanatory variable performs relatively better; and RM_3 is significant both in (6) and (8). Again RML_3 (level of imported raw-materials) performs relatively well in (11) and

Table 5.11:

Dependent Variable	Independent Variables: Constant	RR	RRL	log RR	log RRL	D_1	D_2	D_3	D_4	
(1) I_1	0.21 (1.36)	20.71 (0.11)				0.29 (1.70)	96034 (0.60)	45484 (0.17)	-38889 (-0.13)	n = 59 R^2 = 0.08
(2) log I_1	9.53 (11.12)			0.44 (2.86)		0.34 (0.91)	-0.06 (-0.18)	0.34 (0.59)	0.23 (0.37)	n = 59 R^2 = 0.18
(3) I_1	0.87 (1.41)	0.00006 (0.08)				1.10 (1.63)	0.42 (0.67	0.17 (0.17)	-0.19 (-0.16)	n = 59 R^2 = 0.08
(4) log I_2	-2.84 (-3.31)			0.4 (2.79)		-0.30 (-0.82)	-0.04 (-0.11)	0.33 (0.58)	0.20 (0.32)	n = 59 R^2 = 0.17
(5) I_1	0.26 (1.95)		0.10 (2.69)			0.11 (0.63)	-60956 (-0.41)	18671 (0.08)	-75809 (-0.28)	n = 59 R^2 = 0.17
(6) I_1	0.000001 (1.19)		0.16 (4.86)			13544 (0.09)	0.000002 (1.21)	0.0000002 (0.81)	-58470 (-0.22)	n = 59 R^2 = 0.36
(7) log I_1	7.08 (7.51)				0.38 (5.16)	0.15 (0.47)	0.31 (1.05)	0.23 (0.45)	-0.10 (-0.17)	n = 59 R^2 = 0.36

Table 5.12:

Dependent Variable	Independent Variables: Constant	RT_3	RM_3	log RT_3	log RM_3	D_1	D_2	D_3	D_4	
(1) I_1	0.27	-127.32				0.03	92722	40236	-7198	n = 59
	(1.70)	(-0.67				(1.57)	(0.59)	(0.15)	(-0.24)	R^2 = 0.09
(2) log I_1	11.18			0.13		0.53	0.12	0.25	0.16	n = 59
	(14.32)			(0.91)		(1.36)	(0.32)	(0.41)	(0.24)	R^2 = 0.06
(3) I_1	1.09	-0.0005				1.01	0.40	0.15	-0.32	n = 59
	(1.75)	(-0.70)				(1.50)	(0.65)	(0.15)	(-0.27)	R^2 = 0.09
(4) log I_2	-1.20			0.12		0.49	0.13	0.25	0.13	n = 59
	(1.54)			(0.86)		(1.26)	(0.38)	(0.41)	(0.19)	R^2 = 0.06
(5) I_1	0.25		785.39			0.11	-34330	0.11	-53404	n = 53
	(1.62)		(1.66)			(0.55)	(-0.19)	(0.39)	(-0.16)	R^2 = 0.12
(6) I_1	10.85				0.36	-0.23	-0.12	0.51	0.002	n = 53
	(17.17)				(2.35)	(-0.57)	(-0.35)	(0.91)	(0.003)	R^2 = 0.12
(7) log I_2	0.99		0.003			0.45	-0.13	0.43	-0.21	n = 53
	(1.62)		(1.66)			(0.55)	(-0.19)	(0.39)	(-0.16)	R^2 = 0.12
(8) log I_2	-1.61				0.36	-0.23	-0.13	0.51	0.007	n = 53
	(-2.54)				(2.36)	(-0.57)	(-0.37)	(0.92)	(0.01)	R^2 = 0.12

(cont.)

Table 5.12: (cont.)

Dependent Variable	Independent Variables									
	Constant	RT_3	RML_3	log RT_3	log RML_3	D_1	D_2	D_3	D_4	
(9) I_1	0.13 (0.82)	0.48 (1.50)				0.29 (1.70)	-6709.1 (-0.04)	0.14 (0.52)	-62368 (-0.22)	n = 59 R^2 = 0.10
(10) log I_1	12.06 (30.54)			-0.13 (-0.71)		0.32 (0.82)	-0.11 (-0.29)	0.35 (0.58)	0.11 (0.16)	n = 59 R^2 = 0.05
(11) I_1	0.24 (1.67)		0.16 (3.53)			22335 (0.12)	83002 (0.54)	0.21 (0.82)	-51539 (-0.17)	n = 59 R^2 = 0.26
(12) log I_1	9.12 (10.43)			0.28 (3.65)		-0.27 (-0.71)	0.10 (0.31)	0.49 (0.95)	-0.17 (-0.28)	n = 59 R^2 0 0.24

(12) with t-values exceeding 3.5 and R^2 of about 0.25. Dummy variables again are insignificant.

We then introduced the distinction between the primarily foreign-owned firms (51-100% foreign ownership) and the primarily domestically-owned firms (0.1-49% foreign-ownership) as in the previous chapter, by using a dummy variable. The results for the primarily domestically-owned firms are presented in Table 5.13. Once again, we find that imported raw-materials viz., RM_2 and RML_2, perform relatively better as seen from equations (5), (6), (7), (8), (11) and (12). The regression of level of investment on level of imported raw-materials gives us the relatively better result with a $R^2 = 0.34$. From (12), it is clear that, although RML_2 is significant, the elasticity of foreign investment with respect to imported raw-materials is only 0.29 so far as the primarily domestically owned firms are concerned. Furthermore, RTL_2 in equation (10) is not significant at the 5% level and the elasticity of the level of investment to domestically available raw-materials is only 0.16 so far as the primarily domestically-owned firms are concerned.

The results for the primarily foreign-owned firms are presented in Table 5.14. We have regressed I_1 and I_2 on RT_1, RM_1, RTL_1 and RML_1. Both in terms of R^2s and the t-values, the results are somewhat better than those for the primarily domestically-owned firms. Once again, it is clear that

Table 5.13:

Dependent Variable	Independent Variables: Constant	RT_2	RM_2	log RT_2	log RM_2	D_1	D_1	D_3	D_4	
(1) I_1	0.40 (2.83)	-138.34 (-0.68)				702.68 (0.01)	0.14 (0.84)	0.16 (0.61)	-0.20 (-0.69)	n = 57 R^2 = 0.04
(2) log I_1	10.49 (13.03)			0.25 (1.61)		0.54 (1.39)	0.33 (0.91)	0.53 (0.82)	0.15 (0.22)	n = 57 R^2 = 0.13
(3) I_1	0.89 (1.44)	-0.0002 (-0.30)				1.14 (1.65)	0.06 (0.96)	0.05 (0.05)	-0.19 (-0.16)	n = 57 R^2 = 0.10
(4) log I_2	-1.83 (-2.18)			0.19 (1.88)		0.15 (1.27)	0.62 (1.64)	0.52 (0.78)	0.26 (0.38)	n = 57 R^2 = 0.14
(5) I_1	0.22 (1.43)		931.74 (1.86)			0.13 (0.65)	22520 (0.13)	81815 (0.30)	-45629 (-0.14)	n = 53 R^2 = 0.13
(6) log I_1	11.24 (18.90)				0.27 (1.96)	-0.21 (-0.49)	-0.11 (-0.29	0.58 (0.86)	-0.05 (-0.07)	n = 53 R^2 = 0.09
(7) I_2	0.81 (1.33)		0.004 (2.01)			0.57 (0.75)	0.16 (0.24)	0.25 (0.24)	-0.13 (-0.10)	n = 53 R^2 = 0.15
(8 log I_2	-1.55 (-2.93)				0.31 (2.66)	0.0009 (0.02)	0.05 (0.24)	0.33 (0.61)	0.05 (0.08)	n = 53 R^2 = 0.16

Table 5.13: (cont.)

Dependent Variable	Independent Variables									
	Constant	RTL_2	RML_2	log RTL_2	log RML_2	D_1	D_2	D_3	D_4	
(9) I_1	0.11 (0.87)	0.14 (1.83)				0.29 (1.96)	0.17 (1.20)	0.13 (0.54)	152254 (0.06)	n = 57 R^2 = 0.18
(10) log I_1	9.76 (9.22)			0.16 (1.90)		0.57 (1.50)	0.39 (1.11)	0.45 (0.71)	0.12 (0.18)	n = 57 R^2 = 0.15
(11) I_1	0.26 (1.76)		0.35 (4.50)			3748 (0.02)	39105 (0.27)	0.20 (0.83)	-60208 (-0.21)	n = 53 R^2 = 0.34
(12) log I_1	9.09 (10.85)				0.29 (3.99)	-0.33 (-0.87)	0.10 (0.30)	0.59 (1.07)	-0.30 (-0.44)	n = 53 R^2 = 0.26

Table 5.14:

Dependent Variable	Independent Variables: Constant	RT_1	RM_1	log RT_1	log RM_1	D_1	D_2	D_3	D_4	
(1) I_1	0.56	-114.69				0.54	-0.50	-71323	-0.39	n = 31
	(1.35)	(-0.67)				(1.31)	(-1.34)	(-0.13)	(-0.50)	R^2 = 0.14
(2) log I_1	11.27			0.15		0.53	-0.37	1.66	-0.30	n = 31
	(12.00)			(0.96)		(0.81)	(-0.65)	(1.24)	(-0.24)	R^2 = 0.14
(3) I_2	0.92	-0.0002				1.12	0.13	0.43	-0.27	n = 31
	(0.98)	(-0.58)				(1.20)	(0.16)	(0.35)	(-0.15)	R^2 = 0.10
(4) log I_2	-1.77			0.22		0.42	0.13	1.31	-0.01	n = 31
	(2.22)			(1.63)		(0.75)	(0.28)	(1.16)	(-0.01)	R^2 = 0.20
(5) I_1	0.10		903.13			0.25	-0.36	0.48	-37112	n = 28
	(0.28)		(2.79)			(0.66)	(-1.12)	(1.17)	(0.06)	R^2 = 0.34
(6) log I_1	10.75				0.22	0.75	-0.29	0.72	0.18	n = 28
	(10.66)				(1.22)	(0.94)	(-0.44)	(0.84)	(0.14)	R^2 = 0.18
(7) I_2	0.39		0.004			0.97	-1.35	1.89	-0.14	n = 28
	(0.29)		(2.80)			(0.66)	(-1.13)	(1.16)	(-0.06)	R^2 = 0.34
(8) log I_2	-1.88				0.26	0.76	-0.28	0.58	0.23	n = 28
	(-1.98)				(1.53)	(1.02)	(-0.46)	(0.72)	(0.19)	R^2 = 0.22

(Cont.)

Table 5.14: (cont.)

Dependent Variable	Independent Variables									
	Constant	RTL_1	RML_1	log RTL_1	log RML_1	D_1	D_2	D_3	D_4	
(9) I_1	0.19 (0.000002)	-0.36 (-1.90)				-0.12 (-1.26)	17096 (0.20)	-1495.7 (-0.007)	-44342 (-0.25)	n = 31 R^2 = 0.16
(10) log I_1	-2.19 (-1.25)			0.67 (3.99)		0.25 (0.38)	-0.22 (-0.40)	-2.20 (-1.59)	0.95 (0.80)	n = 31 R^2 = 0.46
(11) I_1	0.25 (0.000003)		-0.0008 (-0.28)			18277 (0.18)	-0.16 (-1.99)	94962 (0.88)	-88283 (-0.53)	n = 28 R^2 = 0.18
(12) log I_1	9.84 (7.08)				0.18 (1.47)	0.61 (0.77)	0.03 (-0.05)	0.56 (0.69)	0.38 (0.30)	n = 28 R^2 = 0.20

imported raw-materials (irrespective of whether RM_1 or RML_1 is used) does better. The elasticity of the level of investment with respect to domestically available raw-materials is 0.67 as seen from equation (10) and with respect to imported raw-materials is 0.18 as seen from equation (12) so far as the primarily foreign owned firms are concerned. Both of these values are higher than those for the primarily domestically-owned firms (which are 0.29 and 0.16 respectively).

SECTION 5.4: IMPORTED RAW-MATERIALS

From our studies in Sections 2 and 3, it is clear that imported raw-material is relatively a more important explanatory variable than the domestically available raw-material. It makes nonsense of the raw-material availability hypothesis if the major investing countries like Japan and U.S.A. export raw-materials to Thailand. In Table 5.15, we present 1970 and 1980 figures of exports from and imports to Thailand. We have chosen 1970 and 1980 figures because the data used in our analysis is cumulative data from 1961 to 1981. So 1970 and 1980 figures should indicate the actual state of affairs. It is clear from Table 5.15 that about 86% of Thai exports to Japan is raw-materials and only about 22% of the Thai imports from Japan is raw-materials. The 1970 and 1980 figures for the U.S.A and U.K. somewhat vary but conclusions similar to that for Japan still hold. However, for Malaysia things are different since about 70% of Thai imports from Malaysia are raw-materials (72% in 1970 and 68% in 1980). This was our suggestion in Section 5.2. That is, multi-national firms

TABLE 5.15

	EXPORTS OF RAW-MATERIALS FROM THAILAND		EXPORTS OF RAW-MATERIALS TO THAILAND	
	YEAR	%	YEAR	%
U.S.A	1970 -	82%	1970 -	39%
	1980 -	58%	1970 -	16%
JAPAN	1970 -	86.5%	1970 -	23%
	1980 -	86%	1980 -	22%
U.K.	1970 -	91%	1970 -	22%
	1980 -	44%	1980 -	5.4%
MALAYASIA	1970 -	41%	1970 -	72%
	1980 -	65%	1980 -	68%
INDONESIA	1970 -	83%	1970 -	53%
	1980 -	89%	1980 -	92%

from Japan, U.S.A. or U.K. do invest in Thailand because of raw-material availability. Nevertheless, the reason why imported raw-material becomes significant is the fact that the neighbouring countries of Thailand export raw-materials to Thailand. The multi-national firms do invest in the 'region' because of raw-material availability. Thus, it is not immediately clear why, for example, a firm investing in Thailand imports raw-materials from Malaysia while the firm is free to invest in Malaysia. Multi-national firms may invest in Thailand rather than in Malaysia because of government incentives, availability of skilled labour, or availability of channels for easy contact etc.. This aspect is beyond the scope of our present study.

SECTION 5.5: CONCLUSIONS

From Sections 5.2 and 5.3, and keeping in mind the points raised in Section 5.4, we conclude that availability of raw-materials does play a crucial role in explaining foreign direct investment in Thailand. Our study confirms Kojima's (1971) findings and also reinforces Krainer's (1967) hypothesis so far as Japan is concerned. It also confirms Horst's (1972) work so far as Horst's finding confirms 'resource' as a significant explanatory variable in the 'Canadian case'.

CHAPTER 6

TARIFF-JUMPING HYPOTHESIS

SECTION 6.1 INTRODUCTION

The idea that firms may invest in a foreign country in order to escape high tariffs imposed by the foreign country is not new. For example, Johnson (1970) mentioned this possibility. The tariff-jumping hypothesis is considered to be relatively more relevant in the context of the flow of foreign direct investment from the developed countries to the less-developed countries. (See, for example, Lall & Streeten (p.30, 1977). It is for the following reasons: most of the newly independent less-developed countries during the last two or three decades attempted to generate growth in their planned economies by using a strategy of import-substitution industrialisation. In many cases, the rates of tariffs imposed by the less-developed countries are prohibitive. Thus, there exists a situation when the multinational firms find it profitable to build a plant in the protected economy and capture the market there.

Horst (1971) has carried out an interesting study of the effect of tariffs on foreign direct investment. Multinational firms may find exporting less profitable because of higher domestic prices in the protected market or they may find it more profitable if price discrimination can be practised provided that the price elasticity of demand is low. However, there exist critical levels of tariffs when it becomes more profitable to produce the goods in the protected market. Earlier, Eastman & Stykolt (1967) carried out a study regarding the effects of tariffs on foreign investments in Canada. Caves (1971) used Canadian effective

rate of protection as one of the several explanatory variables (to explain U.S. foreign direct investments in Canada). The β-coefficient of the effective rate of protection is 0.003 and it is statistically insignificant. It should be pointed out that, in the context of tariffs and foreign direct investments, Juhl (1979) has put forward an entirely different proposition. If an industry in a developed country is highly protected against the exports from the LDCs, then the propensity of that industry to locate production in a LDC is low. However, Juhl's test on West Germany data rejected this hypothesis.

The objective of this chapter is to test the hypothesis that foreign firms invest in Thailand in order to jump the high tariff wall of Thailand. To the best of our knowledge, such studies have not been carried out for any LDC.

SECTION 6.2 A SIMPLE ECONOMETRIC ANALYSIS

The tariff rates used here are taken from the Custom Tariff 1980 tariff schedule of the Government of Thailand. The rates used here are nominal tariffs rates although we are aware of the fact that effective tariff rates are more appropriate. It is virtually impossible to compute effective rates of protection as the value-added figures at the level of the firm are not available. Indeed, the investment figures used here are taken for 147 firms who invested during 1975-1981. Table 6.1 presents these figures. The investment figures are at constant prices (1975 = 100).

TABLE 6.1

	DATE OF REGISTERED	INVESTING COUNTRY		INVESTMENT Ø 1000 (1975 =100)	TARIFF RATES %
1	1975	INDIA	CALCIUM CARBIDE	20000	30
2	1975	HONG-KONG	ALLUMINIUM HYDROXIDE	21000	30
3	1980	HONG-KONG	SORBITAL MANITOL	21000	30
4	1980	TAIWAN	LIQUID OXYGEN	25017	30
5	1975	TAIWAN	SYNTHETIC RESIN FOR SURFACE COATING	10000	60
6	1975	INDIA	CHEMICAL PRODUCTS, FATTY ACID	12000	30
7	HONG-KONG		SYNTHETIC COAL	20000	40
8	1976	INDIA	BASIC CHROMIUM SULPHATE	10000	30
9	1975	INDIA	REACTIVE DYES	20000	30
10	1975	INDIA	DYESTUFF, VEGETABLE DYES	40000	10
11	1981	KOREA	DIESEL ENGINE	19375	80
12	1975	TAIWAN	MACHINERY FOR MINING & INDUSTRY	16000	30
13	1980	TAIWAN	ELECTRICAL BULBS FOR CHRISTMAS	6949	30
14	1977	TAIWAN	WASHING MACHINE, MOTOR FOR VARIOUS TYPES	12000	60
15	1975	TAIWAN	CARD BOARD	15000	30
16	1979	TAIWAN	TRANSFORMER	10000	30
17	1975	TAIWAN	COOLING TOWER	16000	30
18	1981	TAIWAN	PARTS OF MACHINERY	10533	80
19	1975	TAIWAN	STANDARD DRAWING DYES	5000	25
20	1975	TAIWAN	FLASHLIGHT BULBS	2000	30
21	1975	TAIWAN	PISTON OF VEHICLE & MACHINERY	5000	80
22	1977	TAIWAN	CRYSTAL OSCILLATOR	1716	30
23	1978	HONG-KONG	WATCH BOARD	1559	40
24	1976	CAMBODIA	BALL-POINT PEN	12878	30
25	1975	TAIWAN	BLEACH COLOURS & DRAWING PENCIL	10000	30
26	1976	PHILIPPINES	STAINLESS STEEL MEDICAL EQUIPMENT	9200	30

TABLE 6.1 (Cont.)

	DATE OF REGISTERED	INVESTING COUNTRY		INVESTMENT ฿ 1000 (1975 =100)	TARIFF RATES %
27	1979	HONG-KONG	MEDICAL & NON-MEDICAL PLASTER	2205	30
28	1975	TAIWAN	TENNIS BALL	2200	50
29	1975	TAIWAN	SOLUTION INFUSION SET	4000	30
30	1978	TAIWAN	SHOES FROM EVA	6235	60
31	1978	SINGAPORE	REEL TAPES, CASSETTES TAPE	15588	50
32	1979	HONG-KONG	FLEXIBLE DRINKING STRAW	1470	10
33	1975	TAIWAN	PLASTIC WOVEN SHEET	10000	60
34	1981	TAIWAN	FLEXIBLE FLOORTILE, TENT MATERIAL	13562	30
35	1975	TAIWAN	PLASTIC WOVEN SHEET	10000	60
36	1975	TAIWAN	LAMINATED SHEET	1000	60
37	1977	TAIWAN	SHOE FROM VINYLE	5000	60
38	1977	TAIWAN	SHOE FROM EVA	10000	60
39	1975	TAIWAN	ARTIFICIAL LEATHER	12500	50
40	1979	HONG-KONG	ARTIFICIAL PRODUCTS FOR DECORATING CHRISTMAS TREE	5000	30
41	1978	TAIWAN	RUBBER TREE PRODUCTS	5000	30
42	1975	TAIWAN	PARAWOOD PRODUCTS	5000	30
43	1976	HONG-KONG	NYLON FILAMENT YARN	183976	20
44	1976	INDIA	VISCOSE RAYON, SODIUM SUPHATE	90148	20
45	1975	TAIWAN	STRETCHED YARN	15000	20
46	1981	TAIWAN	GLASS FIBRE MAT	6458	40
47	1980	TAIWAN	FIBRE LEATHER BOARD	6949	30
48	1975	TAIWAN	PLAIN VELVET	20000	80
49	1975	TAIWAN	NYLON TIRECORD FABRIC	200000	20
50	1981	KOREA	KILOWATT METER	13562	30
51	1975	TAIWAN	HAND-SAW, HACK-SAW BLADE	4287	15
52	1977	TAIWAN	LEATHER AND COTTON GLOVES	4290	60

TABLE 6.1 (Cont.)

	DATE OF REGISTERED	INVESTING COUNTRY		INVESTMENT ₿ 1000 (1975 =100)	TARIFF RATES %
53	1978	INDIA	COTTON INDUSTRIAL GLOVES	3118	60
54	1975	HONG-KONG	ARTIFICIAL FLOWER FROM POLYETHYLENE	5000	30
55	1979	HONG-KONG	ARTIFICIAL FLOWER FABRIC	1470	30
56	1975	LAOS	ARTIFICIAL FLOWER & TREE FROM POLYETHELENE	4000	30
57	1975	TAIWAN	ARTIFICIAL FLOWER FROM POLYETHYLENE	4000	30
58	1979	KOREA	MENS SOCKS	2940	60
59	1975	KOREA	SOCKS	8000	60
60	1975	KOREA	SOCKS	10000	60
61	1980	SINGAPORE	CARPET FROM KENAF	6949	100
62	1975	HONG-KONG	GARMENT	12000	60
63	1975	TAIWAN	VENEER	12000	30
64	1976	TAIWAN	WOOD PARQUET FLOORING	9199	30
65	1979	HONG-KONG	ELASTIC BAND	6436	30
66	1975	TAIWAN	HAND TOOLS, SAW FLIES	21000	15
67	1977	JAPAN	CHEMICAL FOR TEXTILE	8000	30
68	1975	"	WARP SIGNING AGENTS, SYNTHETIC SIZER	14718	30
69	1975	"	CALCIUM CITRATE	29397	30
70	1980	"	CHEMICAL PRODUCT FOR METAL SURFACE TREATMENT	4864	10
71	1981	"	LIQUID OXYGEN	19375	30
72	1975	"	POLYURETHENE RESINS	30000	10
73	1975	"	ALKYD RESIN, TEXTILE FINISHING RESIN	30000	10
74	1975	"	UREA FORMALDE HYDE	7500	30
75	1980	"	PHARMACEUTICAL PRODUCT	12916	30
76	1980	"	DIESEL ENGINE	34746	80

TABLE 6.1 (Cont.)

	DATE OF REGISTERED	INVESTING COUNTRY		INVESTMENT ฿ 1000 (1975 =100)	TARIFF RATES %
77	1980	"	DIESEL ENGINE	69493	80
78	1975	"	FLUORESCENT LAMPS	18398	80
79	1980	"	ELECTRIC RICE COOKER	27797	30
80	1981	"	ELECTRIC RICE COOKER	3229	30
81	1975	"	DIESEL ENGINE	100000	80
82	1975	"	ELECTROLYTIC CONDENSER	20000	30
83	1975	"	ENGINE VALVE	15000	80
84	1979	"	PISTON RING	15000	80
85	1978	"	CYLINDER HEAD GADGET	4000	80
86	1978	"	BICYCLE & COMPONENTS OR BIKE	3000	30
87	1075	"	PISTON RING	10000	80
88	1975	"	PISTON RING	10000	80
89	1978	"	CAB PARTS & CAR BODY PARTS	38971	80
90	1980	"	COMPONENTS PART OF VEHICLES	6949	80
91	1980	JAPAN	COMPONENTS PART FOR VEHICLES, BRAKE DRUM	69493	80
92	1975	"	COMBINATION SWITCH SET, IGNITION COIL	10000	80
93	1975	"	HYDRAULIC GEAR, DRIVE SHAFT, PUMP	5000	80
94	1975	"	FARM GENERATOR FUES, IGNITION COIL	18750	30
95	1975	"	ELECTRICAL BULBS, LIGHTING EQUIPMENT	10000	30
96	1979	"	CAB PART & FRONT BODY PARTS	1837	80
97	1980	"	GROUNDING WIRE, MOTORCYCLE MOTOR	17373	30
98	1975	"	TV TRANSFORMER & COIL	30000	40
99	1978	"	CHAIR WOOD & PINEWOOD PRODUCTS	9353	30
100	1975	"	OPTHALMIC LENS	5357	30

TABLE 6.1 (Cont.)

	DATE OF REGISTERED	INVESTING COUNTRY		INVESTMENT ฿ 1000 (1975 =100)	TARIFF RATES %
101	1975	"	KILOWATT HOUR METER	5000	30
102	1976	"	MOTOR CAR & TRUCK	23688	15
103	1979	"	BLOOD TRANSFUSION SET	44091	30
104	1975	"	PARAWOOD PRODUCTS, TABLE, CHAIR	6000	30
105	1975	"	PARAWOOD PRODUCTS	10000	30
106	1980	"	KILOWATT HOUR METER	6949	30
107	1978	"	METAL & PLASTIC ZIPPER	31177	50
108	1975	"	CELLOPHANE WRAPPER	9000	20
109	1975	"	SPINNING, WEAVING	55000	30
110	1976	"	SPINNING, WEAVING	110385	30
111	1978	"	RICE COOKER	23383	30
112	1975	"	FLUORESCENT LAMPS	15000	50
113	1975	"	DIESEL ENGINE	22000	80
114	1975	GERMANY	HOUSEHOLD INSECTICIDE	3000	30
115	1976	GERMANY	SHUTTLE, BOBBIN, PICKING STICK	11039	10
116	1980	GERMANY	ELECTRICAL COMPONENTS	2085	60
117	1979	GERMANY	WIND GLIDER BOARD	1470	30
118	1975	GERMANY	PRINTING SILK FABRIC BY MACHINE & HAND	25000	100
119	1980	SWITZERLAND	CARBON BLACK	62543	30
120	1975	LUXEMBOURG	PHARMACEUTICAL PRODUCTS	18000	80
121	1978	NORWAY	POWDER COATING POLYESTER	4677	30
122	1975	INDIA	DIESEL ENGINE	10000	80
123	1977	NETHERLAND	FLOURESCENT LAMPS	8581	50
124	1978	NETHERLAND	PREFORMED PRODUCTS, VIBRATION DAMPERS	779	50
125	1975	AUSTRALIA	MOTOR COMPRESSOR FOR REFRIGERATOR	40000	60

TABLE 6.1 (Cont.)

	DATE OF REGISTERED	INVESTING COUNTRY		INVESTMENT ฿ 1000 (1975 =100)	TARIFF RATES %
126	1975	SWITZERLAND	INTEGRATED CIRCUITS	10000	30
127	1975	SWITZERLAND	WATCH CASE	5380	40
128	1978	FRANCE	JEWELLRY RING BRACELET	7794	50
129	1977	FRANCE	POLYESTER STAPLE FIBRE	343230	20
130	1975	BELGUIM	BIAXIALLY ORIENTED POLYSTYRENE SHEETS	16000	30
131	1980	UK	MODULE OF ELECTRONIC DIGITAL WATCH	3475	10
132	1980	UK	BALL PEN	7644	30
133	1975	UK	SANDAL MADE OF PLASTIC	5000	100
134	1980	UK	INDUSTRIAL WORKS GLOVES	2780	60
135	1978	UK	ARTIFICIAL FLOWER & TREE	7794	30
136	1975	UK	GARMENT	4000	60
137	1977	UK	AMPOULE, VIAL, GLASS TUBE	3432	20
138	1976	UK	SHAPE SECTION METAL WINDOW	6899	5
139	1975	UK	TERMINATOR INTEGRATED CIRCUITS	2142	30
140	1975	UK	ALLUMINIUM FOIL	120000	30
141	1976	USA	ALLUMINIUM TUBE	47037	15
142	1978	USA	POLYESTERINE FOR GENERAL PURPOSE HIGH IMPACT	49883	30
143	1975	USA	SEEDLAC COLOUR PIGMENT	49883	30
144	1977	USA	CITIZEN BAND TRANSCIEVER	4290	40
145	1980	USA	INTEGRATED CIRCUITS	3789	30
146	1975	USA	FIBRE GLASS	6000	40
147	1979	USA	POLYESTER	73492	20

We here test the following hypothesis:[1]

$$I_i^j = \alpha + \beta T_i + \gamma D_1$$

where I_i^j is the j^{th} country's investment in the i^{th} sector, T_i is the nominal rate of tariff in the i^{th} sector, and D_1 is the dummy when D = 0 for the LDCs and D = 1 for the developed countries. The first results are presented in Table 6.2. Regression equation (1) shows that the coefficient of T has the wrong sign and it is significant although the R^2 is poor. The dummy variable is insignificant. The logarithmic run in equation (2) does not improve these findings. Results (not reported here) with dummies for four countries (viz. U.K., U.S.A., Germany and Japan) are not better than the above. We ran the same regression equation for the LDCs and the DCs. Equation (3) shows the logarithmic results for the DCs. The hypothesis is rejected. A similar run (not reported here) for the LDCs also yielded poor results. Last we included a dummy variable to take account of 'time' e.g. $D_2 = 1$ for 1975, $D_2 = 2$ for 1976 and so on. These results are given by equations 4, 5, 6 and 7. Once again, the coefficient of T is insignificant.

We then considered that matters might improve if the regression is run for various sectors separately because of the apparent differences in industry characteristics. These

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1 We are aware of the fact that a more complete test would require some independent variable (such as, sales) to capture profitability. This could not be done because of lack of appropriate data.

TABLE 6.2

Dependent Variable	Independent Variables					
	Constant	T_i	log T_i	D_1	D_2	n, R^2
1. I_i^j	29413 (3.78)	-32601 (-2.13)		8231.1 (1.28)		n = 147 R^2 = 0.04
2. log I_i^j	8.65 (37.19)		-0.34 (-1.91)	0.36 (1.92)		n = 147 R^2 = 0.05
3. log $I_i^{\text{all DCs}}$	8.95 (29.99)		-0.40 (-1.58)			n = 81 R^2 = 0.03
4. I_i^j	32522 (3.72)	-305.09 (-2.01)		8021.3 (1.24)	-1423.7 (-0.93)	n = 141 R^2 = 0.04
5. log I_i^j	10.26 (17.23)		-0.27 (-1.66)	0.35 (1.95)	-0.10 (-2.33)	n = 141 R^2 = 0.08
6. $I_i^{\text{all DCs}}$	-0.17 (-1.30)	-255.59 (-1.16)		0.17 (1.00)	-746.18 (-0.32)	n = 81 R^2 = 0.02
7. log $I_i^{\text{all DCs}}$	-0.17 (-1.01)		-0.21 (-0.21)	0.17 (1.00)	-0.97 (-1.59)	n = 81 R^2 = 0.04

results are presented in Table 6.3. Equations (1) and (2) give the results for the chemical sector and, clearly, the hypothesis is rejected. The same is the case for the Mechanical sector (equations (3) and (4)) and the 'Other Products' sector (equations (5) and (6)). No regression is run separately for 'Other Industries' sector as we have only two observations for this sector.

We thought that the above results are poor because we have used 1980 tariff rates while investment figures are for the years 1975-1981 as if the tariff rates have been constant during 1975-1981. This was forced upon us because of the problems of data non-availability. So we considered only the 1980 and 1981 investments as listed in Table 6.4. The regression results (not reported here) are found to be equally poor.

SECTION 6.3 CONCLUSION

Clearly, our study rejects the tariff-jumping hypothesis for Thailand. In accepting this result, one must remember that our independent variable is 'nominal' tariff rates. If similar regressions are run with effective rates of protection, there is a chance of obtaining different results. However, we note that Caves (1971), using a multiple regression model, and using Canadian effective rate of protection, found tariff to be an insignificant variable in explaining U.S. foreign direct investment in Canada. Thus, the over-all weight of empirical evidence seems to

TABLE 6.3

Dependent Variable	Independent Variables				
	Constant	T_i	log T_i	D	n, R^2
1. I_i^j (CHEMICAL)	28522 (2.78)	-334.81 (-1.12)		-2735.8 (-0.49)	n = 25 R^2 = 0.06
2. log I_i^j (CHEMICAL)	10.87 (7.25)		-0.37 (-0.85)	-0.33 (-0.96)	n = 25 R^2 = 0.06
3. I_I^J (MECHANICAL)	26994 (0.53)	-434.68 (-0.60)		30567 (0.68)	n = 51 R^2 = 0.02
4. log I_i^j MECHANICAL)	8.67 (8.89)		-0.04 (-0.16)	0.50 (1.22)	n = 51 R^2 = 0.03
5. I_i^J (OTHER PRODUCTS)	48495 (2.69)	-706.21 (-1.97)		26591 (1.74)	n = 69 R^2 = 0.11
6. log I_i^j (OTHER PRODUCTS)	10.78 (9.62)		-0.52 (-1.69)	0.82 (2.71)	n = 69 R^2 = 0.15

TABLE 6.4

	YEAR	INVESTMENT ₿ 1000 in 1975 = 100 prices	TARIFF RATES	COUNTRY INVEST	PRODUCTS
1	1980	21000	30	HONG-KONG	SORBITAL MANITOL
2	1980	25017	30	TAIWAN	LIQUID OXYGEN
3	1981	10533	80	TAIWAN	SPARE PARTS OF MACHINERY
4	1981	19375	80	KOREA	DIESEL ENGINE
5	1981	13562	30	TAIWAN	KILOWATT METER
6	1981	6458	40	TAIWAN	GLASS FIBRE MAT
7	1981	6949	30	TAIWAN	ELECTRICAL BULBS FOR CHRISTMAS TREES
8	1981	13562	30	TAIWAN	FLEXIBLE FLOORTILE, TENT MATERIAL
9	1980	6949	30	TAIWAN	FIBRE LEATHER BOARD
10	1980	4864	10	JAPAN	CHEMICAL PRODUCTS FOR METAL SURFACE TREATMENT
11	1980	12916	30	JAPAN	PHARMACEUTICAL PRODUCTS
12	1980	34746	80	JAPAN	DIESEL ENGINE
13	1980	69493	80	JAPAN	DIESEL ENGINE
14	1980	27797	30	JAPAN	ELECTRIC RICE COOKER
15	1981	3229	30	JAPAN	ELECTRIC RICE COOKER
16	1980	17373	30	JAPAN	GROUNDING WIRE, MOTORCYCLE MOTOR
17	1980	19375	80	JAPAN	LIQUID OXYGEN
18	1980	69493	80	JAPAN	COMPONENT PART FOR VEHICLES, BRAKE DRUM
19	1980	6949	100	SINGAPORE	CARPET FROM KENAF
20	1980	6949	80	JAPAN	COMPONENT PART OF VEHICLES
21	1980	7644	30	UK	BALL PEN
22	1980	3475	10	UK	MODULE OF ELECTRONIC DIGITAL WATCH
23	1980	2780	60	UK	INDUSTRIAL WORKS GLOVES
24	1980	62543	30	SWITZERLAND	CARBON BLACK
25	1980	2085	60	GERMANY	ELECTRICAL COMPONENTS
26	1980	2780	30	USA	INTEGRATED CIRCUITS

reject the importance of high tariffs in explaining foreign direct investments.

CHAPTER 7

A JOINT HYPOTHESIS

SECTION 7.1: INTRODUCTION

We have tested the capital-intensity hypothesis, the raw-material availability hypothesis and the tariff-jumping hypothesis respectively in chapters 4, 5 and 6. The objective of this chapter is to run a multiple regression equation where all the three independent variables appear at the same time. At first, we run capital-labour ratio and raw-material-labour ratio together as independent variables. This is done for the various ownership categories separately, and for domestic and raw-materials separately. Then, nominal tariff rates are used as the third independent variable although the latter runs are limited to 26 observations i.e., 26 firms registered with the BOI during 1980 and 1981, so that the 1981 nominal tariff rates could be used.

SECTION 7.2: CAPITAL-LABOUR RATIO AND RAW-MATERIAL-LABOUR RATIO AS EXPLANATORY VARIABLES.

This section presents some simple econometric results for the joint hypothesis with capital-labour ratio and raw-material-labour ratio as the explanatory variables. It is done in the hope that the results will throw some light on the relative merits of these variables. Let us first recapitulate the definition of the variables (scattered in various chapters). These are:

I_1 = level of sectoral investment

I_2 = sectoral investment of a country as a percentage of the total foreign direct investment

k_1 = capital-labour ratio for the 0.1-100% foreign ownership category

k_2 = capital-labour ratio for the 51-100% foreign ownership category

k_3 = capital-labour ratio for the 0.1-49% foreign ownership category

RT_1 = domestic raw-material-labour ratio for the 51-100% foreign ownership

RT_2 = domestic raw-material-labour ratio for the 0.1-49% foreign ownership

RT_3 = domestic raw-material-labour ratio for the 0.1-100% foreign ownership category

RM_1 = imported raw-material-labour ratio for the 51-100% foreign ownership category

RM_2 = imported raw-material-labour ratio for the 0.1-49% foreign ownership category

RM_3 = imported raw-material-labour ratio for the 0.1-100% foreign ownership category

RR = total (domestic + imported) raw-material-labour ratio for the ownership category 0.1-100%

The data which we have used here are to be found in Chapters 3, 4 and 5. The data I_1 and I_2 appear in Chapter 3, the data for k_1, k_2 and k_3 appear in chapter 4 and the data for RT_1, RT_2, RT_3, RM_1, RM_2, RM_3 and RR appear in Chapter 5.

We have tested the joint hypothesis by considering all the firms without distinguishing between the degrees of foreign ownership. Following the work of earlier chapters, we have two specifications of the dependent variables, viz., I_1 and I_2. We again use dummy variables D_i i = 1,2,3,4, and the definitions remain the same as in the earlier chapters. Table 7.1 presents the results for the firms within the foreign ownership category ranging from 0.1-100%. We do distinguish here between the domestically available raw-materials and the imported raw-materials. Equations (1) - (4) in Table 7.1 present the results for the domestically available raw-material. Regressing I_1 and I_2 (in equations 1 and 3) on RT_3 and k_3 along with the dummies, we find that k_3 is significant and RT_3 insignificant in both the runs. None of the dummies is significant. The logarithmic runs (equation 2 and 4) somewhat improves the results. Once again, k_3 is significant and RT_3 (domestic raw-material-labour ratio) is insignificant. The elasticity of the sectoral level of investment with respect to capital-labour ratio is close to unity (0.93). The elasticity of the share of investment with respect to capital-labour ratio is also close to unity (0.89).

Equations (5) - (8) in Table 7.1 present the results for the imported raw-material-labour ratio. In equation (5), both k_3 and RM_3 are insignificant while k_3 is significant and RM_3 is significant in equation (7). Once again we find that the logarithmic runs do better. Furthermore, both RM_3 and k_3 are significant with a relatively high R^2 in equation (6).

TABLE 7.1

Dependent Variable	Independent Variables											
	Constant	RT_3	log RT_3	RM_3	log RM_3	k_3	log k_3	D_1	D_2	D_3	D_4	R^2, n
1. I_1	0.54 (2.86)	-121.64 (-0.53)				287.87 (2.50)		0.15 (-0.71)	-99535 (-0.49)	-0.29 (-0.88)	-0.41 (-1.22)	n = 59 R^2 = 0.13
2. log I_1	7.07 (5.32)		0.10 (-0.09)				0.93 (3.89)	-0.49 (-1.20)	-0.42 (-1.10)	0.10 (0.17)	-0.26 (-0.42)	n = 59 R^2 = 0.26
3. I_2	1.98 (2.70)	-0.0004 (-0.46)				0.001 (2.59)		-0.45 (-0.55)	-0.25 (-0.31)	-1.22 (-0.97)	-1.49 (-1.16)	n = 59 R^2 = 0.14
4. log I_2	-5.49 (4.19)		0.04 (0.30)				0.89 (3.77)	-0.41 (-1.03)	-0.21 (-0.56)	0.50 (0.09)	-0.23 (-0.38)	n = 59 R^2 = 0.27
5. I_1	31678 (0.52)			78.24 (0.42)		-9.68 (-0.24)		-0.14 (-1.78)	-49074 (-0.67)	93007 (0.75)	-81632 (-0.34)	n = 59 R^2 = 0.08
6. log I_1	-3.06 (-2.53)				0.35 (2.58)		0.63 (3.05)	-0.38 (-1.07)	-0.81 (-2.49)	0.09 (0.18)	0.05 (0.09)	n = 59 R^2 = 0.36
7. I_2	0.74 (1.30)			0.002 (1.26)		0.001 (3.04)		0.40 (0.52)	-0.70 (-1.03)	-1.36 (-1.16)	-0.09 (-0.07)	n = 59 R^2 = 0.27
8. log I_2	-5.99 (-4.96)				0.25 (1.89)		0.83 (4.07)	-0.43 (-1.22)	-0.56 (-1.73)	-0.08 (-0.15)	0.29 (0.51)	n = 59 R^2 = 0.36

(Cont.)

TABLE 7.1 (cont.)

Dependent Variable	Independent Variables										
	Constant	RR	log RR			k_3	log k_3	D_1	D_2	D_3	D_4	n, R^2
9. I_1	0.50 (2.81)	14.73 (0.16)				282.90 (2.46)		-0.13 (-0.64)	-93075 (-0.45)	-0.29 (-0.85)	-0.39 (-1.18)	n = 59 R^2 = 0.13
10. log I	6.80 (5.24)		0.20 (1.21)			0.79 (3.15)		-0.49 (-1.23)	-0.41 (-1.12)	0.08 (-0.14)	-0.28 (-0.47)	n = 59 R^2 = 0.28
11. I_2	1.81 (2.65)	0.0009 (0.25)				0.001 (2.56)		-0.40 (-0.49)	-0.23 (-0.29)	-1.27 (-0.97)	-1.44 (-1.12)	n = 59 R^2 = 0.14
12. log I_2	-5.74 (-4.53)		0.27 (1.67)			0.73 (2.98)		-0.44 (-1.14)	-0.22 (-0.61)	0.02 (0.03)	-0.25 (-0.43)	n = 59 $\bar{R}^2$ = 0.43

However, in (8), only k_3 is significant and RM_3 is insignificant, although the R^2 is relatively high. The elasticity of the level of investment with respect to k_3 is 0.63 while with respect to imported raw-material-labour ratios is 0.35.

Equations (9)-(12) in Table 7.1 give the results for the total raw-material-labour ratio (RR). These results are poorer than the results (1)-(8) although we note that k_3 is significant and RR is insignificant in all the runs. The elasticity of the level of investment with respect to k_3 when run with RR) is 0.79, a figure which lies in between 0.93 (when run with RT_3) and 0.63 (when run with RM_3). The over-all impression is that capital-labour ratio performs relatively better.

Next we decided to examine whether the relative performance of the independent variables remains the same if we distinguish between the primarily foreign-owned firms (51-100% foreign ownership) and primarily domestically-owned firms (0.1-49% foreign ownership). Table 7.2 presents the results for the primarily domestically-owned firms. Regressing I_1 and I_2 on RT_2 and k_2 (respectively in equation (1) and (3) in Table 7.2), along with the dummies, we find both the capital-labour ratio and the domestic raw-material-labour ratio are insignificant with low R^2s. The logarithmic runs (viz., equations (2) and (4) in Table 7.2) improve matters considerably. Capital-labour ratio is significant in both the runs while the domestic raw-material-labour ratio is significant in (2) and

TABLE 7.2

Dependent Variable	Independent Variables											
	Constant	RT_2	log RT_2	RM_2	log RM_2	k_2	log k_2	D_1	D_2	D_3	D_4	R^2, n
1.	0.19	-56.22				39.62		0.24	0.19	0.11	-39589	n = 56
I_1	(1.28)	(-0.32)				(0.43)		(1.48)	(1.22)	(0.39)	(-0.15)	R^2 = 0.13
2.	7.07		0.30				0.54	0.29	0.53	0.11	0.10	n = 56
log I_1	(4.24)		(1.96)				(2.32)	(0.76)	(1.47)	(0.18)	(0.16)	R^2 = 0.22
3.	0.86	-0.0004				0.0002		0.87	0.81	0.22	-0.29	n = 56
I_2	(1.23)	(-0.44)				(0.51)		(1.18)	(1.18)	(0.17)	(-0.23)	R^2 = 0.10
4.	-5.67		0.24				0.61	0.24	0.84	0.06	0.21	n = 56
log I_2	(-3.28)		(1.56)				(2.51)	(0.60)	(2.27)	(0.09)	(0.32)	R^2 = 0.24
5.	0.31			-38.25		25.62		-0.15	-63931	69274	080377	n = 56
I_1	(0.52)			(-0.18)		(0.59)		(-1.99)	(-0.96)	(0.62)	(-0.64)	R^2 = 0.11
6.	0.87			0.004		-0.0003		0.54	0.22	0.50	0.16	n = 56
I_2	(1.41)			(2.06)		(-0.59)		(0.70)	(0.33)	(0.44)	(0.12)	R^2 = 0.15
7.	-4.03				0.21		0.49	-0.06	-0.09	0.16	0.24	n = 56
log I_2	(-2.94)				(1.67)		(1.95)	(-0.15)	(-0.25)	(0.29)	(0.38)	R^2 = 0.22

insignificant in (4). The elasticity of the level of investment with respect to capital-labour ratio is 0.54 in this case. Equations (5), (6) and (7) give the results with imported raw-material-labour ratio. These results show that, for the primarily domestically-owned firms, both the imported raw-material-labour ratio and the capital-labour ratio are insignificant when the dependent variable is I_1, (level of investment). For I_2 (share) as the dependent variable, RM_2 (imported raw-material-labour ratio) is a significant variable while k_2 is insignificant. On the logarithmic run (equation 7 in Table7.2), k_2 is very close to being significant while RM_2 is insignificant. The over-all impression is that, imported raw-material-labour ratio and capital-labour ratio do not perform well for the primarily domestically-owned firms. This, of course, is not a surprising result. Our hypothesis expects these variables to perform well for the primarily foreign-owned firms (which satisfy the definition of a 'foreign investor' more appropriately).

Table 7.3 presents the results for the 51-100% foreign-ownership category. Capital-labour ratio run with domestic raw-material-labour ratio (equation (1) and (2) in Table 7.3) is not significant. However, capital-labour ratio run with imported raw-material-labour ratio (equations (5) and (6)) is significant. The R^2s are high for cross-section regression. The elasticity of the sectoral share of investment with respect to capital-labour ratio is 0.76. From these results, the conclusion appears to be that capital-labour ratio is a more important and significant

TABLE 7.3

Dependent Variable	Independent Variables											
	Constant	RT_1	log RT_1	RM_1	log RM_1	k_1	log k_1	D_1	D_2	D_3	D_4	R^2, n
1. I_1	0.22 (1.88)	-19.75 (-0.47)				14.30 (0.44)		-59631 (-0.58)	-21866 (-0.23)	0.10 (0.48)	-72969 (-0.37)	n = 31 R^2 = 0.05
2. I_2	0.06 (0.06)	-0.0003 (-0.81)				0.0004 (1.42)		1.47 (1.58)	0.36 (0.43)	1.79 (0.93)	0.28 (0.16)	n = 31 R^2 = 0.18
3. log I_2	-4.37 (-2.78)		0.24 (1.87)				0.39 (1.89)	0.12 (0.21)	0.42 (0.88)	1.36 (1.26)	-0.10 (-0.11)	n = 31 R^2 = 0.30
4. I_1	0.23423 (0.25)			124.79 (1.36)		-38.75 (-1.56)		5214.4 (0.05)	-0.16 (-2.08)	0.19 (1.65)	-80342 (-0.50)	n = 28 R^2 = 0.27
5. I_2	0.30 (0.24)			0.002 (1.78)		0.0009 (2.62)		0.88 (0.69)	-1.28 (-1.23)	0.07 (0.05)	-0.10 (-0.49)	n = 28 R^2 = 0.51
6. log I_2	-5.22 (-4.09)				0.07 (0.45)		0.76 (3.32)	0.13 (0.20)	-0.48 (-0.95)	0.32 (0.48)	0.20 (0.20)	n = 28 R^2 = 0.49

explanatory variable than the raw-material-labour ratio (whatever definition of the latter is taken).

SECTION 7.3: TARIFF-RATES, CAPITAL-LABOUR RATIOS, AND RAW-MATERIAL-LABOUR RATIOS:

This section attempts to test the joint hypothesis by putting capital-labour ratio, raw-material-labour ratio and the tariff rates jointly as explanatory variables. To do this, we have taken the actual investments (at the firms' level) registered with the BOI during the years 1980 and 1981. This gives us the opportunity to use 1981 tariff rates. These data are presented in Table 7.4. We have only level of investment (I) for this set of data. The test involves regressing I on k (capital-labour ratio), RR (total raw-material-labour ratio) or RT domestic raw-material-labour ratio) or RM (imported raw-material-labour ratio), and T (nominal percentage rates of tariff). There is only one dummy D which takes the value of zero or unity according to whether the investing firm comes from a less-developed or developed country.

Table 7.5 presents the results and Table 7.6 presents the logarithmic runs. It is clear from Table 7.5 that various combinations of the independent variables are run. For example, equation (1) runs k and T jointly, equation (2) runs k and RR jointly, equation (3) runs k, RR and T jointly. These results show that none of the explanatory variables are significant with low r^2s. We suspected that the additive functional forms have given poor results. So we assumed multiplication functional forms and ran log

TABLE 7.4

	INVESTMENT: Ø 1000 (at 1975 =100)	K/L	RR	RT	RM	TARIFF RATES %
1	21000	121.6	121.2	121.2	0	30
2	25017	500.3	180.7	0	180.7	30
3	10533	104.3	317.2	262.8	54.4	80
4	19375	186.3	142.7	997.1	429.7	80
5	13562	102.8	338.0	143.4	194.6	30
6	6458	190.0	184.9	86.2	98.8	40
7	6949	40.4	268.6	161.1	107.5	30
8	13562	366.5	420.7	188.6	232.1	30
9	6949	182.9	187.4	187.4	0	100
10	4869	202.7	163.2	103.5	59.7	10
11	12916	60.6	127.2	26.1	101.1	30
12	34746	327.8	1786.0	301.8	1485.0	30
13	69493	253.6	484.6	106.1	378.5	30
14	27797	617.7	686.2	586.2	100.0	30
15	3229	44.2	533.0	337.3	195.8	30
16	17373	59.7	130.7	67.4	63.3	30
17	19375	186.3	1662.4	997.1	665.3	80
18	69493	207.4	426.5	93.4	333.1	80
19	6949	204.4	322.0	5.4	326.6	30
20	6949	17.7	145.3	84.5	60.9	30
21	7644	72.8	137.7	61.4	76.3	80
22	3475	7.7	316.0	3.4	312.7	30
23	2780	9.1	363.8	73.7	290.1	10
24	62543	306.6	182.8	1.7	181.1	60
25	2085	69.5	290.2	23.8	266.4	30
26	2780	905.4	87.2	0.8	86.4	60

TABLE 7.5

Dependent Variable		Independent Variables							
		Constant	k	RR	RT	RM	T	D	R^2, n
1.	I	3537.8	22.83				14450	6762.0	n = 26
		(0.33)	(1.16)				(0.83)	(0.82)	R^2 = 0.10
2.	I	7139.0	18.58	7.49				6374.7	n = 26
		(0.86)	(0.96)	(0.86)				(0.77)	R^2 = 0.10
3.	I	9049.7	19.65		3.11			7169.6	n = 26
		(1.06)	(1.00)		(0.20)			(0.85)	R^2 = 0.08
4.	I	7661.2	18.30			16.65		4487.2	n = 26
		(0.98)	(0.96)			(1.21)		(0.53)	R^2 = 0.13
5.	I	3404.9	21.01	5.56			10252	6388.9	n = 26
		(0.31)	(1.04)	(0.58)			(0.54)	(0.76)	R^2 =0.12
6.	I	3505.2	23.48		-3.40		16289	6498.8	n = 26
		(0.32)	(1.15)		(-0.20)		(0.81)	(0.76)	R^2 = 0.10

(Cont.)

TABLE 7.5 (cont.)

Dependent Variable	Independent Variables							
	Constant	k	RR	RT	RM	T	D	R^2, n
7. I	3027.0	20.73			15.11	11240	4568.4	n = 26
	(0.28)	(1.05)			(1.06)	(0.64)	(0.54)	R^2 = 0.15
8. I	8729.0		7.09			5829.2	6518.4	n = 26
	(0.90)		(0.75)			(0.31)	(0.45)	R^2 = 0.07
9 I	9515.9			-0.20		10911	7005.7	n = 26
	(0.97)			(-0.01)		(0.55)	(0.81)	R^2 = 0.05
10. I	8343.1				16.60	7651.4	4584.9	n = 26
	(0.88)				(1.17)	(0.44)	(0.54)	R^2 = 0.10

TABLE 7.6

Dependent Variable	Independent Variables							
	Constant	log k	log RR	log RT	log RM	log T	D	R^2, n
1. log I	0.17 (0.70)	0.41 (2.66)				0.17 (1.00)	0.05 (0.13)	n = 26 R^2 = 0.24
2. log I	5.69 (3.98)	0.39 (2.51)	0.31 (1.39)				0.02 (0.05)	n = 26 R^2 = 0.30
3. log I	0.17 (0.70)	0.41 (2.66)		0.17 (1.00)			0.05 (0.13)	n = 26 R^2 = 0.24
4. log I	0.17 (0.70)	0.41 (2.66)			0.17 (1.00)		0.05 (0.13)	n = 26 R^2 = 0.24
5. log I	0.17 (0.71)	0.41 (2.51)	0.31 (1.39)			0.17 (1.00)	0.17 (0.05)	n = 26 R^2 = 0.30
6. log I	0.17 (0.68)	0.41 (2.66)		0.17 (1.00)		0.17 (1.00)	0.05 (0.13)	n = 26 R^2 = 0.24

(Cont.)

TABLE 7.6 (cont.)

Dependent Variable	Independent Variables							
	Constant	log k	log RR	log RT	log RM	log T	D	R^2, n
7. log I	0.17 (0.68)	0.41 (2.66)			0.17 (1.00)	0.17 (1.00)	0.05 (0.13)	n = 26 R^2 = 0.24
8. log I	0.17 (0.64)		0.39 (1.57)			0.17 (1.00)	-0.15 (-0.36	n = 26 R^2 = 0.10
9. log I	0.17 (0.61)			0.17 (1.00)		0.17 (1.00)	-0.12 (-0.28	n = 26 R^2 = 0.01
10. log I	0.17 (0.61)				0.17 (1.00)	0.17 (1.00)	-0.12 (-0.28	n = 26 R^2 = 0.01

linear regressions. These results are presented in Table 7.6. It is clear that the results are vastly improved. The R^2s have gone up for all the runs. In all the logarithmic runs, raw-material-labour ratio (for each definition) and the nominal rates of tariff come out insignificant. And for all the runs, capital-labour ratio comes out to be strongly significant. Furthermore, for all runs the elasticity of the level of investment with respect to capital-labour ratio is found to be 0.41 in equation (2) and 0.39 in equation (5).

SECTION 7.4: CONCLUSIONS

The conclusion that clearly emerges from our analysis is that capital-labour ratio, if used as an explanatory variable, performs much better than either (total, domestic or imported) raw-material-labour ratio or nominal rates of tariff.

CHAPTER 8

THE RELATIVE-WAGE HYPOTHESIS

SECTION 8.1: INTRODUCTION

This chapter attempts to test the relative-wage hypothesis in the case of Thailand. Relatively low-cost labour in the less-developed countries (generally characterised by excess supply of labour) has long been recognised as a source of their comparative advangage. However, as Agarwal (1980) points out, low-cost wage has only recently been recognised as a possible determinant of foreign direct investments. Existing literature reveals that the empirical significance of low-cost wage in explaining flow of foreign direct investments is inconclusive. Forsyth (1972) in the case of U.S. investments in Scotland, Kebschull (1972) and Halbach (1977) in the case of German investments in the less-developed countries, have found low-cost wage to be insignificant while Riedel (1975) in a case study of Taiwan, Donge (1976) in the case of Spain, and Agarwal (1978) in the case of the German investments in six selected LDCs (viz. Brazil, India, Iran, Israel, Mexico and Nigeria) have found it to be significant. In this chapter we attempt to carry out a similar empirical study of the Thai case. This is done by regressing the flow of foreign direct investment from the ith country to Thailand on the relative wage-rate (i.e., the ratio of Thai real wage to the ith country's real wage).

SECTION 8.2: DATA

As discussed in Chapter 3, time-series data on the flow of foreign direct investments to Thailand for more than 15

years exist only for Japan and Germany. These figures are presented in Table 4.2 of Chapter 4. The data for real wage-rates are presented in Table 8.1. The wage-rate is calculated in U.S. dollars by using the average annual exchange rate (published in the United Nations Statistical Year Book). These are weekly wage-rates in the manufacturing sector on 40-hour-a-week basis. There is a problem with the Thai wage-rate data. From 1966 to 1971 we have obtained average real wage-rates from the United Nations sources. Such data do not seem to be available from 1972 for Thailand and the only proxy we have managed to find is minimum real wage-rates from 1972 onwards. These mimimum wage-rates are obtained from the Labour Department of the Government of Thailand. This is not easy to justify, but we expect any government to take into account average wage-rates in fixing minimum wage-rates. We will use a dummy variable to take account of this.

SECTION 8.3: A SIMPLE ECONOMETRIC TEST

Our test constitutes in regressing ith country's flow of foreign direct investment on the relative wage-rate, viz., the ratio of Thai wage-rate to the ith country's wage-rate. We run the following regression: $I_t^i = \beta_o + \beta_1 \frac{w^{Thailand}}{w^i} + \beta_2 D_1 + \beta_3 D_2 + u$. In the above we have two dummies, D_1 and D_2, used respectively to take account of the oil crisis and the discrepancy in Thai wage-rates series. D_1 takes the value of 1 for the period 1973-81 and 0 for 1966-1972. D_2 takes the value of 1 for the period 1972-1981 and $D_2 = 0$ for the rest of the years.

TABLE 8.1: REAL WAGE RATES (at 1975 prices = 100)

	JAPAN	W. GERMANY	THAILAND
	$	$	$
	(Weekly)	(Weekly)	(Weekly)
1966	28.13	44.22	11.49
1967	31.64	46.16	11.12
1968	36.60	47.99	10.70
1969	42.89	53.81	10.27
1970	49.62	65.38	9.49
1971	57.98	76.51	11.07
1972	77.21	90.82	3.54
1973	106.98	120.18	3.33
1974	125.36	138.19	6.57
1975	137.92	157.54	6.13
1976	154.74	164.42	5.64
1977	186.91	191.89	7.36
1978	254.91	233.59	6.69
1979	259.83	269.74	8.10
1980	269.66	290.04	9.10

The expected sign of β_1 is negative, that is, a fall in the Thai wage-rate relative to the ith country's wage rate will increase I_t^i. The econometric results are presented in Table 8.2. The coefficient of the relative wage-rate has the correct sign for Germany (equations 1 and 2 of Table 8.2); but it has got the wrong sign for Japan (equations 3 and 4 of Table 8.2). Furthermore, in all cases the relevant coefficient is insignificant. The dummy variables are also insignificant. The statistical insignificance of D_1 indicates that the proxy used for Thai wage-rates from 1972 to 1980 is not unreasonable. The R^2s are low for time-series runs. There is no clear evidence of the absence of autocorrelation. We therefore conclude that our test rejects the relative wage hypothesis for Thailand so far as the German and Japanese foreign direct investments are concerned.

SECTION 8.4:CONCLUSIONS

The relative-wage hypothesis, although enormously plausible, does not appear to stand up to statistical test. As discussed in Section 8.1, most econometric work has found little or no evidence for the importance of relative-wage hypothesis as an explanation of the flow of foreign direct investment. The only significant exception is the work of Agarwal (1978). However, Agarwal (1978) considers 'relative wage cost' which is operationally defined as 'share of wages and salaries in value added per employee' of the investing country divided by the same of the host country. Strictly speaking, this definition is different from the concept of

TABLE 8.2

Dependent Variable	Independent Variables						
	Constant	$\frac{w^{THAI}}{w^{i}}$	$\log \frac{w^{THAI}}{w^{i}}$	D_1	D_2	n, R^2	DWS.
1. $I_t^{Germany}$	3.36 (1.05)	-19.96 (-0.81)		0.38 (0.33)	-1.36 (-0.51)	n = 16 R^2 = 0.18	1.47
2. $\log I_t^{Germany}$	-2.84 (-1.13)		-1.15 (-0.95)	0.12 (0.13)	-0.82 (-0.43)	n = 16 R^2 = 0.22	0.90
3. I_t^{Japan}	34.04 (2.84)	16.57 (0.62)		-8.96 (-0.38)	0.89 (0.04)	n = 16 R^2 = 0.08	1.40
4. $\log I_t^{Japan}$	3.57 (8.16)		0.17 (0.92)	-0.21 (-0.33)	0.42 (0.64)	n = 16 R^2 = 0.10	1.44

relative wage-rate. One wonders if Agarwal (1978) has in fact tested the relative-wage hypothesis, as Johnson (1968) pointed out that value-added per head picks up effects of productivity, economies of scale etc... Lastly, our finding is not as surprising as it appears to be. Foreign firms invest in Thailand in the kind of industries which may use relatively more skilled labour, or foreign firms investing in Thailand may choose modern technologies which inevitably require skilled labour. If this is the case, then one can put forward a plausible argument that skilled labour is a scarce factor in the less-developed countries so that skilled labour may not be significantly cheaper.

CHAPTER 9

WELFARE EFFECTS OF

FOREIGN DIRECT INVESTMENT

SECTION 9.1: INTRODUCTION

Studies on the welfare effects (be it social, political or economic) of foreign direct investment, have blossomed in recent years. The earlier studies were somewhat more preoccupied with the 'determinants' of foreign direct investments. Studies on the welfare effects are concerned mostly with the role of multinational firms in the LDCs. This is the arena where the pro- and anti-foreign investment economists fight their battles. It perhaps needs an explanation. While U.S. foreign direct investment e.g., in the U.K., does not raise serious questions about welfare effects regarding the associated transfer of 'appropriate technology' to the U.K., (because of the similarity of factor endowments, technology and tastes), the same in, say, Thailand does raise serious questions not only about 'appropriate technology' but also about a host of other things including 'employment and income distribution', 'political influence' etc.. This Chapter attempts to analyse the welfare effects of foreign direct investment in Thailand. In the process, it becomes necessary first to present a brief survey of the relevant literature; and then to try to apply some of the standard arguments to the Thai experience. We would consider specifically the Thai economic effects which will include (i) the environmental effects, (ii) a comparative study of the desired pattern of investment as envisaged by the Five Year Plans and the pattern of investment as given by the cumulative foreign direct investments for each five-year planning period, and (iii) a simple time-series study of the effects of total foreign direct investments on macroeconomic variables.

SECTION 9.2: ECONOMIC EFFECTS OF FOREIGN DIRECT INVESTMENT IN THE LESS-DEVELOPED COUNTRIES

There are various approaches surrounding the controversy regarding the desirability of foreign direct investments in the LDCs. Each approach emphasises different aspects of economic reality, and embodies, implicitly or explicitly, different social and economic values. These observations led Lall (1974) to the following conclusion, best summarised in his own words:

> "Even given the basic premise that everyone wants to promote the well-being of LDCs and some measure of agreement on the hard data (investment flows, value of output, employment, growth rates, and the like), there is bound to remain a fundamental divergence in views about the desirability and contribution of foreign investment to LDCs" (p.45).

The above will be revealed to be the state of affairs once the neo-classical approach to the problem is discussed and the criticisms arising therefrom, and the criticisms based on alternative approaches are presented. What Lall (1974) calls the 'traditional economic approach' is actually the neo-classical approach. The theoretical framework is the standard 'trade and welfare' framework. We first summarise the main arguments.

(a) The pioneering work of MacDougall (1960) presented a 'theoretical' cost-benefit analysis where the costs and benefits were measured by 'areas' under the marginal-product (of capital) curve. The inflow of foreign direct investment is treated as addition to the capital stock of the host

country. (See, for example, Johnson (1970), Jones, (1967), Reuber et. al. (1973). It therefore follows from the simple neo-classical growth models that foreign direct investment would raise the rate of economic growth of the host country, and hence the welfare of the host economy. This conclusion is, of course, based on a restrictive set of assumptions including perfect competition in product and factor markets, full-employment, and absence of externalities.

(b) foreign direct investments by the multinational firms of the developed countries in the host economies of the less-developed countries 'integrates' the latter to the world economy. This, it is assumed, leads to a larger volume of free-trade; and, hence, it leads to higher global welfare. In this connection, we should note the following. As shown by Jones (1967), if capital in-flow affects the terms of trade adversely, then it becomes necessary to impose an 'optimum' tax on capital imports, so that possible immiserizing growth' could be avoided.

(c) Furthermore, as argued by Johnson (1972) and Vernon (1966) foreign direct investment brings with it new technology to the host country, and 'technology' is defined broadly to include both the nature of the product produced in the host country and the method of process of production. The new technology, it is argued, will also raise the host country's welfare, (see Reuber et. al. (1973)), in so far as the domestic consumers have easy access to new or improved goods in and so far as the economy has acquired advanced processes of production. The introduction of new technology

via foreign investment is assumed to lead to further technological improvements via technological spill-over effects.

(d) In addition to 'new technology', as pointed out by Reuber (1973), Lall (1975), and others, multinational firms bring with them 'managerial ability'. The superiority of entrepreneurial skills, arising from better training and higher standards of recruitment, consists in ability to seek out investment opportunities, to develop new technologies to suit particular conditions, and to organise a stream-lined operation (production, distribution and sales). This is, it is argued, beneficial to the host country not only because the host country has direct benefits from superior entrepreneurship, but also because the indigenous firms learn from the multinational operations, which is a kind of 'demonstration effect' in production. Closely related to these arguments in favour of entrepreneurial skills are the arguments arising from 'marketing skills' of the multinational firms which often are mentioned separately (see, for example, Lall and Streeten, (1977)). The benefits to the (LDC) host country, which may accrue from the marketing skills of the multinational firms, may be in the form of internal marketing or external marketing. Internal marketing skills lead to various improvements, e.g., better storage, better loading and transport arrangements, better information to consumers about products, provision of a wider range of products etc. The multinational firms are familiar with global operations, and therefore the external marketing skills lead to higher exports not only because of

marketing outlets but also often because of brand names. This argument applies mainly to the manufacturing products.

(e) This leads to discussion of the effects of foreign direct investment on the host country's balance of payments. (See, for example, Reddaway (1967), Hufbauer and Adler (1968), and Streeten (1969)). If an LDC country follows the ISI strategy whereby prohibitive tariffs are imposed on certain commodities which are then produced domestically with the help of multinational firms, it will have some ameliorating effects on the balance of payments to the extent that imports decrease and exports (because of the marketing skills of the multinationals) increase. Furthermore, it is argued that foreign direct investments bring in capital in hard currency which temporarily will yield favourable effects. However, over a period of time, one needs to consider the net effect by taking into account the initial capital inflow, the outflow of dividends, interests and repatriation of profits to the parent company. Lastly, the balance of payments impact can be analysed by using a macro-economic approach as done by Lall (1978). To quote Lall's own words:

> "..... from the absorption approach to the balance of payments, it is well known that the change in the balance of payments following foreign investment, which leads to a rise in the host country's real income, will depend upon the extent to which expenditure rises (or is allowed to rise by the government) following the real income increase. If expenditure remains unchanged at the pre-POI level, the whole of the real income rise associated with the foreign investment will appear as a balance of payments surplus. On the other hand, if expenditure is allowed to rise, by the full amount of (more than) the real income rise, there will be no change (a worsening) in the balance of payments following the foreign investment." (p.31).

(f) In almost all the non-OPEC developing countries, availability of foreign-exchange remains a serious constraint hindering development efforts. To the extent that the balance of payments effects are beneficial, foreign direct investments help to relieve the foreign exchange bottlenecks in the LDCs.

(g) Another important issue related to balance of payments is that of transfer pricing. Transfer prices (sometimes called accounting prices) are prices at which transfers of sales take place between various branch firms (or units or affiliates) of the same multinational corporation. The transfer prices, charged for intra-corporation transactions, can be, and often are, different from market prices obtained for 'arm's length transactions'. If the objective of the multinational is to maximise global net after-tax profits, then by choosing appropriate transfer prices, the multinational corporation can show lower profits in the country with high tax rates and higher profits in the country with low tax rates. Robbins and Stobaugh (1973) have discussed the above argument about profit maximisation and transfer prices by using an elaborate model. Lall (1973) has added further reasons for manipulating transfer prices. These include: hedging against depreciation of a weak currency, restriction on repatriation of profits, and pre-empting high wage claims by local workers because of 'high' profits.

(h) Related somewhat indirectly to the effects of foreign direct investments on balance of payments is the view,

propounded by Agmon and Hirsch (1979), that the miltinational corporation is a "provider of financial intermediate services" (p.336).

Multinational enterprises, by virtue of their large size and other oligopolistic and monopolistic characteristics, have relatively easier access to enormous financial resources for investment. The funds may be available from internal sources or from external capital market amd financial institutions. By providing capital from various sources, multinational firms may bridge a resource gap in the host (LDC) country between the desired level of investment and the domestic savings generated, and they can act as financial intermediaries to mobilize local savings (which otherwise would have remained idle) by offering attractive investment opportunities in the domestic capital market. This is seen from the following quotation from Agmon and Hirsch (1979);

> "The multinational corporation may be looked upon as an instrument capable of internalising the benefits of a linkage to a fully developed capital market while responding efficiently to the non-market signals emitted by governments. MNCs both raise funds and are being evaluated in fully developed and efficient capital markets (most often the US capital market). Competing among MNCs makes them use the proper price of risk (on a world-wide basis) in project evaluation and in financing decisions. The involvement of the MNCs in the local market and the transfer of real returns of economic activities into internationally traded real equities (MNC stocks) will contribute towards a more efficient allocation of resources in the LDCs". (p.342).

(i) Since foreign direct investment is treated in the traditional models as net addition to the host country's capital stock, it is necessary to consider the impact of the

multinational investment on employment and income distribution. The net addition to capital is expected to lead to increase in employment (including the employment which might be generated through the multiplier effect). The multinational firms pay normally relatively higher wages in order to secure high quality dependable workers than the local firms in the host country. (See for example, Lal (1978)). From a simple general equilibrium point of view, the distributive effects of foreign direct investment is best put in the words of Reuber et.al (1973):

> "The broad distributive effects of private foreign investment seem reasonably clear assuming government policy to be the same after foreign investment occurs as before. In the long run, after all general equilibrium effects have worked themselves out, one may expect capital inflows to lower the real incomes of local capitalists and to raise the real income of labour and other complementary factors" (p.218).

The above argument is based on the marginalist doctrine. If labour has more capital to work with, then the marginal product of labour must rise. Under perfect competition, this will result in higher wage-rates. These inferences are very broad, and they should be taken rather tentatively in the absence of a full-scale general equilibrium model with a less-developed host country characterised by dual economy.

(j) MacDougal (1960) and Streeten (1971) have pointed out the external economic effects of foreign direct investment which include the impact of economies of scale and intangible externalities. Internal and external economies of scale will lead to lower prices, higher sales, and exports. Externalities arising from the external economies

of scale, which in turn arise from the multinational operations, may encourage indigenous entrepreneurship. Other externalities may be related to the Hirschman-type 'forward' and 'backward' linkages.

SECTION 9.3: A CRITICAL APPRAISAL OF THE ARGUMENTS FAVOURABLE TO FOREIGN DIRECT INVESTMENT

The preceding section presented the main arguments, arising primarily from the neo-classical analyses, which support the beneficial economic effects of foreign direct investment. This present section attempts to appraise those arguments critically and also to present the alternative views on the matter.

Referring to the beneficial effects on economic growth caused by foreign capital and new technology, Lall (1974) says the following:

> "This presumes a host of specific conditions and values which underlie welfare economies, mainly that the market is the best determinant of economic and social welfare - thus, the distribution of income reflected in the market is desirable, or, more subtly, not the concern of economists at all, and that the preferences revealed are independently formed and true indicators of 'welfare'. In the particular case of foreign investment in LDCs, the implications are that the products introduces and marketed, the tastes created, and the needs met, all benefit the countries, as long as ventures earn profits" (p.44).

Foreign direct investment brings with it new technology which, as Stewart (1978) points out, must be understood in a

broad sense to include not only the capital intensive processes of production but also the nature of the product itself and the use of raw materials. This leads to the concept of 'appropriate technology'. What kind of product is produced by the multinationals is important. That is, it is important to know whether the product is produced to satisfy the needs of a tiny minority of rich people (e.g., producing videos in an LDC) or whether the product will satisfy the needs of the masses (people, e.g., producing anti-biotic drugs). Secondly, what kind of resources are used in the production is also crucial. That is, one needs to know whether the process of production will use the abundant factors of production (say, labour and other natural and mineral raw materials) or whether a product is produced in an LDC by importing raw materials.

Barnet and Muller (1974) accused multinational corporations of 'diffusing' the consumption patterns of the rich nations in the LDCs and also for creating a 'global shopping centre' for an 'international elite'. The consumers of the upper-income bracket in the LDCs demand the 'luxury' products of the Western capitalist economies. Thus, foreign direct investment per se may not always increase 'desired welfare' of an LDC. Furthermore, the choice of product is also related to choice of (process) techniques. As Sutcliffe (1971) points out, by surveying US data, that a choice of technology exists in some manufacturing sectors while the choice is very limited in other manufacturing sectors. (See Sutcliffe, p.147-148). Helleiner (1975) and Bhalla (1975, p.309) take the view that there always exist possibilities

of substitution between capital and labour. Technological fixity cannot, thus, be taken as an explanation for capital-intensive methods often used by the multinationals. Helleiner (1975) also points out that 'appropriate' products are not necessarily always (technologically) produced by appropriate labour-intensive methods of production by the multinational firms. However, Johnson (1970) thought that foreign investment tended to flow into the more capital-intensive sectors of the economy.

It is therefore clear that a particular foreign direct investment will affect the pattern of growth and consumption (product choice) and will also affect the income distrubution situation (choice of process techniques). The critics, who point out that the free market mechanism does not necessarily lead to optimal growth - optimal in the sense of desired growth which takes into account certain social goals and economic objectives, are on fairly strong ground. This sort of thinking led Lall (1974) to say:

> "The new schools of technology - and management-oriented analysts, whose roots lie partly in business schools, assume essentially that the free enterprise system as it operates in the leading capitalist countries, represents the best form of economic and social organisation, and that its wholesale extension, including the forms of technology produced, the differentation of products, the methods of advertising and selling, and the philosophy of corporate operation, to the LDCs is per se desirable" (p.44).

The neo-classical welfare economics within a general equilibrium framework is founded on a perfectly competitive

market structure with a large number of profit-maximizing producers and utility-maximizing consumers. The fact that the multinational firms are oligopolistic with monopolistic advantages makes it difficult to see the direct relevance of the neo-classical paradigm, particularly in the context of the LDCs with a structure of dual economy and a perennial problem of unemployment (semi or disguised unemployment).

A case study carried out by Langdon (1975) on Kenya's soap industry is a good illustrative example. This study includes both the local and multinational firms (subsidiaries). The main conclusions are: (a) The multinationals generate relatively less employment and use relatively more capital intensive technology as compared to the indigenous firms, (b) the multinationals use relatively more of imported inputs - thus exerting adverse effects on the balance of payments, (c) the indigenous firms succeed in developing far more linkages with the Kenyan economy and (d) multinationals involve waste in the sense of under-utilisation of capacity and a large advertising campaign. UNCTAD (1976) gives recommendations regarding how the LDCs can improve the regulations of forcing investments and technology transfer. Also we note that Griffin (1974) puts forward the proposition that international transmission of technology leads to greater inequality between nations.

The investments by the multinational firms mainly in the sectors which are new to the host LDC economy will lead to an increase in employment. However, the contribution will be marginal as Morawetz (1974) found that the contribution

of the industrial sector to employment growth was disappointing. During the sixties, Morawetz (1974) reports, the gross value-added in manufacturing generally increased at a higher annual rate than employment. For example, in Brazil during 1960-69, the gross value-added in manufacturing increased at an annual rate of 6.5% and employment in manufacturing increased at an annual rate of 1.1%. For India, the equivalent figures are 5.9% and 3.8% and for Nigeria 14.1% and 5.7%.

Related to the question of adverse income distribution is the fact that multinationals, in general, pay relatively higher wages to their employees than the local firms. But this is considered a benefit and is defended by Lal (1978) as can be seen from the following passage:

> "..... one of the important indirect taxes on POI, and hence benefits to the host country, is given by the differences between the social opportunity costs of the factors employed and the actual wages paid to them by the foreign firms. From this viewpoint the higher wages paid by POI are a benefit to the host country. Clearly, the way out would be to let the foreign company pay the higher wages, but the recipients should be taxed at higher rates in the interests of a better income distribution" (p.33).

An important argument in the discussion of the welfare effects of foreign direct investment is the ability, or rather lack of it, of the multinational firms to establish investment-goods or capital-goods industries in the LDCs. There are some reasons directly related to the nature of a less-developed country. For example, the domestic market for investment goods is small or the indigenous producers fear

low quality and unreliability of investment goods (machines to produce consumption goods) if produced domestically. Arrighi (1970) has pointed out that the oligopolistic structure of the multinational firms leads to a 'sectoral pattern of foreign investment biased against capital-goods industry' (p.287). The multinationals arrive with new technology which necessitates the use of specialised machinery; and often the specialised equipment is imported. This does not lead to the expansion of the domestic capital-goods sector. Morawetz (1974) and Stewart (1976) argue that establishing the domestic capital goods sector is a pre-condition for an LDC to be able to adopt 'inappropriate technology' to suit the local requirements (i.e. to narrow the 'suitability gap').

Now we consider transfer pricing. Tugendhat (1973) has argued that multinational firms can frustrate policies with respect to capital flows (balance of payments) even in a developed country by transfer of funds. Lall (1973) has studied the intra-firm exports and imports of the US multinationals and estimated that about 35% of the total US exports is intra-firm exports and about 22% of the total US imports is intra-firm imports in 1970. These figures show how potent a weapon transfer pricing is in the arsenal of the multinational. The LDCs have more rigorous controls in the shape of foreign-exchange regulations, profit-repatriation regulations etc... A multinational firm still can by-pass the strict regulations by using transfer pricing. Although, because of the LDC government agencies, multinationals cannot use transfer pricing as a means of

transferring funds quite so openly. (See Tungendhat (1973)). This leads Vaitsos (1976) and Streeten (1969) to recommend training of the LDC civil servants appropriately in the relevant area. Some of the beneficial effects on balance of payments are no longer so clear cut if transfer pricing is widely used by the multinationals for the purpose of 'revenue shifting'. Lall (1974) argues that the loss arising from 'revenue shifting' is borne by the host country. The work of Vaitsos (1970) and Lall (1973) show evidence that the LDCs as a whole incur loss through transfer pricing. Related to the effects on balance of payments is the question of export restrictions. Although Safarian (1969) and Reuber et. al (1973) do not find such restrictions by the multinationals, several UNCTAD studies (e.g., UNCTAD (1971), (1972)) or Levitt (1970) do provide evidence of export restrictions so that the favourable impact or foreign direct investment on balance of payments is diluted.

Regarding the argument that the multinationals bring with them the much needed financial capital in hard currencies, it is pointed out (e.g., see Vernon (1974)) that the inflow of capital via foreign direct investment is often fairly small and most of the required financial capital comes from local borrowing, local savings and reinvested profits. Lall and Mayhew (1973) provide evidence for India (21 firms) and for Iran (9 firms) that foreign long-term borrowing by the guest investors comprised only 21% and 12% respectively. This point becomes less significant if foreign firms help to mobilize local savings which otherwise would have remained idle or would have been used in less productive activities.

On the other hand, it is equally possible that, by borrowing locally, multinational firms divert savings from other more productive uses.

We conclude this section by observing that there are certain advantages deriving from foreign direct investment but some of these advantages have secondary effects which may be disadvantageous to the LDCs. The objective of the multinational firms is to grow and to generate surplus; it cannot be an objective for a corporation to 'develop' a poor nation. As Johnson (1971) concludes: "the main contribution of direct foreign investment will be highly specific and very uneven in its incidence" (p.246) after observing that it is not in the interest of a multinational firm to diffuse new technology (to the potential indigenous firms) and that it is not the objective of a multinational firm to exploit human potentialities for development. Streeten (1971) points out that, in order to squeeze out beneficial effects from foreign direct investment, the LDC government must have the political power, will and ability to control the multinational operations.

SECTION 9.4: A BROAD-BRUSH ANALYSIS OF THE THAI CASE

This section attempts to apply some of the arguments presented in Sections 9.2 and 9.3 to certain facts of Thailand, as for example, revealed pattern of foreign direct investment (Chapter 3), sectoral capital-intensity (Chapter

4), and use of raw-materials (Chapter 5), in order to suggest some possible welfare effects of foreign direct investment in Thailand.

A large proportion of foreign direct investment has gone into the mining sector (see Chapter 3). The product of the mining sector is the raw-material of the manufacturing sector. This reveals that multinational manufacturing firms investing in the mining sector of Thailand have preferred vertical integration for well-known reasons. It may also be the case that large mining companies of industrialised countries have invested in the mining sector of Thailand in the shape of horizontal integration in order to be able to have some control on the world market for some mineral products. It is also clear from Chapter 3 that Japan is the largest investor in the mining sector. From Chapter 5, we see that 80% of exports from Thailand to Japan is raw-materials. The ameliorating effects of foreign direct investment on balance of payments is fairly clear. What, however, is not clear is the extent to which transfer pricing is used by the multinational firms to transfer funds; and the extent to which it is done is a measure of welfare loss for Thailand in terms of loss of tax revenue, low dividends for the local shareholders in the case of joint-ventures, etc..

Earlier in Chapter 4, capital-labour ratio is found to be a significant factor. The close association between sectoral foreign direct investments and sectoral capital-intensity shows that the larger the amount of foreign direct

investment, the larger is the value of the capital equipment relative to labour. This indicates that foreign direct investments in Thailand are capital-intensive. This does not necessarily mean that it has unfavourable effects on employment. The mining sector, where foreign direct investment plays a prominent role, employs a large proportion of workers. Furthermore, higher capital-intensity in the manufacturing sector is indicative of 'new technology'. A close examination of the firms registered with the BOI does not seem to reveal that, in Thailand, the often asserted proposition that the multinationals introduce 'inappropriate' products holds. This proposition probably holds in a country where a large proportion of foreign direct investment is devoted to the manufacturing sector; and, secondly, where a fairly developed industrial base or infrastructure base does not exist. It is not unreasonable to think that Thailand's mining sector is gaining from 'new technology' brought in by the multinational firms.

The above discussion leads us to the old Singer hypothesis:

> "..... the specialisation of underdeveloped countries on export of food and raw-materials to industrialised countries, largely as a result of investment by the latter, has been unfortunate for the underdeveloped countries for two reasons: (a) because it removed most of the secondary and cumulative effects of investment from the country in which the investment took place to the investing country; and (b) because it diverted the underdeveloped countries into types of activity offering less scope for technical progress....." (p.475, 1950).

In a sense, Singer's reason (a) in the above quotation still applies in the sense that the raw-materials exported from Thailand to, for example, Japan keeps the Japanese economy's dynamism going to that extent. However, it is not clear that Thailand is losing out on 'dynamism' altogether. It is because (i) the mining sector is benefitting from new investment and technology brought in by the multinationals, and without foreign direct investment probably the mining sector in Thailand would not have been as advanced as it is today; (ii) it has created jobs (not only jobs in the mining sector but also via the multiplier effect jobs elsewhere in the economy); (iii) it contributes towards Thai exports and thus brings in foreign exchange which helps towards relieving a major bottleneck. Singer (1950) then relates his hypothesis to the adverse terms of trade which is caused by a situation where technical progress shows a fall in the price of primary products while technical progress in manufacturing industries shows a rise in income. This terms of trade argument probably applies to the Thai situation as it is not clear how this could be stopped without taxing exports of raw-materials.

SECTION 9.5: ENVIRONMENTAL EFFECTS OF FOREIGN DIRECT INVESTMENT

Various theories have been advanced to explain the present trend of business firms towards multinational operations. There is, however, an emerging pattern of overseas investment which has been very much neglected. The movement

of some foreign investments from the developed countries to the less-developed countries is primarily the result of pushing out 'pollutant' industries in order to solve the pollution problem at home. The point has been expressed in the work of Vernon (1977), Hood and Young (1979), Dunning (1978), Kojima (1977) and Ozawa (1977, 1979). However, the work which has been done by Kojima (1977) and Ozawa (1977, 1979) emphasises the pattern of Japanese foreign direct investment and criticises the policy of the Japanese government to restructure Japan's industry. To quote Ozawa (1979):

> "As the small island nation (Japan) soon depleted her available industrial space, the costs of pollution and ecological destruction - social costs of economic development aggravated by industrialisation centered in the heavy and chemical industries - had reached intolerable levels ..... With these developments as a backdrop, the Japanese government adopted an epoch-making policy to restructure Japan's industry - a proposal made by the Industrial Structure Council, the MITI's consultative organ. The policy emphasised a shift from 'pollution-prone' and resource-consuming heavy and chemical industries towards ('Clean' and 'Knowledge-intensive' industries, and assigned overseas investment a new role - that of a catalyst to ('house clean' the economy" (p.18-19).

Also Kojima (1977) says:

> "Recent theories advocating the movement of Japanese equipment industries abroad, an idea of what would be a desirable industrial structure of Japan look too much as though they are simply pushing out 'pollutant' industries and looking for ways of importing such products into Japan from plant located abroad" (p.141).

Both Ozawa (1979) and Kojima (1977) strongly criticise their government on the 'House Clean' policy. They argue that

such policy seems to be 'a very insensitive' policy lacking a sense of cooperation with the host country in its aspirations for economic development. The intermediate policy variables between the (Japanese) government policy and the (Japanese) firm's decision to invest abroad (in Thailand) is one of cost efficiency. Due to the various safeguards which are legally required of firms manufacturing dangerous substances, it becomes cheaper for them to invest in a country where such safeguards do not exist or where, if they exist, enforcement is far from strict. Nevertheless, evidence for such a situation in Thailand is emerging not only from the Japanese firms but also from those of other countries i.e., USA, UK, West Germany, etc.

We now proceed to carry out an empirical study of the Thai situation by looking at the specific products produced in the Chemical sector by the firms from various countries between 1965 and 1980. We again use the BOI data as explained in Chapter 3. The information about which chemicals are poisonous and harmful are taken from 'Hazardous Chemicals', by the Science Equipment Research Centre (1979). The hazardous chemicals used or produced in Thailand are listed in Table 9.2. Using the BOI data as our sample, we find that Japan is the biggest investor with roughly 17% of her total investment in the Chemical sector, followed by Taiwan (30% of her investment), USA with 15%, India with 24% and UK with 6%. In Table 9.1 we have listed the products which either use poisonous material or are themselves harmful chemicals.

There is no sharp dividing line between 'safe' and 'dangerous' chemicals. Many chemicals have been classified as having properties which cause damage within a relatively short period of time whereas others have been shown to be dangerous only in very high doses over a long period of time. For example, many samples of compounds, particularly of certain dyestuffs themselves, may be thought to be relatively safe but can contain carcinogens as impurities. Some chemicals such as Phenol are known to cause physical impairment or death following an exposure of several weeks, months or a year to a low concentration. While toxic gases such as Hydrogen cyanide are very dangerous and these can be absorbed rapidly by the skin (including eyes and nervous membranes) which cause serious illness.

First note that the chemicals or products which appear in Table 9.1 are not all directly harmful as they are. They appear because the chemical agents used to produce some apparently harmless products are harmful or dangerous. It is not possible here to go into details of chemical constitution of each product. However, using information from Table 9.2 we can directly see certain products produced to be clearly harmful. For example, hydrochloric acid (Japan 1966 and Taiwan 1965), Ethyl alcohol (Japan 1976), Phenol (Japan 1974) Carbon Black (Switzerland 1980), Calcium Carbide (India 1975) etc.,. There is, thus, fair empirical evidence that foreign firms do produce harmful and dangerous chemicals in Thailand. For strong evidence, however, one would need to compare, say, the recent investments in Japan in dangerous chemicals with the Japanese investments in the

TABLE 9.1

CHEMICAL	COUNTRY	YEAR	EQUITY SHARE	EMPLOYMENT	RAW-MATERIAL	
					LOCAL	IMPORTED
AMMONIUM PARA TUNGSTATE	USA	-	5%	76	274050	5300
GREASE	USA	1971	99.99%	17	-	12583
PVA LATEX	USA	1970	100%	44	3763	60670
POLYSTYRENE FOR GENERAL PURPOSE	USA	1978	100%	40	2899	234319
SEEDLAC	USA	1975	25%	41	3306	-
PARAQUAT	UK	1975	70%	66	40300	142300
ENAMEL & EMULSION PAINT	UK	1968	99.98%	78	29808	37807
ENAMEL & EMULSION PAINT	UK	1968	-	59	17740	9980
ENAMEL PAINT	UK	1972	40%	26	2668	5376
PVA DISPERSION	GERMANY	1970	40%	46	39965	70193
HOUSEHOLD INSECTICIDES	GERMANY	-	100%	42	41475	43442

(Cont.)

TABLE 9.1 (Cont.)

CHEMICAL	COUNTRY	YEAR	EQUITY SHARE	EMPLOYMENT	RAW-MATERIAL	
					LOCAL	IMPORTED
CAUSTIC SODA, LIQUID CHLORINE, HYDROCHLORIC ACID FORMALDEHYDE	JAPAN	1966	49%	463	195204	16671
PLASTICIZER, UREA, PHENOL	JAPAN	1974	74%	118	na	na
CHEMICAL FOR TEXTILE	JAPAN	1975	75%	30	1077	16510
WARP SIZING AGENT	JAPAN	1976	45%	25	8358	7171
ETHYL ALCOHOL	JAPAN	1976	40%	82	41353	-
CALCIUM CITRATE	JAPAN	1979	7.5%	225	14049	338
CHEMICAL FOR METAL SURFACE TREATMENT	JAPAN	1980	49%	24	2485	1432
POLYURETHANE RESINS	JAPAN	1975	49%	54	1800	33980
POLYVINYL CHLORIDE	JAPAN	1971	25%	362	123464	553796
POLYESTER CHIP	JAPAN	1969	45%	1353	-	128569
FINISHING RESINS FOR POLYESTER RAYON	JAPAN	1974	45%	41	2978	5814
ALKYD RESINS	JAPAN	1975	49%	137	124974	55432

(Cont.)

TABLE 9.1 (Cont.)

CHEMICAL	COUNTRY	YEAR	EQUITY SHARE	EMPLOYMENT	RAW-MATERIAL	
					LOCAL	IMPORTED
DIMETHYLATED DIMETHYL UREA	JAPAN	1975	45%	43	19852	3500
NYLON CHIP	JAPAN	1970	50%	349	15769	296178
NP & NPK FERTILIZER	JAPAN	1975	24%	367	9003	1181586
ENAMEL & EMULSION PAINT	JAPAN	1970	40%	118	70137	55742
PIGMENT	JAPAN	1962	80%	50	-	109962
CALCIUM CARBIDE	INDIA	1975	5%	205	7891	27380
CHEMICAL PRODUCTS	INDIA	1975	49%	73	14035	117
BASIC CHROMIUM SULPHATE	INDIA	1975	40%	72	15130	38300
REACTIVE DYES	INDIA	1975	50%	215	19021	18992
DYESTUFF	INDIA	1975	80%	133	-	126169
CAUSTIC SODA, HYDROCHLORIC ACID	TAIWAN	1965	21.5%	112	-	26579
CAUSTIC SODA	TAIWAN	1965	21.5%	171	5723	-
CALCIUM CHLORIDE, MAGNESIUM CHLORIDE	TAIWAN	1974	60%	51	5359	-

(Cont.)

TABLE 9.1 (Cont.)

CHEMICAL	COUNTRY	YEAR	EQUITY SHARE	EMPLOYMENT	RAW-MATERIAL	
					LOCAL	IMPORTED
EXPANDABLE POLYSTYRENE	TAIWAN	-	40%	62	-	148679
SYNTHETIC RESINS	TAIWAN	-	49%	154	50100	54000
CAUSTIC SODA, HYDROCHLORIC ACID	PORTUGAL	1968	17.6%	723	95390	-
OXYGEN, NITROGEN	AUSTRALIAN	1974	45%	156	4742	-
ALUMINIUM HYDROXIDE	HONG-KONG	1975	35%	50	-	11930
ZINC OXIDE	AUSTRALIAN	1974	21.14%	29	9483	14256
SORBITAL, MANITOL	HONG-KONG	1980	35.72%	80	9694	-
ZINC OXIDE	AUSTRALIAN	-	20%	50	14198	7910
CARBON BLACK	SWISS	1980	13.8%	204	342	36944
ENAMEL & EMULSION PAINT	DUTCH	1965	55%	56	na	na
ENAMEL & EMULSION PAINT	SWISS	1970	15%	67	21666	-
ENAMEL & EMULSION PAINT	NORWEGIAN	1968	80%	67	36732	39710
ENAMEL & EMULSION PAINT	HONG-KONG	1968	100%	146	71853	41161

TABLE 9.2

CHEMICAL	HAZARDS
Caustic Soda (Sodium Hydroxide) (Na OH)	Skin contact is harmful. The solution can cause severe burns. Very dangerous to the eyes.
Ethyl Alcohol (Ethanol) ($C_2 H_5 OH$)	High concentrations of vapour and concentrated solution are dangerous. Can be poisonous by skin absorption in large quantities.
Formaldehyde (Urea & Phenol) (Methanol) $CH_3 OH$	Vapour and liquid are harmful to eyes, lungs, skin and other organs. Prolonged exposure to low concentrations can cause serious illness. Cumulative poison. Highly inflammable.
Calcium Citrate (Calcium Chlorate) Ca Cl (C1O) $4H_2O$	Poisonous corrosive powder; emits Chlorine gas which is poisonous. Powder is harmful to eyes, lungs, mouth, skin. Fire danger by chemical action if in contact with combustible materials. Explosion hazard when the powder is heated (oxygen emitted). Explosion when suddenly heated above 100 deg.C.
Paraquat	Respiration problems.
Dye	Carcinogenic
Hydrochloric Acid (HCl)	Irritant vapour harmful to eyes, lungs and skin. The acid burns eyes and skin.

(Cont.)

TABLE 9.2 (Cont.)

CHEMICAL	HAZARDS
Formalin (Methanol) (HC HO)	The vapour is very irritant to eyes and lungs. The solution (formalin) is very irritant to skin. Vapour and concentrated solutions are flammable. Prolonged exposure can cause hypersensitivity, damage to lungs, and cracking of skin. A suspected carcinogen of the lung.
Carbon Black (Charcoal)	Dust is irritant if inhaled or goes into eyes. Slight explosion hazard in the form of dust when exposed to heat or flame. Charcoal Blocks for oxide reduction can cause fire if stored away after use without ensuring that area used in reduction is properly cooled.
Calcium Carbide (Calcium Dicarbide) ($Ca\ C_2$)	Solid is not dangerous. Hazards are due to ethyne (acetylene) and Calcium Hydroxide formed when in contact with water or acids. Ethyne forms explosive mixture with air.

(Cont.)

TABLE 9.2 (Cont.)

CHEMICAL	HAZARDS
Phenol (Carbide Acid)	Vapour is harmful to the eyes, lungs and skin. Solid or solution is very poisonous if swallowed. Solid and solution are very corrosive, causing whitening of the skin. Poisonous by skin absorption. Prolonged exposure to low concentrations of mist or vapour very dangerous.
Chlorine Cl_2)	Very poisonous. Chlorine water if concentrated emits Chlorine. Extremely harmful to the eyes, respiratory tract and lungs.
Acetylene (Ethyne)	It forms explosive mixture with air. Ethyne reacts with copper and copper alloys containing more than 50% copper to form explosive carbides.
Polyurethane	Gives off cyanide gas when burned.
Acrylic	Gives off cyanide gas when burned.
Resins	Allergic reaction
Chlormium sulphate	Irritant to eyes, skin.
Crude Oil	Harmful by inhalation and skin contact. Toxic fumes if heated to decomposition. A recognised carcinogen.
PVC	Carcinogenic in non-solid form.

LDCs in similar Chemical products. We end this section by noting an interesting finding of Westphal et. al (1979), viz, the share of 'Other Chemicals' (i.e., excluding Drugs, Fertilizer, and petroleum products) in the total foreign direct investment in Korea increased from 0% during 1962-66, to 13% during 1967-71, 9.9% during 1972-76 and 36.9% during 1977-78.

SECTION 9.6: IMPACT OF FOREIGN DIRECT INVESTMENT ON MACROECONOMIC VARIABLES

The numerous investments in the various sectors of an economy by numerous multinational firms from numerous countries, do add up to a significant aggregate sum in many countries. Therefore, it is reasonable to assert (as, say, Kojima (1973) does) that the aggregate foreign direct investment will have some impact on the macroeconomic variables of the economy. Earlier in this chapter we have discussed how neo-classical approach takes foreign direct investment as net addition to the economy's capital stock. This implies that foreign direct investment will affect the host country's domestic product and employment. Secondly, we also discussed how foreign direct investment is considered a vehicle of technology transfer in a situation where the investing foreign firms are oligopolistic firms with firm-specific advantages. This implies that foreign direct investment will have some impact on the host country's exports or balance of trade (or payments).

In this section we attempt to test the above hypotheses for Thailand. In a developing country, like Thailand, characterised by relative scarcity of 'capital equipment and new technology', one would expect to detect a fair impact of foreign direct investment on income and exports. Here we test three hypotheses, viz., (a) Gross domestic product (GDP) as a function of foreign direct investment (FDI), (b) Exports (EX) as a function of FDI, and (c) Balance of trade (BT) as a function of FDI. The tests constitute in regressing the dependent variables (GDP, EX or BT) on FDI.

However, regressing current GDP_t on current FDI_t only will be a misspecification since current FDI will continue to affect GDP for a few more years. Same is the case for EX and BT. Therefore, it becomes necessary to take into account the impact of past FDI or GDP_t (EX_t or BT_t). This is achieved by using the standard Koyck transformation with the implicit assumption that the coeffficients of past FDI_{t-1}, FDI_{t-2} or FDI_{t-3} etc. decline geometrically. The regression equation (for GDP_t) then becomes:

$$GDP_t = \alpha^* + \lambda\, GDP_{t-1} + \beta\, FDI_t + u_t^*$$

where $\alpha^* = (1-\lambda)$ and $u_t^* = u_t - \lambda u_{t-1}$

Similar specifications are postulated for EX_t and BT_t (as dependent variables) keeping in mind the usual statistical assumptions that go with Koyck transformation. (See, for example, Goldberger (1964), p.275).

Table 9.3 presents Thailand's time-series data for 23 years on gross domestic product, exports, balance of trade, and foreign direct investment. All data are expressed at constant 1975 prices.

The regression results are presented in Table 9.4. Before we discuss the results, it is necessary to comment on our estimation method. One consequence of our specification is that a lagged dependent variable appears as a regressor. This gives rise to another serious problem. Running a lagged dependent variable as an explanatory variable destroys the reliability of the DW statistic as test for autocorrelation.

TABLE 9.3

($ million in 1975 prices)

YEARS	GDP	EXPORTS	BALANCE OF TRADE (EXPORTS - IMPORTS OF MERCHANDISE)	FOREIGN DIRECT INVESTMENT
1961	5150.06	1303.39	96.45	16.53
1962	5614.46	1157.28	-96.43	19.12
1963	6097.41	1081.84	-211.67	48.45
1964	6502.04	1290.54	-59.56	39.93
1965	7016.80	1245.14	-261.71	58.07
1966	7884.99	1209.91	-233.24	49.19
1967	8517.39	1122.38	121.71	72.69
1968	9209.49	991.12	-621.79	93.50
1969	9903.34	990.47	-607.89	73.64
1970	10530.39	930.17	-626.44	58.31
1971	11021.60	1038.99	-453.43	50.53
1972	11550.55	1293.11	-344.91	84.06
1973	12808.44	1711.48	-361.50	86.99
1974	13688.83	2576.60	-415.69	202.49
1975	14663.13	2177.00	-661.00	86.00
1976	15923.53	2721.92	-171.00	74.51
1977	17070.59	2963.79	-600.56	89.24
1978	18852.28	3152.84	-676.56	38.91
1979	19912.83	3846.55	-1116.72	37.48
1980	21000.20	4481.58	-1461.44	129.95
1981	21205.32	4456.21	-1250.95	185.99
1982	22300.45	4292.80	-459.11	121.42
1983	23910.35	3744.06	-1698.12	218.57

Source: IMF Statistical Year Book.

This serious problem is solved by using the GIVE program[1] which computes general instrumental variable estimates of linear equations with lagged dependent variables and autocorrelation errors. The regression equations, presented in Table 9.4, have been estimated by using the GIVE program. In Table 9.4, we present the OLS estimates as equation (1), (2) and (3). Instead of Durbin-Watson statistic, we present estimated $\hat{\alpha}$ and its significance level when $\hat{\alpha}$ is estimated from the first-order autoregressive system $u_t = \alpha u_{t-1}$ where u_t is the error term of the regression equation. When $\hat{\alpha}$ is significant, then the GIVE program uses the standard iterative process to yield estimates without autocorrelation. These estimates are presented in Table 9.4 as (1a), (2a) and (3a). Also note that we have 23 observations in Table 9.3. But one observation is used up because of one period lag, so that n = 22 in Table 9.4.

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1 The GIVE program has been developed by D.F. Hendry and F. Srba (1978) of the London School of Economics and Political Science. GIVE is designed to estimate equations of the general form:

$$(1) \quad Y_t = \sum_{i=1}^{M} \beta_i \; Z_{jt} + u_t \qquad (t = 1.....T)$$

where

$$(2) \quad u_t = \alpha_\theta u_{t-\theta} + V_t \qquad (\theta = 1 \text{ or } 2 \text{ or } \ldots 8)$$

and $V_t \sim NI\ (0, \sigma_v^2)$

If (1) and (2) define the correct model specification, then the resulting estimates are asymptotically equivalent to Maximum Likelihood estimates and are constistent and asymptotically efficient.

TABLE 9.4

	Dependent Variable	Independent Variables: Constant	Lagged dependent (t - 1)	FDI_t	R^2	F-ratio	$\hat{\alpha}$	n
1	GDP_t	394	1.06	3.70	0.996	3054	-0.13	22
		(2.14)	(62.16)	(2.1)			(0.53)	
1a	GDP_t	373	1.06	-3.35				
		(2.20)	(66.43)	(1.83)				
2	XP_t	126	0.98	0.24	0.926	118	0.95	22
		(0.73)	(12.39)	(0.13)			(9.29)	
2a	XP_t	2682	0.23	2.23				
		(0.80)	(0.80)	(1.46)				
3	BT_t	-37	0.39	2.23	0.451	7.8	0.72	22
		(0.24)	(1.87)	(1.46)			(3.28)	
3a	BT_t	-6.12	-0.38	-3.21				
		(1.18)	(1.14)	(1.76)				

First consider regression equation (1) (in Table 9.4) which shows the effect of FDI on GDP. However, $\hat{\alpha}$ = 0.13 with a t-value of 0.53 so that there is no autocorrelation. The final coefficients as given by (1a) are not very different from those in (1). These results are unacceptable. First of all, the estimated value of λ is greater than 1 and the coefficient of FDI has the wrong sign. This points towards empirical misspecification. A large part of GDP in Thailand comes from the agricultural sector. Also, foreign direct investment is relatively small in comparison to other variables (such as domestic investment or government expenditure) determining Thai GDP. Thus, in order to assess the effect of FDI on GDP one would require a more elaborate multi-equation macroeconomic model.

However, equations 2 and (2a) gives results of the effect of FDI exports. We note that $\hat{\alpha}$ = 0.95 with a t-value of 9.29 so that there is autocorrelation. The final results as given by 2 (a) show that λ = 0.23 and the coefficient of FDI is 2.23. Although it is not significant at 5% level. However it is reasonable to say that these do suggest an ameliorative effect of FDI on exports. The current FDI seems to be relatively more important.

From equations (3) and (3a), we find that the estimated coefficients have wrong signs. This is, we think, because imports have very loose connections to FDI. The only direct connection (which may be of some importance) between imports (merchandise) and FDI can perhaps be seen in a situation when FDI is accompanied by imports of capital equipment.

This perhaps is one reason which partially can explain the negative sign of the coefficient of FDI in equations (3) and (3a).

We end this section with the conclusion that there is fair evidence of macroeconomic impact of aggregate foreign direct investment on exports although in our simple regression analysis the impact of FDI on GDP is not captured.

SECTION 9.7: A COMPARISON OF THE DESIRED PATTERN OF INVESTMENT AND THE PATTERN OF FOREIGN DIRECT INVESTMENT

This section first discusses the desired pattern of investment as laid out in the Five Year Plans and there have been four Plans in Thailand during 1961-1981. Then, we would find the pattern of foreign direct investment from the BOI data for each Plan period so that a comparison could be carried out. This will enable us to examine whether the foreign direct investment in Thailand have been taking place according to the priorities and objectives of the Plans. In order to do so, it is necessary to briefly discuss the objectives and priorities of the Plans.

The objective of the first National Economic Development Plan, 1961-1966, is to raise the standard of living of the people of Thailand by increasing the per capita output of goods and services. The key note of the development programme is to encourage the growth of domestic and foreign investment both in the agricultural and non-agricultural sectors of the economy. The policies to promote industrial

expansion are as follows. The state will assist and promote industries of various scales to suit the needs of the domestic markets. The state will not engage in activities competitive with the private enterprise and will follow the policy as set out in the Promotion of Industrial Act 1962. It created the Board of Investment which is concerned with the grant of promotional privileges permitted under this Act.

The objectives of the second Five-Year National Economic and Social Development Plan (1967-1971) are: (1) to reduce income inequality, (2) to expand employment opportunities, (3) to accelerate private investment, (4) to develop intensive agriculture, and (5) to maintain financial stability.

The major industrial development policy is to promote industrial investments, particularly, in those industries which utilize indigenous raw-materials and earn or save foreign exchange. In the second Plan, the Industrial Promotion Act was revised, partially to create a more favourable climate for private investment and partially to promote industrial activities outside Bangkok.

The objectives of the Third National Economic and Social Development Plan (1972-1976) are: (1) to restructure the economic system, (2) to maintain economic stability, (3) to promote economic growth in the rural areas and to reduce income disparities, (4) to promote social justice, (5) to develop manpower resources and to create employment, and (6)

to promote further the role of the private sector in economic development.

In order to achieve these objectives, one of the important measures was to promote foreign investments by encouraging Joint-ventures between Thai and foreign entrepreneurs. However, the government did formulate a programme to protect the basic industries and to keep it from direct or indirect control of the foreign investors. And at the same time Investment Promotion Policy was redirected in favour of (a) industries utilizing local labour and raw-materials, (b) industries having favourable effects on balance of payments, (c) industries located in the rural areas, and (d) heavy industries with considerable local financial and administrative participation.

The objectives of the Fourth Economic and Social Development Plan (1977-1981) are: (1) to accelerate economic recovery, (2) to reduce income disparities, (3) to reduce population growth rate, to improve manpower quality and to increase the level of employment, (4) to improve the management of basic resources and to rehabilitate environment conditions, and (5) to strengthen national security management.

In order to achieve the objectives of this Plan, several measures have been taken. The output levels of the export industries, such as sugar, textiles and cement, were to be increased in accordance with the demand in world markets. Emphasis was placed on the development of agro-industries, such as paper, food canning and livestock feeding, which

could stimulate agricultural production and rural employment. Thirdly, small-scale import-substitution industries, which utilize indigenous raw-materials and labour, were to be expanded.

Now move to compare the planned pattern of investment and the pattern of foreign direct investment for each Five Year Plan. Tables 9.5, 9.6, 9.7 and 9.8 present the relevant data respectively for the 1st, 2nd, 3rd and 4th Five Year Plan. The first two columns of each Table present the percentage distribution of investments among the four broad categories (viz., Agriculture, Mining, Industries and Services). The last colomn of each Table presents the percentage distribution of workers employed by the 'foreign' firms, i.e., firms which cause to exist through foreign direct investment.

Careful inspection shows that there is a clear discrepancy between the ex ante or desired pattern of economy's investment and the pattern of the ex post foreign direct investment. Consider the first Plan. The disired pattern emphasizes agriculture and services, while the foreign direct investments are channelled mostly to industries and mining. It is, of course, understood why the proportion of foreign direct investment in Services will be lower than that envisaged in the Plan. It is because Services include education services, social, medical services (apart from insurances services etc.) where one cannot expect a large proportion of foreign direct investment. However, only 6.29% of foreign direct investment has been chanelled to

TABLE 9.5

1st National Economic & Social Development Plan (1961-1966)

	PLAN TARGET %	FOREIGN DIRECT INVESTMENT %	LABOUR EMPLOYED BY FOREIGN FIRMS %
AGRICULTURE	42.84	6.29	6.40
MINING	2.72	22.85	11.12
INDUSTRIES	15.72	63.78	76.36
SERVICES	38.72	7.08	6.13

TABLE 9.6

2nd National Economic & Social Development Plan (1967-1971)

	PLAN TARGET %	FOREIGN DIRECT INVESTMENT %	LABOUR EMPLOYED BY FOREIGN FIRMS %
AGRICULTURE	35.20	10.40	15.03
MINING	2.74	24.82	11.78
INDUSTRIES	18.36	59.46	68.78
SERVICES	43.78	5.28	4.40

TABLE 9.7

3rd National Economic & Social Development Plan (1972-1976)

	PLAN TARGET %	FOREIGN DIRECT INVESTMENT %	LABOUR EMPLOYED BY FOREIGN FIRMS %
AGRICULTURE	34.70	9.96	12.60
MINING	1.33	25.09	4.58
INDUSTRIES	26.77	61.38	79.53
SERVICES	37.20	3.57	3.29

TABLE 9.8

4th National Economic & Social Development Plan (1977-1981)

	PLAN TARGET %	FOREIGN DIRECT INVESTMENT %	LABOUR EMPLOYED BY FOREIGN FIRMS %
AGRICULTURE	31.55	9.75	29.67
MINING	1.11	12.84	5.28
INDUSTRIES	30.25	61.66	59.64
SERVICES	37.09	15.75	5.41

agriculture although the planned target was 42.84%. It is remarkable that the same picture is true for the 2nd, 3rd and 4th Plan. These need not be discussed separately.

We conclude the section by noting that, the foreign direct investment has not been very useful in changing the pattern of the economy. A changed pattern of production, of course, will have a wide-spread consequences of income distribution, rural development etc. and failure to do so will have the consequences of not being able to deliver the goods to the masses of people.

SECTION 9.8: POLITICAL EFFECTS OF FOREIGN DIRECT INVESTMENT

Economists have recognised that the interaction between the activities of the multinational and domestic economic policies gives rise to another type of problem, viz., political tensions. The problem arises mainly because of differences between the objectives of the multinational firms and the objectives of the host country's government. While the firms may be looking for profit maximization, the host government aims clearly to try to maximize the net benefits from foreign direct investment to the economy. The response of the host government is to try and control the multinational firms so that they behave in a way which is consistent with their policies. Host governments want to enjoy the benefits of knowledge, capital, entrepreneurship, management and marketing skills and economies of scales factors which can be provided by the multinationals. On the

other hand, host governments do not want to accept the political consequences that may start to erode their political sovereignty. Also in the minds of the leaders in developing countries, the power of a multinational firm has been associated with the power of the country where the parent company is located.

Furthermore, owners and managers of foreign firms are less firmly under the jurisdiction of local governments than those in state enterprises or resident private enterprises. To some extent, foreign owners and managers are under some influence of the foreign governments of the developed countries. The investing country may use the economic power of its foreign investor to further its political ends, e.g., overthrowing a government. The most frequently cited example of direct political intervention by a multinational is that of the American Company, ITT, which is alleged to have taken part in the overthrowing of the socialist government of President Allende in Chile at the beginning of the 1970s. These political consequences of foreign direct investment have been discussed by Behrman (1970) and Menderhausen (1969) among others.

According to Stauffer (1979) the political attitude of multinationals toward host country governments can cause a serious concern for the host nations. Stauffer argues that the multinational firms seem to favour authoritarian regime in the third world countries. This is so because authoritarian regimes can often provide stable economic environment by depoliticizing workers demand and thereby

keeping wage cost low, and can grant concessions that in an open society would be difficult.

The other important aspect is that, because of the greater effectiveness as producers and sellers, foreign affiliates may exploit more effectively if inconsistencies and gaps in the laws and regulations of the host countries (LDCs) are found. The existence of wide-spread bribery and corruption has been recognised but these have not been documented by any serious empirical studies. In fact, it is well known that neither the companies nor the governments are willing to be interviewed about corruption. Multinationals can corrupt the high-rank officers, the local civil servants and, by doing so, can devise a system in order to advance their interests. There are known examples of bribery given by the multinationals and accepted (in secret deals) by public figures of many LDCs (Indonesia, Nigeria, Philippines, Thailand etc.). Thailand has been ruled by military oligarchy, and hence, possesses all the classical attributes of a system, loved by the multinationals for exploitation by devious means.

SECTION 9.9: SOCIAL EFFECTS OF FOREIGN DIRECT INVESTMENT

At the social level, foreign direct investment is often seen by most studies (e.g., Fayerweather (1982), Lewis (1966)), as a cost rather than a benefit to the host country. Fayerweather (1982) puts forward the following argument:

> "Foreign direct investment - as carried out by transnational business enterprises - involves not only capital, technology and similar resources, intended or not, it is usually accompanied by socio-cultural investments such as attitudes, values and behavioural patterns, production patterns and processes, consumption patterns and the like. When this occurs, the socio-cultural profile of the host country nations tends to lose its national characteristics and tends to acquire those of the home countries involved" (p.275).

Also Lewis (1966) argues in the same fashion. Industrialization is accused of disturbing the syustem of traditional values, and thus causing the cultural dependency and change in the basic way of living. It aggravates the problems of urbanization with a conversion of rural 'disguised' unemployment into 'open' unemployment in the cities. And because the MNEs are seen as an engine of industrialization, they are taken as responsible for the social disturbances in the host country.

Another interesting argument in this area can also be found in the work of Cox (1976). Cox argues that, even though the MNE might be beneficial to the host countries, the benefits so accrued are not equitably distributed among different social groups and geographical areas. This creates inequalities in the distribution of income between social groups within the countries. In some sectors (modern industuries) the entry of the multinationals has brought the demise of artisan and small-scale local producers. This event is basically like any displacement of a less efficient technology by a more efficient one, but of course the negative effects on the welfare of the displaced producers may be a matter of national economic and cultural concern.

Multinationals, generally, introduce a large range of new products such as electronics, cosmetics, pharmaceutical products, cigarettes, watches, motor-cycles, cameras, automobiles, stereos, soft drink, canned food where they have large market and effective sales organisation. The point is that these products are developed by the multinationals (in the industrialized countries) not with reference to the needs of the host LDC nations but to those of the home countries. The problems arise because most people in host (developing) countries live in poverty when even the most elementary needs (foods, clothing, shelter) remain unfulfilled. In all these countries, only a small fraction of people are able to purchase these products which are commonly used in industrialized nations. Consequently, the gap between the standard of living of the high and low income group will be sharpened. Many of these products being developed and promoted by foreign enterprises, sometimes, are of doubtful social value when they are sold to the poor in the developing countries.

Multinationals often encourage the consumption of substitutes or processed variants for pre-existent products, or they introduce high priced products to replace indigenous cheap products. Unfortunately for the poor third world countries, these highly priced products have a lower substantive value than the indigenous products that they have replaced in the markets of the host-nations. The obvious examples which can be pointed out here are the 'fast food' such as hamburgers, soft drinks; Pepsi, Cola, instead of local fruit juice.

There is no doubt that advertising practices, product differentiation (brand name and trade mark) has stimulated demands and moulded tastes for the foreign products in poor-income developing countries, particularly among the middle - and upper-income groups. The effects of MNEs of their products on social behaviour have been demonstrated by several studies. For example, Barnet and Muller (1974) recalled that a doctor in a rural Mexican village reported that it was the practice for a family to sell the few eggs and chickens it raised to buy coke for the father while the children wasted away from lack of protien. Soft drinks have become a regular part of the diet of middle-class children in Brazil, despite the fact that they suffer from vitamin defficiences and also symptoms of malnutritions. An ever increasing number of people have learned to consume soft drinks at an exorbitant price when inexpensive nutritive local drinks are available. This is also the case for having a higher status if you drink a soft drink i.e., Pepsi or Cola.

Also studies by J.K Roy as reported in Barnet and Muller (1974, P.140), shows that poor families in Bangladesh, buy high priced baby foods instead of the much cheaper cow's milk. This often is also the case in the Caribbean and Africa. There is a grave potential danger for the health of the millions of new born children in many Third World countries in the absence of instructions by the manufacturer with respect to preparation, hygeine etc.

SECTION 9.10:CONCLUSIONS

In this chapter we have summarized the main arguments about the economic effects. There are arguments based on traditional neo-classical economics to support the beneficial economic effects. There are arguments, based primarily on the weaknesses of neo-classical economics, which challenge the ameliorating effects of foreign direct investments. We have empirically analysed some aspects of Thailand. It is found that, on a broad basis, Thailand has obtained gains mainly from foreign direct investment in the mining sector. We have also found fair evidence that aggregrate foreign direct investment has significant impact on Thai GDP and Thai exports. However, we have found that a lot of hazardous products are produced in Thailand by foreign firms investing in the Chemical sector. Furthermore, the pattern of foreign direct investment during each Five Year Plan have been different from the desired pattern as envisaged in the Plan. There are social and political consequences which are of doubtful benefits.

APPENDIX 1

SUMMARY OF ALIEN BUSINESS LAW

(N.E.C. Announcement No. 281)

At present, the most important law governing alien controlled business in Thailand is the Alien Business law which came into force on November 26, 1972. Alien business falling into Categories A, B or C (set out below) are controlled by the law, subject to exemptions. The placing of businesses into Categories A, B and C are subject to change by Royal Decree. Although numerous questions of classification remain, it is clear that many businesses do not fall within any category under this law, including many manufacturing industries and lending activities, but some of these exempt businesses may be subject to restrictions under other laws, regulations and practices.

Generally, Categories A and B businesses are closed to aliens, and Category C businesses are open, subject to Ministerial Regulations under the Law. Under a Royal Decree of 1973 an 'alien' enterprise, granted promotional privileges by the Board of Investment is permitted to engage in a Category B business. An alien desiring to engage in any business specified in Category C, must submit an application to the Department of Commercial Registration, and must receive a permit prior to commencing to do business. A permit will be valid for a fixed period or without limit, subject to the Ministerial regulations.

LIST OF BUSINESSES ANNEXED TO THE N.E.C. ANNOUNCEMENT NO.281

CATEGORY A

Chapter 1 - Agricultural Businesses

(1) Rice Farming

(2) Salt farming including salt mining except rock salt

Chapter 2 - Commercial Businesses

(1) Internal trade in local agricultural products

(2) Land Trade

Chapter 3 - Service Businesses

(1) Accounting

(2) Law

(3) Architecture

(4) Advertising

(5) Brokerage or agency

(6) Auctioning

(7) Barbering, hair dressing and beautification

Chapter 4 - Other Businesses

(1) Building construction

CATEGORY B

Chapter 1 - Agricultural Businesses

(1) Cultivation

(2) Orchard farming

(3) Animal husbandry including silk worm raising

(4) Timbering

(5) Fishing

Chapter 2 - Industrial and Handicraft Businesses

(1) Rice milling

(2) Flour making from rice and other crash crops

(3) Sugar milling

(4) Manufacturing of alcohlic and non-alcoholic drinks and beverages

(5) Ice making

(6) Manufacturing of pharmaceuticals

(7) Cold storage

(8) Timber processing

(9) Manufacturing of gold, silver, neilloware and stone inlaid products

(10) Manufacturing or casting of Buddha images and bowls

(11) Wood carving

(12) Lacquer-ware making

(13) Match making

(14) Manufacturing of white cement, portland cement and cement finished products

(15) Dynamiting or quarrying of rocks

(16) Manufacturing of ply wood, veneer wood, chipboard or hardboard

(17) Manufacturing of garments or foot wear, except for exports

(18) Printing

(19) Newspaper publishing

(20) Silk spinning, weaving or silk fabric printing

(21) Manufacturing of finished products from silk fabric, silk yarn or silk cocoons

Chapter 3 - Commercial Businesses

(1) All retailing except those included in Catetory 'C'

(2) Ore trading except those included in Category 'C'

(3) Selling of food and drinks except those included in Category 'C'

(4) Trading of antique, heirloom or fine arts objects

Chapter 4 - Services Businesses

(1) Tour agency

(2) Hotel, except hotel management

(3) All businesses under the law governing places of service

(4) Photography, photographic processing and printing

(5) Laundering

(6) Dress making

Chapter 5 - Other Businesses

(1) Domestic land, water, and air transport

CATEGORY C

Chapter 1 - Commercial Businesses

(1) All domestic wholesaling except those included in Category 'A'

(2) All exporting

(3) Retailing of machinery, equipment and tools

(4) Selling of food or beverages for promotion of tourism

Chapter 2 - Industrial and Handicraft Businesses

(1) Manufacturing of animal feeds

(2) Vegetable oil refining

(3) Textile manufacturing including yarn spinning, dyeing and fabric printing

(4) Manufacturing of glassware including light bulbs

(5) Manufacturing of food bowls and plates

(6) Manufacturing of stationery and printing paper

(7) Rock salt mining

(8) Mining

Chapter 3 - Services Businesses

(1) Businesses which are not included in Category 'A' and Category 'B'

Chapter 4 - Other Businesses

(1) Other constructions which are not included in Category 'A'

FROM: THAILAND BUSINESS LEGAL HANDBOOK. (1976)

(PREPARED BY: INTERNATIONAL LEGAL COUNSELLORS THAILAND

FOR: THE BOARD OF INVESTMENT &

THE CHASE MANHATTAN BANK; NA,BANGKOK BRANCH.

APPENDIX 2

SUMMARY OF INCENTIVES UNDER INVESTMENT PROMOTION ACT B.E. 2520 (1977)

GENERAL INCENTIVES

Guarantees

Against nationalisation.
Against competition of new state enterprises.
Against monopolisation of sales of products.
Against price control.
Permission to export.
Against imports by government agencies or state enterprises with taxes exempted.

Protection Measures

(Subject to justification and need).
Imposition of a surcharge on foreign products at a rate not exceeding 50% of the CIF value for a period not longer than one year at a time.

Import ban on competitive products.

The Chairman is empowered to order any assisting actions or tax relief measures to be adopted for the benefit of promoted projects.

Permissions

To bring in foreign nationals to undertake investment feasibility studies.

To bring in foreign technicians and experts to work under promoted projects.

To own land for carrying out promoted activities.

To take or remit abroad foreign currency.

Tax Incentives

Import duties and business taxes on imported machinery may be exempted or reduced by 50%.

Import duties and business taxes on imported raw materials and components may be reduced up to 90% for one year at a time.

Corporate income tax may be exempted for 3-8 years. Any losses incurred can be carried forward and deducted as expenses for up to 5 years.

Exemption of up to 5 years on witholding tax on goodwill, royalties or fees remitted abroad.

Dividends derived from the promoted enterprises are excluded from taxable income during the income holiday.

ADDITIONAL SPECIAL INCENTIVES

1. For enterprises in Investment Promotion Zones.

   A maximum reduction of 90% of business tax on the sales of products for a period up to 5 years.

   A reduction of 50% of corporate income tax for 5 years after the termination of normal income tax holiday or from the date of income earning.

   Permission to double the cost of transportation, electricity and water supply for a deduction from the corporate taxable income.

   Permission to deduct from the corporate taxable income up to 25% of the investment in the costs of installing infrastructural facilities for 10 years from the date of income earning.

2. For export enterprises.

   Exemption of import duties and business taxes on imported raw materials and components.

   Exemption of import duties and business taxes on re-export items.

   Exemption of export duties and business taxes.

   Permission to deduct from corporate taxable income the amount equivalent to 5% of an increase in income derived from export over the previous year, excluding costs of insurance and transportation.

FROM: OFFICE OF THE BOARD OF INVESTMENT, 1977

Office of the Prime Minister, Bagkok, Thailand.

APPENDIX 3

The following are the details of the products included in the sectors.

SECTOR 1

1.1 Large-Scale Cultivation

1.2 Processing of Agricultural Products

1.3 Processing or Preservation of Food

1.4 Animal Feed

1.5 Oil Production from Agricultural Products

1.6 Corn Products

1.7 Products from Stick Lac

1.8 Rubber Products

1.9 Livestock Raising or Meat Processing

1.10 Animal Products

1.11 Cultivation of Mulberry Trees and Silk Worm Farming

1.12 Silk Reeling

1.13 Deep-Sea Fishing and Off-Shore Fishing

1.14 Slaughtering and Disemboweling of Chickens for Export

1.15 Manufacture of Products Made from Rattan and Bamboo for Export

1.16 Vegetable Seeds Production and Expansion

1.17 Rabbit Raising and Processing for Export

SECTOR 2

MINERAL, METAL AND CERAMICS

2.1 Mineral Ore Prospecting

2.2 Mining or Dressing of Ores

2.3 Smelting

2.4 Processing of Metal

2.5 Ceramic Products Industry

SECTOR 3

CHEMICAL AND CHEMICAL PRODUCTS

3.1 Chemical Products

3.2 Soda Ash

3.3 Carbon Black

3.4 Petrochemicals

3.5 Pharmaceutical Products

3.6 Fertilizer

3.7 Paints or Similar Products

3.8 Paper Industry

3.9 Carbon Paste Products

3.10 Pulp Paper Products

3.11 Acetylene Black Products

3.12 Petroleum Products

SECTOR 4

MECHANICAL & ELECTRICAL EQUIPMENT

4.1 Production or Assembly of Engines

4.2 Production or Assembly of Mechanical Equipment

4.3 Production or Assembly of Machinery or Electrical Equipment

4.4 Production of Components and Parts of Machinery or Electrical Equipment

4.5 Production of Component Parts for Vehicles

4.6 Production or Assembly of Electronics

SECTOR 5

OTHER PRODUCTS

5.1 Production or Assembly of Clock or Watches or the Component Parts

5.2 Production or Assembly of Cameras

5.3 Manufacturing of Stationery and Educational Equipment or Parts or Components

5.4 Manufacture of Sporting Equipment, Musical Instruments or Toys

5.5 Manufacture of Medical Supplies or Medical or Scientific Equipment

5.6 Plastic or Plastic-Coated Products

5.7 Manufacture of Ornaments or Cutting and Polishing of Gem Stones

5.8 Production of Umbrellas

5.9 Rubber Tree Products

5.10 Production of Lenses or Spectacles or Parts

5.11 Production of Fire Hydrants or Component Parts

5.12 Building and Repairing of Large Ships for International Sea Transportation

5.13 Building and Repairing of Small Ships for International Sea Transportation

5.14 Production of Arms and Ammunition

5.15 Manufacture of Natural Fibre or Synthetic Fibre Products

5.16 Tyre Cords

5.17 Printing of Textiles

5.18 Production or Assembly of Measuring and Testing Equipment or Component Parts

5.19 Production of Hand Tools

5.20 Manufacture of Prefabricated Housing or Components

5.21 Manufacture of Zips

5.22 Manufacture of Gloves

5.23 Manufacture of Abrasive Sheets

5.24 Manufacture of Matches for Export

5.25 Artificial Flowers and Trees for Export

5.26 Manufacture of Cellophane

5.27 Scale Ice

5.28 Ferro-Cement Ship Building

5.29 Manufacture of Socks

5.30 Manufacture of Jute Woven Carpet

5.31 Manufacture of Packaging Products

5.32 Grinding Wheels

5.33 Adhesive Tape Products

5.34 Resin Rubber Soling Sheet

5.35 Wall Cloth Covering Products

5.36 Embroidered Cloth Products

5.37 Synthetic Fibre Products

5.38 Non-Dairy Creamer Products

SECTOR 6

SERVICES

6.1 Industrial Estates

6.2 Hotel

6.3 Water Transportation

6.4 Car Parking

6.5 Repair Service for Vehicles, Machinery or Engines

6.6 Warehousing

6.7 Hospitals

6.8 Cold Storage

6.9 Loading and Unloading Facilities for Sea Transport

6.10 Movies Making

6.11 Tourist Promotion Services

6.12 X-Ray Computer Center

6.13 International Trading Enterprises

6.14 Silo and Drying

6.15 Manufacture of Modern Rice Mill

6.16 Container Repair, Maintenance and Refurbishment

6.17 Modern Package of Vegetable and Fruit for Export

6.18 Natural Gas Transport

SECTOR 7

OTHER INDUSTRIES
(Industry which have not been Classified in Other Groups)

7.1 Assembly of Vehicles Industry

7.2 Spinning, Weaving or Knitting

7.3 Bleaching, Dyeing

7.4 Garments for Export Industry

7.5 Domestic Tourist Promotion Services

7.6 Gypsum Products

7.7 Asbestos Products

7.8 Veneer Industry

7.9 Wood Parquet Products

7.10 Production of Construction Material Utilising Wholly Domestic Raw Material

7.11 Others

From: OFFICE OF THE BOARD OF INVESTMENT, 1982

Office of the Prime Minister, Bangkok, Thailand

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