

2475/4073

MONASH UNIVERSITY
THESIS ACCEPTED IN SATISFACTION OF THE
REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

ON..... 16 September 2003

.....
Sec. Research Graduate School Committee

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Addendum

p. 54 para 3: The critical bounds of the relative population size ($\frac{M_j}{M_i}$) change for different basic structures in the open economy setting. The reason is that this model does not cover nonbasic structures. The existence of general equilibrium in a basic structure depends on the particular values of the relevant variables. Accordingly, the threshold values of the relative population size vary with changes in the values of other variables that determine general equilibrium for different structures with international division of labour.

p. 60 para 2: For simplicity, we do not distinguish between external education and internal learning. Instead it is assumed that the education of the x worker takes place within the firm.

p. 63 para 1: Figure 4 illustrates possible structures with international trade for the global economy. In the two-country global economy, complete international division of labour means that individuals in one country only produce one type of good and individuals in the other country only produce the other type of good. For the purpose of production and consumption, individuals from one country have to trade with individuals of another country. It follows that the composition of structures with international division of labour has the following features:

- (1) Each country has only one configuration;
- (2) A structure encompasses two countries;
- (3) The configurations of the two countries are different but complementary to each other in terms of forming a basic structure.

These features and the assumption of partial international mobility of labour (labour producing x is internationally mobile, but labour producing y is internationally immobile) lead to six possible structures involving complete international division of labour:

- SI (A2)
- SI* (B1)
- FL (A4 or A8) ----- A4 and A8 are the same structure
- FL* (D1 or H1) ----- D1 and H1 are the same structure

Figure 4 shows all 64 potential compositions of structure with international trade in the two-country setting. The method for figuring out the construction of structures is as follows. First, we list all eight possible configurations for each country according to the terms specified above. They are: which good is produced under specialisation; whether the individual is the owner of the firm; and where the production is carried out. Then we get 64 potential "structures" by combining any two configurations for country i and j . By excluding infeasible combinations and recognising symmetries we obtain three pairs of feasible structures. Potential structures are identified as infeasible by the following considerations:

- Complete international division of labour is inconsistent with both countries producing the same good. This excludes the 32 combinations in the cells marked with a dash (“-”).
- We assume that y producers are internationally immobile. This assumption rules out production of good y in the country where x producers are resident, regardless of whether x producers or y producers are the owner of the firm. This excludes the 16 potential “structures” in the shaded cells.
- Production activity requires the existence of a workforce. If both x producers and y producers are the owners of the firm, no employees (production workers) will be available. This excludes the eight structures in the cells marked with a tilde (“~”).

The total number of potential structures is $56+8=64$. The total number of the structures excluded on the basis of the foregoing considerations is $32+16+8=56$. Therefore, there are eight feasible structures (located at A2, B1, A4, A8, D1, H1, C6, F3). As A4 and A8 are identical and D1 and H1 are identical, six distinct feasible structures with international division of labour remain for explanation.

p.67 (3.7a): $x_i^d = \frac{x_i^x}{N}$ should read $x_i^d = \frac{x_i^s}{N}$.

p.68 last para: For simplicity, I have intentionally disregarded non-basic structures. A basic structure is a structure from which no other structures can be derived by excluding one or more of its constituent configurations. The assumption of complete specialisation, that each person sells not more than one good, precludes nonbasic structures from general equilibrium (Yang, 2001, p.176). As a result, nonbasic structures are normally excluded from explicit consideration in inframarginal analysis that involves complete specialisation. In the present model, the assumption of complete division of labour implies that a person does not sell more than one good. This feature excludes all nonbasic structures.

p.71 following para 1: It is worth noting that the original statement of the Yao theorem (Yao, 2001) allows for multiple general equilibria. However, potential multiple general (as distinct from corner) equilibria occur only as “razor edge” scenarios in this model. Such outcomes occur when trading efficiency and other relevant parameters assume values that place the equilibrium outcome on the dividing line that demarcates two different structures. For instance, if $k > k_1$, structure V occurs in equilibrium; while if $k < k_1$, structure W occurs in equilibrium. But if $k = k_1$, either structure V or W may occur in equilibrium, leading to multiple general equilibria. Since the ambiguous nature of such razor edge scenarios detracts from succinct statements of the core issues of my thesis without adding materially to their clarification, I ignore these outcomes in the formal analysis.

p.75 para3, last sentence: “Might” should read “will”.

p.97 para 1: This model is an extension of the model in Chapter 3. It introduces the structure FM to capture the size of direct investment outflows from a country. In order to avoid repeating in Chapter 4 the analysis of Chapter 3 for the set of potential

closed economy structures, I have invoked some *ad hoc* assumptions about the characteristics of pertinent efficiency parameters. These are:

- (1) The international transaction efficiency for goods (θ) and the international transfer efficiency for labour (δ) are sufficiently high to ensure that structures with international trade occur in general equilibrium, leaving structures with solely domestic trade to be excluded.
- (2) The transaction efficiency for intermediate goods is lower than that for final goods. This is the essential rationale for the existence of the institution of the firm (e.g., Cheung, 1983; Williamson, 1975). Therefore, the institution of the firm as a device for bypassing market transactions in intermediate goods will be the preferred form of economic organisation.
- (3) Intermediate goods are highly knowledge intensive relative to labour intensive final goods. It follows that proportionately more people should be engaged in the production of (labour intensive) final goods. This implies that in the normal case, even if the host country has a larger population, it may still not be sufficiently large to absorb all the foreign investors' output x . In that case, the division of labour will be incomplete and local production of goods x and y occurs simultaneously. Hence, the analysis would not lose generality by excluding international structures with another FX in host country.

p.103 para 3: The definition of $M_{x_{i2}}$ is given on page 112: " $M_{x_{i2}}$ is the number of people from the source country who are engaged in the production of intermediate good x for the FDI subsidiary."

**TRANSACTION EFFICIENCY, DIVISION OF LABOUR
AND
FOREIGN DIRECT INVESTMENT**

Dexin Yang

Thesis submitted for the degree of PhD

**Department of Economics
MONASH UNIVERSITY**

Melbourne, Australia

December 2002

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STATEMENT OF ORIGINALITY

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university. And to the best of my knowledge and belief, this thesis contains no material published or written by another person, except where due reference is made in the text of the thesis.



Dexin Yang

December 2002

ACKNOWLEDGEMENTS

This thesis would have been impossible without many individuals' significant advice, stimulation and encouragement, which simply cannot be forgotten.

First, I am indebted to my two supervisors. Professor Xiaokai Yang has made an invaluable contribution to the present work. Not only has he provided the idea of the inframarginal analysis to the topic and the techniques for modelling in the framework of the inframarginal analysis, but he has also taken the time to read everything I have been able to come up with. I am especially grateful to him for his uninterrupted guidance at his most difficult time when he was in severely poor health. His intelligence, insights, background of rigorous training, stamina, and kind-heartedness are impressive and always the source of my admiration. I owe an equal deal to Professor Dietrich Fausten. Not only has he given me academic guidance, especially with regard to the subject of foreign direct investment, but he has also provided kind support in other aspects of my study. His busy academic activities and administrative affairs have not prevented him from carefully reading every drafts of my thesis and providing very detailed important comments. His continuous encouragement has benefited me greatly, and his conscientiousness and patience are always the source of my admiration.

I am very grateful to Professor Yew-Kuang Ng for his important comments, encouragement and supports.

My deep thanks also go to Dr. Guang-Zhen Sun. His comments on Chapter 3 and his efforts to innovate techniques for inframarginal analysis are most appreciated.

I also thank Dr. Mengchun Liu and Dr. Dingsheng Zhang for their comments on an early draft of Chapter 3. I appreciate Yongsheng Zhang for helping me collect the data on China's outward FDI.

I would also thank my mother, my wife and my children for their invaluable support. For my study my wife and children have changed their routine of life.

ABSTRACT

This thesis has two parts. The exploration part uses inframarginal analysis to develop models with endogenous international economic structures and international division of labour to investigate the nature and size of foreign direct investment (FDI). The explanation part uses the basic findings from the models to interpret the pattern of China's outward FDI, which has shown features that cannot be explained by the existing theory of FDI.

Following Cheung's idea that the firm replaces the market for intermediate goods with the market for labour (Cheung, 1983) and drawing on the Yang-Ng (1995) model of the firm, Chapter 3 develops a Walrasian general equilibrium model of FDI to capture the mechanisms for the emergence and development of FDI by using inframarginal analysis. It shows that FDI is a form of the organisation of international activity and division of labour. Via FDI the investing firm indirectly prices intangible intermediate goods in the context of the international economy by expanding the firm's governance boundary to the host country. When other factors are given, high transaction efficiency for ordinary labour (or all factors other than those which are priced indirectly) in the host country and high transaction and transfer efficiencies for professionals (including all factors related to the indirect pricing) from the home country encourage FDI from the home country to the host country. The relationship between FDI and trade in final goods and in intermediate goods (e.g., foreign licensing) is determined and shaped by the transaction efficiencies for goods and factors within and between the two countries.

Chapter 4 establishes an extended model based on the model of Chapter 3 to investigate the determination of the size of FDI (inward or outward alike) of a country. This model has generated a clear picture of the determinants of the size of FDI and the precise functioning of those determinants. It shows that the relative volume of FDI is affected positively by the host country's transaction efficiency for final goods and ordinary labour, by the international transfer efficiency for cross-border movements of managerial and technical professionals, as well as by the home country's transaction efficiency for managerial and technical professionals. Conversely, difficulties in the production of intermediate goods, transaction efficiency for intermediate goods at home, as well as

international transaction efficiency for traded goods affect FDI negatively. The results, while confirming some acknowledged arguments in the existing literature of FDI and trade about the determination of FDI and its relationship with trade, have swept away some views inconsistent with each other due to the narrower focus in reaching these views in the existing literature. Examples include Mundell's argument that a consequence of FDI is the elimination of the basis for trade between the two countries (Mundell, 1957). Our analysis shows that even though, as Mundell claims, FDI results in the contraction at home and expansion in the host country of the industry in which FDI takes places, FDI brings about a new pattern of division of labour which lays a new basis for trade between the two countries, and the volume of trade occurs on a scale corresponding to the volume of the FDI.

Chapter 5 explores the rationale for the emergence and development of China's outward FDI, which has exhibited salient features that defy the existing mainstream theories of FDI. It is generally acknowledged in the literature that FDI from a developing country is most likely to be directed initially to its neighbouring developing countries and to grow gradually in volume and distance. However, this is not the case with China's outward FDI, which developed rapidly after the first few years and is concentrated heavily in a few developed countries, i.e., the United States, Canada and Australia.

The analysis is carried out in the framework of our two models. The results of the analysis show that the growth and geographical distribution of China's outward FDI are essentially determined by the changing transaction conditions for labour and goods at home relative to host country transaction conditions and international transaction and transfer conditions between China and host countries. The results have not only verified our finding in previous chapters, but they also have answered questions about the specific characteristics of China's outward FDI that are awkward for the existing theory of FDI.

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1. Introduction

This thesis has two parts. The exploring part uses inframarginal analysis to develop models with endogenous international economic structures and international division of labour to investigate the nature and size of foreign direct investment (FDI), the major mode by which investing firms extend their span of control of business activities internationally via acquisition or establishment of overseas enterprises. The explaining part uses the basic findings from the models to interpret the emergence and development of China's outward FDI, which has shown features that cannot be explained by the existing theory of FDI.

1.1. *Economic Organisation, Division of Labour and FDI*

1.1.1. **FDI and economic organisation**

Economic organisation involves methods of organisation and economic institutions that use those methods. Mainstream economic theory deals with this subject mainly under two sets of conceptions, namely, price and hierarchy, and the market and the firm (Hennart, 1993). Following Williamson's conception of equating hierarchy with the firm (Williamson, 1975), most of the existing theories treat markets and hierarchies, and therefore the market and the firm, as two opposites in organising economic activities. It is basically held that the market uses the price system to organise transactions between firms, and that the firm organises internal activities via hierarchy.

It follows that market based transactions will be most efficient in organising exchanges when the market is perfect. Under such a condition, price signals operate in a low-cost manner to transmit information about costs of production and distribution and the values of resources in alternative uses. In other words, in a perfect market it is the price mechanism, a function of supply and demand, that organises the economy more effectively. Here, firms, in neo-classical theory, are merely production units that result from demand for a product and from the economies of scale needed to produce that product efficiently.

However, the costs of organising and monitoring market transactions become quite high where the market is not perfect. Unfortunately, contrary to what neo-classical theory presumes, market imperfection is normal, and perfect markets are the rare exception. First, the quality of competition cannot be maintained where the transaction requires investment in assets specific to the deal. The parties are then stuck with each other and the discipline of competition is lost. Secondly, the transaction becomes more complex where the exchange of information and knowledge is involved. Information asymmetry between the transacting parties and difficulties in describing the trading object may hinder the proper monitoring of the transaction. Thirdly, it is impossible to specify contract terms satisfactorily when the future is unpredictable.

When the two parties to a transaction are within the same firm, i.e., under common governance of hierarchy based on common ownership, difficulties stemming from market imperfections can be overcome and therefore transaction costs due to the existence of market imperfections can be avoided. This occurs for two reasons. First, by bringing assets specific to each party of the transaction under common ownership, the firm is able to provide a central contracting agency for the multitude of resource owners (of labour and capital) to well define the products, process and task. Second, common ownership also enables the firm to centralise the monitoring function which is needed to prevent shirking and maintaining quality.

By introducing the differences in transaction efficiency for different trading objects into the analysis, Cheung (1983) makes a further clarification about the nature of the firm: the institution of the firm replaces the market for intermediate goods with the market for labour that is hired to produce the intermediate goods. By formalising and developing Cheung's idea, Yang and Ng (1995) show that a firm is a structure of residual rights between trade partners such that one party (the employer) has the authority to allocate the labour of the other party (the employee) and claims the residual of the contracts between the two parties that specify the payment for labour of the employees. The institution of the firm can be used to include in the division of labour the activities involving intangible outputs and effort inputs, for which the pricing efficiency is prohibitively low. By doing so, the direct pricing and marketing of these activities can be avoided, and therefore the transaction costs are reduced and the division of labour is promoted.

While the properties of the market and the firm as well as their related transaction have been explored extensively by economists, there is relatively little exploration of the location of economic activity, another crucial feature of economic organisation. Due to various reasons, the market is not universal and homogenous, but consists of different markets at different locations for different factors and products, and economic activity can take place in different regions, including at home and abroad. In addition, the firm is not deemed to be a single-plant production unit with all firm activities in a single location. The multinational enterprise (MNE), the main subject of FDI and a consequence of such investment, illustrates this feature.

The multinational enterprise is a firm which controls and manages production establishments - plants - located in at least two countries (Caves, 1996, p.1). In the perspective of economic organisation, the institution of the MNE involves not only the classical question of the boundary between the administrative allocation of resources within the firm and the market allocation of resources between firms, but also the question of the geographical setting of the boundary between the firm and the market as well as the question of the form of hierarchy. It is an important issue in economic organisation why multinationals expand their administrative boundaries internationally rather than domestically. A related issue is why some firms expand their administrative boundaries internationally but others do not. In principle it is natural that, in a market economy, entrepreneurs are free to displace market transactions by increasing the scope for allocations made administratively within their firms, and the most profitable pattern of enterprise organisation should ultimately prevail. Where more profitable results can be obtained from placing plants under common administrative control, there multi-plant enterprises will predominate and single-plant firms will merge or go out of business. But it is not as certain about the mechanisms for the situation where multi-plant firms prevail. Often it is claimed that the joint-input property of intangible assets plays a vital role in the emergence of multi-plant enterprises. It is further less certain in the literature about the prevalence of multi-plant transnational enterprises, i.e., multinational enterprises, which involve more than one economy and market conditions vary between economies. The main difficulty in generalising FDI and MNEs stems from the high complexity of multinational operations and diversity in market conditions among countries, which complicate the story enormously.

Peter Buckley and Mark Casson (1976) argue that MNEs exist because the transaction cost of doing business through an internalised network of wholly owned subsidiaries is in many cases lower than that of arm's length relationships. Their argument is based on the observation that modern production is a process involving the participation or input of various units, with each specialising in a different aspect of economic activity, such as manufacturing, marketing, research and development, human resource development, procurement, and management of financial assets. These units are interdependent, and the process forms a value-added chain by a flow of tangible intermediate products including materials, components and semi-finished goods and intangible and knowledge-based intermediate goods such as patents, engineering expertise, management and marketing skills, and quality control. Market imperfections arising from information asymmetries and asset specificity make it difficult and inefficient to use the market to organise transactions of intermediate products. The cost-saving efficiency of exchange and transaction through a hierarchy urges firms to bypass the market and create an internal "market" that brings the related intermediate product markets and production under common ownership and control. The MNE is therefore the result of the process of internalisation of markets of reaching across national boundaries.

Obviously, the internalisation theory of FDI and MNEs falls short of explaining why firms have to invest abroad to bypass the external market rather than investing at home for the same purpose. In addition, research in this stream "was often (at best) partial equilibrium in nature and focused on individual firms rather than on explaining the pattern of direct investment in relation to country and industry characteristics" (Markusen and Maskus, 1999, p.2).

1.1.2. FDI and division of labour

The division of labour is a core issue in classical economics. Adam Smith attributes overwhelming importance to the division of labour. He maintained that capital accumulation, division of labour, and foreign trade are the sources of a nation's economic growth. The division of labour improves the efficiency of labour; and increasing specialisation leads to rising per capita income. By extending the division of labour, improvements in production reduce the amount of input per unit of output. Smith also

notes that the division of labour depends upon the extent of the market:

[T]he division of labour is limited by the extent of the market.... When the market is very small, no person can have any encouragement to dedicate himself entirely to one employment, for want of the power to exchange all that surplus part of the produce of his own labour, which is over and above his own consumption, for such parts of the produce of other men's labour as he has occasion for (Smith, 1776, pp.27-28).

Allyn Young has developed Smith's observation and argues that the extent of the market also depends upon the division of labour. Not only is supply a function of market size, but demand is also a function of the level of division of labour (Young, 1928). In other words, the division of labour increases wealth, which, in turn, widens the market (stimulates demand), enabling the division of labour to be carried further forward. Therefore the extent of the market and the division of labour go hand in hand.

For centuries international division of labour was essentially carried out indirectly through arm's length trade in goods. This is a process of the internationalisation of commercial capital (Martinussen, 1997), in which the productive forces are extended and the potentialities of an international division of labour are fully exploited. Though this process essentially calls for the adjustment of domestic industrial structures and inter-industry patterns, it does not imply *per se* a serious reduction in the cohesion of national productive systems.

However, the situation has been changing since the late 19th century when FDI began to play an ever-increasing role in the world economy. "By 1914, FDI, which is the modality by which a package of resources and capabilities are transferred across national boundaries within the same firm, had already begun to assume some importance in linking national economies - particularly between the Metropolitan countries and their colonies, and between the North American and European economies" (Dunning, 1997, pp.17-18). Since the mid-20th century the dominant role of trade in the international division of labour has been giving way to FDI, the so-called internationalisation of productive capital.

The classical division of labour through trade implied that the developing countries almost exclusively exported raw materials to the industrialised countries. In exchange they received the processed goods which were manufactured in the industrialised countries. When FDI began to play a role in the world economy, changes took place to that pattern of the division of labour. When firms from industrialised countries establish production in developing countries, those firms can serve the local markets and therefore promote import substitution in the host countries. This was the case in Latin American countries and a few Asian countries during the period from the world wars to the 1970s. FDI from developed countries in developing countries may also be intended to promote exports to the world market. In the perspective of industrialisation in the host developing countries, this is the export-oriented strategy. The direction of the division of labour established by such FDI is quite different from the classical pattern of the division of labour which characterised as developed countries the exporters of industrial goods and as developing countries the exporters of raw materials. In short, the relocation and establishment of industry by MNEs from developed countries implies a considerable change in the international division of labour, as some developing countries began to export industrial goods (Martinussen, 1997, p.115).

The role of FDI in the international division of labour is far beyond just helping developing countries become exporters of manufactured goods. When created assets become more important in determining national comparative advantages, FDI aimed at exploiting firm-specific assets and acquiring strategic resources can find a suitable investment environment in developed countries. As a consequence, North America, the EU and Japan are not only the main investors, but also the main destinations for FDI: more than 80 per cent of world FDI is directed to industrialised countries (Graham and Krugman, 1991; Markusen, 1995). In fact, FDI from developing countries, for instance, China¹, also takes developed countries as its major destination. Unlike trade, FDI strongly affects the cohesion of national productive systems; and the growth of FDI implies that it is the firm rather than the national state that is playing an ever-growing role

¹ China's outward FDI is heavily concentrated in the United States, Canada and Australia, each accounting for 15, 14 and 13 per cent, respectively, of China's outward FDI during the 1979-1998 period (MOFTEC, 1993-1999).

in organising the international division of labour.

A notable feature of FDI's role in the division of labour is the MNE internalised international division of labour via FDI. Here the hierarchy of the MNE replaces the market in the organisation of division of labour. In contrast to the division of labour by arm's length trade, the internalised international division of labour depends on the extent of the intra-firm "market", which essentially depends on technical progress determined by the division of labour. As a result of rapidly growing FDI and MNE activity, MNEs' internal trade, which mainly reflects the intra-firm international division of labour, is impressive in volume. MNEs' internal trade alone accounts for about 1/3 of world trade and their combined internal trade and related public market trade account for about 2/3 of world trade (UNCTAD, 1999).

Internalised international division of labour forms cross-border specialisation within the firm. There are three types of cross-border specialisation. The first is horizontal specialisation whereby the same products supplied by the same firm are produced in different countries. The second is vertical specialisation whereby different parts of the value added chain are produced in different countries. And the third type of specialisation is asset-augmenting specialisation which is a mixture of horizontal and vertical specialisations but with more emphasis on enhancing the firm's future wealth-creating capabilities in a learning-effective and cost efficient way. While horizontal specialisation is mainly between countries with similar development level, vertical specialisation is predominantly between countries with different development levels, and asset-augmenting specialisation is located around developed countries. Nevertheless, MNEs are predominantly vertical in nature, as the "slicing up of the value added chain" involves relocating the relevant parts of the production process to countries which are abundant in relevant labour (Krugman, 1995). The contemporary concentration of FDI in developed countries reflects the fact that the division of labour in its advanced state has now extended to what Casson (1988) calls a "division of thought", i.e., advanced intellectual specialisation, which can easily find the technical base in developed countries.

Nevertheless, as Yang (2001, pp.10-11) indicates, the division of labour has been essentially ignored since Walras and Marshall, and the interdependence between the

division of labour and FDI attracts little attention in mainstream economics. Correspondingly, FDI has been approached without considering the associated division of labour in the literature of FDI. Except for a few odd scraps in describing multinational activities, the division of labour is excluded from the existing models and theorems of FDI and MNEs, no matter whether they are general equilibrium models or partial equilibrium models.

1.1.3. Research on FDI

It is generally acknowledged in academia that FDI has evolved into a distinct field of study since the 1960s, after rapid expansion of FDI and the related activities by MNEs during the post-war period had fundamentally altered the pattern of the world economy, attracting attention to the newly raised issues which could not be fully explained by established economic theory.

The literature on FDI basically developed along two broad lines. One is the *general equilibrium* approach which applies the macroeconomic framework initially based on the neoclassical theory of international trade, and the other is the *partial equilibrium* approach which applies the tools of micro-economics based on the theory of the firm.

The international trade approach to FDI has two basic types. One is the conventional type, based on the framework of the Heckscher-Ohlin trade model. Its perspective sets out from differences in factor endowments between countries and emphasises the influence of factors external to an MNE such as the size and growth of relevant countries and government policies like tariffs, domestic taxes, and labour laws on the MNE investment decision. Another type of the international trade approach investigates FDI in the framework of the "new trade theory" which has incorporated features of increasing returns to scale, imperfect competition, and product differentiation into traditional general equilibrium trade models.

Contrary to the trade approach, the firm-oriented approach develops basically within the framework of imperfect competition, addressing questions such as: why do firms undertake investment abroad to produce the same goods that they produce at home? The focus of the analysis of this approach is the MNE itself. Though views of different

economists within this approach vary, a common theme in this literature is that "firms investing abroad represent a distinctive kind of enterprise" (Blomström and Kokko, 1997).

As the focus of the general equilibrium approach is basically directed to factors external to the MNE, the explanatory power of theories of this approach is limited by its failure to look at MNEs as a distinctive kind of enterprise (Caves, 1996, p.118). For instance, failure to consider the MNE's internal organisation of international activity easily leads to the hypothesis of a substitute relationship between trade and FDI (for example, Mundell, 1957). This is a simplistic argument which faces theoretical and empirical challenges (Blomström and Kokko, 1994). In contrast, theories of the partial equilibrium approach to FDI are relatively weak in explaining external factors in determining FDI and multinational activities.

It is worth noting that the conceptual literature on FDI was developed at a time when US and British multinationals dominated FDI and globalisation was much less important than it is today. To a great extent it reflected economists' preoccupation with the pattern of worldwide FDI and the international economy as well as domestic market economies in these countries. As at that time these economies were in an unchallenged position internationally, and big companies with most advanced technology and management dominated FDI, the conventional theories are essentially supply-side focused. Abundant capital and superior technology (of investing countries and firms) are the most frequently mentioned terms in the literature, while only "few sharp tests have been devised to distinguish" demand-side FDI (Caves, 1998). As a result, conventional theories, especially the firm-oriented ones, often implicitly or explicitly stress the critical even decisive role of absolute or comparative technological advantage in foreign investment. Examples include Hymer (1960), Vernon (1966), Dunning (1977), and Casson (1979). Changes in the world economy have largely destroyed the boundaries of domestic economies and blurred the boundaries of firms. The facts that FDI from less developed countries (including developing countries) to more developed ones has expanded rapidly, and that small-sized firms actively engage in FDI have made some former conceptions and explanations appear anachronistic.

1.2. Contents of the Thesis

1.2.1. A brief summary of the thesis

The main body of this thesis consists of four chapters. While Chapter 2 presents a survey of previously developed theories of foreign direct investment, the other chapters try to break new ground in explaining the phenomenon of FDI by using inframarginal analysis.

Following Cheung's idea that the firm replaces the market for intermediate goods with the market for labour (Cheung, 1983), and drawing on the Yang-Ng (1995) model of the firm, Chapter 3 develops a Walrasian general equilibrium model of FDI to capture the mechanisms for the emergence and development of FDI by using inframarginal analysis. It yields rich findings regarding the organisation of FDI and other international activities. It shows that foreign direct investment is a form of organising international activity and division of labour. Via FDI the investing firm indirectly prices intangible intermediate goods in the context of the international economy by expanding the firm's governance boundary to the host country. When other factors are given, high transaction efficiency for ordinary labour (or all factors other than the indirect pricing ones) in the host country and high transaction and transfer efficiencies for professionals (including all factors related to the indirect pricing) from the home country encourage FDI flows from the home country to the host country. The relationship between FDI and trade in final goods and in intermediate goods (e.g., foreign licensing) is determined and shaped by the transaction efficiencies for goods and factors within and between the two countries.

The approach of inframarginal analysis adopted in developing this model makes it different from the mainstream theorems in the literature of FDI. So far there is a lack of general equilibrium models in the existing theories of FDI. The awkwardness of partial equilibrium approaches and descriptions has greatly affected the expressions of some original ideas. This in turn has affected the exploration of the changing pattern of FDI in the era of globalisation and knowledge economy. Our model contributes to methodology and theory in changing this situation.

On the other hand, this model incorporates various structures ranging from individual autarky in a closed economy to a high degree of international division of labour in an

open economy. This enables the research on FDI to have a wide perspective and integrated view.

Some extensions of our model can be made without much difficulty to trace specific relationships between selected structures for specific purposes of analysis. For example, the integrated relationships between FDI and trade and empirical studies in such a framework is of interest. In addition, this model can incorporate hybrids of structures into the analysis when a few of such structures are added to the candidates of choices.

Chapter 4 investigates the determination of the size of FDI (inward or outward alike) of a country within an inframarginal model which is based on the model established in Chapter 3. This model endogenises the following phenomena. There are three types of international economic activity, i.e., international trade in final goods, export of intermediate goods (including international technology transfer, and international movement of technical expertise), and FDI (overseas production). The equilibrium organisation pattern of international activity is a function of both countries' characteristics regarding endowments, trading efficiencies and production specialisation of different goods as well as international factors affecting the international movement of factors and goods. Difference in the same type of variables between two countries and difference in different but related variables in the same country form the basis for the international division of labour as well as for specific types of organisation of international economic activity. FDI is the most complex organisation of international economic activity in the sense that besides overseas production it also involves international trade of final goods and international movement of intermediate goods. It therefore would be affected by more variables than the other two types of international activities. A country's outward FDI would be larger in relative volume if the intermediate goods as input for overseas production are less difficult to produce. In such a case the home country can realise scale economies in the production of the intermediate goods, and knowledge capital has a joint-input property. In addition, better conditions for the international movement of technical and managerial experts would also facilitate the expansion of FDI flows between countries.

The model has generated a clear picture of the determinants of the size of FDI and the precise functioning of those determinants. It shows that the relative volume of FDI is

highly susceptible to these sets of influences:

- The transaction efficiency for final goods and ordinary labour in the host country;
- The international transfer efficiency of managerial and technical professionals; and
- The transaction efficiency for managerial and technical professionals in the home country.

Improvements in any of these transaction and transfer efficiencies lead to an expansion of FDI. Conversely, difficulties in the production of intermediate goods, transaction efficiency for intermediate goods at home, as well as international transaction efficiency for traded goods affect FDI negatively.

These results confirm some acknowledged arguments in the existing literature of FDI and trade about the determination of FDI and its relationship with trade. They dispose of some views inconsistent with each other due to the narrower focus in reaching these views in the existing literature. For instance, Mundell's argument that FDI eliminates the basis for trade between the two countries (Mundell, 1957) is exposed as incomplete. Our analysis instead shows that even though FDI results in the contraction at home and expansion in the host country of the industry in which FDI takes places, as Mundell claims, FDI brings about a new pattern of the division of labour which lays a new basis for trade between the two countries, and the volume of trade occurs on a scale corresponding to the volume of the FDI.

Chapter 5 explores the rationale for the emergence and development of China's outward FDI, which has exhibited some features that defy the existing mainstream theories of FDI. It is generally acknowledged in the literature that FDI from a developing country is most likely to be directed initially to its neighbouring developing countries, and to grow gradually in volume and distance. The alleged reasons are that FDI is based on firm-specific advantages to overcome disadvantages faced by FDI subsidiaries in the host country, and that firms from developing countries are relatively weak in international competitiveness. Therefore, FDI from developing countries in its early stages should choose countries with economic, cultural and geographical proximity as the destination so as to bypass or reduce the disadvantages. Only after they have gained international experience through overseas operations and consolidated firm-specific advantages can

these firms invest on a relatively large scale in countries which are distant both in geography and in terms of economic development (Dunning and Narula, 1996; Riemens, 1989; Tolentino, 1993). However, this prognosis stands in sharp contrast to the empirical record of China's outward FDI, which developed rapidly after the first few years and is concentrated heavily in a few developed countries, i.e., the United States, Canada and Australia.

One of the motives of this chapter is to test the propositions advanced in previous chapters about the determination of FDI and its size against empirical evidence from China's outward FDI. The results of the analysis show that the growth and geographical distribution of China's outward FDI are essentially determined by the changing transaction conditions for labour and goods at home relative to host country transaction conditions, and by international transaction and transfer conditions between China and host countries. The results support our findings in previous chapters, and they answer awkward questions about the specific characteristics of China's outward FDI that puzzled existing theory

1.2.2. Contributions of the research

FDI behaviour and the investment environment today are quite different from that of a century ago. Cross investment between developed countries has replaced the traditional North-South investment flows as the predominant pattern. Developing countries have joined actively the rank of investors, and developed countries are important recipients of FDI from developing countries. In spite of these changes, the essential issues are still related to economic organisation, a topic that has attracted increasing academic attention since Coase (1937). When a market expands to cross partially national borders in the process of globalisation, hierarchy and the firm evolve new forms, and methods of economic organisation may also have innovative ways. Specifically, when investigating the rationale for FDI one should consider that international economic organisation is not only affected by home market conditions but also by host country conditions as well as international conditions. It is unreasonable to include only host country conditions in the analysis, and it is also unreasonable to ignore the difference in transaction conditions between countries. Above all, it is not reasonable that the investigation of the rationale

for FDI ignores the issue of the division of labour, an ultimate driving force of economic development and a crucial determinant of the extent of the market.

The two models of this thesis make efforts to improve our understanding of FDI by shedding light on these factors. For that purpose we adopt the Yang-Ng (1993) framework of inframarginal analysis, a method of total cost-benefit analysis across corner solutions in addition to the marginal analysis of each corner solution. This method enables the models not only to mathematically formalise the problem of resource allocation, but also simultaneously to formalise the problem of economic organisation, that is, the problem of finding the efficient level and pattern of division of labour in order to reduce scarcity by trading off productivity gains against transaction costs. The latter issue involves possible corner solutions which are beyond the capability of marginal analysis. The method of inframarginal analysis has increasingly been adopted by economists in interpreting domestic economic issues and international trade. This analysis has yielded rich findings, for instance, the Yang-Ng (1995) model of indirect pricing and the Cheng, Sachs and Yang (2000) analysis of the Ricardian Model. Nevertheless, to our knowledge our models are the first to use inframarginal analysis to address the issue of the international firm and FDI. When the institution of the international firm is integrated into the analysis, a whole spectrum of methods of economic organisation ranging from individual autarky in a closed economy to the cross-border firm of an open economy is covered. In this respect, the models have not only made methodological contributions but also shed light on historical evolution of economic organisation besides FDI.

The two models can be regarded as unified supply-demand models, for they also integrate macro- and microeconomic issues as well as the characteristics of two countries associated with FDI and the MNE. This fills the gap in the existing literature that results from the demarcation between macro and micro approaches and the dominance of supply-side approach in the mainstream theory of FDI. As indicated earlier, research on FDI develops basically along macro and micro approaches, with the former stressing issues external to the MNE and the latter focusing on variables within the firm. Though these two approaches have drawn on conceptions and ideas from each other in their later development, the difference in focus of analysis has limited the extent of explanation of

the resulting theories. The micro-analytic approach, the most deep-going one in the literature of FDI, is valuable for understanding firm behaviour in FDI and multinational activity. It falls short of explaining the related macro issues, such as the impacts of FDI and the relationship between trade and FDI flows of a country which has become increasingly unclear (Gaston and Nelson, 2001, p.12). Conversely, the explanatory power of the macroeconomic general equilibrium framework is constrained by its failure to address the internal variables of the firm, which have replaced the national state as the predominant player in the international division of labour in the era of globalisation.

The models of the present investigation have endogenised international economic structures and international division of labour by adopting the approach of inframarginal analysis. They have also been able to overcome the weaknesses caused by the dominance of the descriptive methodology in the existing literature on the general theory of FDI. The analysis has generated some succinct hypotheses about the determination of FDI and the precise functioning of the determinants, mainly transaction efficiencies for different goods and factors in different countries.

This thesis has also explored the case of China in developing outward FDI by applying our findings from the analytical models. China's outward FDI has only a very short history, and statistical evidence is correspondingly sparse. Detailed comprehensive data, especially on industrial composition and overseas subsidiaries' operation, are not available. The unavailability of detailed data on China's FDI has ruled out the possibility of econometric analysis. However, the qualitative analysis clearly shows that changes in transaction efficiencies for different goods and factors in China in the process of economic reform and transaction efficiencies in the relevant host countries are consistent with the growth and geographical distribution of China's outward FDI, as predicted by our theory.

2. Theories of Foreign Direct Investment: An Overview

This chapter provides a survey of existing theories of foreign direct investment, as background for the development of formal models and their application to China's outward FDI.

2.1. *Research on Foreign Direct Investment*

Foreign direct investment is the major mode by which investors, normally firms, extend their span of control of business activities internationally via acquisition or establishment of overseas enterprises². It differs from international portfolio investment by involving the international transfer of a package of factors in addition to financial capital and by conferring a significant degree of influence over the foreign enterprise of the investing firms.

Foreign direct investment has a long history. In the seventeenth century, firms headquartered in London and Amsterdam began to acquire productive assets abroad. The Hudson Bay Company was engaged both in marketing abroad and in the acquisition of raw materials for the English market, while the Dutch East India Company marketed and sourced in what is now Indonesia³. However, FDI only played a relatively minor role in the international economy until the first rapid expansion during the period between the

² For formal definition of FDI see United Nation (UNCTAD, 1996, p.219) based on OECD (1992) and IMF (1993): "Foreign direct investment is defined as an investment involving a long-term relationship and reflecting a lasting interest and control of a resident entity in one economy (foreign direct investor or parent enterprise) in an enterprise resident in an economy other than that of the foreign direct investor (FDI enterprise or affiliate enterprise or foreign affiliate). Foreign direct investment implies that the investor exerts a significant degree of influence on the management of the enterprise resident in the other economy". Theoretically, foreign direct investors include individuals and public institutions as well as firms. FDI by individuals and public institutions is normally not separately stressed in conventional analysis as it is very limited in volume and importance. The present investigation adheres to that tradition.

³ Mira Wilkins even traces the antecedents of FDI back to 2500 B.C. when Sumerian merchants found in their foreign commerce that they needed men stationed abroad to receive, to store, and to sell their goods (Wilkins, 1970, p.1).

late 19th century and the early 20th century, which was soon destroyed by the two world wars and the 1930s' Depression. The situation changed tremendously after World War II when FDI from developed countries expanded rapidly (Table 1): from the late 1950s until 1967 a boom in FDI occurred which was fuelled largely by the international expansion of the activities of US-based manufacturing and petroleum firms (Graham, 1997, p.100). This boom led to steady development of FDI afterwards.

Table 1 Estimated accumulated stock of FDI by country of origin
(US\$ billion, figures in italics are % of world total)

	1914	1938	1960	1971	1978	1980	1990	1998
Developed countries	14.3	26.4	66	168.1	380.3	499.7	1640.7	3714.9
	<i>100.0</i>	<i>100.0</i>	<i>99.0</i>	<i>97.7</i>	<i>96.8</i>	<i>97.4</i>	<i>95.7</i>	<i>90.2</i>
US	2.7	7.3	32.8	82.8	162.7	220.2	435.2	993.6
	<i>18.5</i>	<i>27.7</i>	<i>49.2</i>	<i>48.1</i>	<i>41.4</i>	<i>42.9</i>	<i>25.4</i>	<i>24.1</i>
Canada	0.2	0.7	2.5	6.5	13.6	23.8	84.8	156.6
	<i>1</i>	<i>2.7</i>	<i>3.8</i>	<i>3.8</i>	<i>3.5</i>	<i>4.6</i>	<i>4.9</i>	<i>3.8</i>
UK	6.5	10.5	10.8	23.7	50.7	80.4	232.6	498.6
	<i>45.5</i>	<i>40</i>	<i>16.2</i>	<i>13.8</i>	<i>12.9</i>	<i>15.7</i>	<i>13.6</i>	<i>12.1</i>
Germany	1.5	0.4	0.8	7.3	28.6	43.1	151.6	390.1
	<i>10.5</i>	<i>1.3</i>	<i>1.2</i>	<i>4.2</i>	<i>7.3</i>	<i>8.4</i>	<i>8.8</i>	<i>9.5</i>
France	1.8	2.5	4.1	7.3	14.9	18	110.1	242.3
	<i>12.2</i>	<i>10</i>	<i>6.1</i>	<i>4.2</i>	<i>3.8</i>	<i>3.5</i>	<i>6.4</i>	<i>5.9</i>
Developing countries	neg	neg	0.7	4	12.5	13.4	73.1	391.1
			<i>1</i>	<i>2.3</i>	<i>3.2</i>	<i>2.6</i>	<i>4.3</i>	<i>9.5</i>
World total	14.3	26.4	66.7	172.1	392.8	513.1	1714.1	4117.1

Source: 1914-1978: Dunning (1983), p.87; 1980-1998: *World Investment Report* 1999.

Rapid expansion of FDI and related activities by multinational enterprises since the 1950s fundamentally altered the pattern of the world economy, giving rise to new realities that remained unexplainable within established theories. To deal with this change, two new broad approaches have been developed. One is the macroeconomic approach by mainstream economists who attempt to adapt the neoclassical theory of international trade. This approach to FDI develops basically within the framework of the Heckscher-Ohlin trade model. The perspective of this approach sets out from differences in factor endowments between countries and emphasises the influence of factors external to the multinational enterprise. These range from size and growth of relevant countries to government policies like tariffs, domestic taxes, and labour laws. The other is the microeconomic approach which is grounded in the theory of the firm. This approach to FDI develops basically within the framework of imperfect competition. It addresses the

basic question why firms undertake investment abroad to produce the same goods as they produce at home. Though views of different economists within this approach vary, the basic point is that "firms investing abroad represent a distinctive kind of enterprises" (Blomström and Kokko, 1997).

It is worth noting that these two broad approaches in their later development have borrowed concepts and ideas from each other and from other disciplines rather than remaining totally independent of each other. The line of demarcation between FDI theories based on the trade theory approach and on the firm-oriented approach is not clear cut.

It is generally acknowledged in academia that Hymer's doctoral dissertation, "The International Operations of National Firms: A Study of Direct Foreign Investment" (Hymer, 1960), is a path-breaking work that marks the beginning of the study of FDI as a separate field⁴. Before then, FDI was grouped with portfolio investment or firm investment in general; no special attention was given to explaining the relative importance of these two types of foreign investment, or of the distinction between investment at home and abroad⁵. Since then, the literature on FDI has grown in volume and sophistication. This growth has roughly taken place in three major waves. The first wave (before early 1970s) created the foundation of the field and set the framework for the analysis; the second wave (mid-1970s to 1980s) elaborated, extended and tested the basic ideas; and the third wave (1990s-) focuses on the changing patterns of FDI.

⁴ However, Buckley (1997, p.219) holds that Dunning's 1958 work on foreign investment in British manufacturing industry is a milestone in the development of the subject. In this respect Hymer was fortunate in being able to draw on this work.

⁵ Up to that time, three main approaches to the phenomenon of FDI seemed to dominate the literature: (1) Different interest rates. Ohlin (1933) holds that international capital movements occur in response to the different interest rates prevailing in those countries. Interest rates would vary according to the differences in factor endowment ratios of labour and capital. As capital moves from low-interest to high-interest countries, equilibrium is achieved. (2) Exchange risk premium. Aliber (1970) argues that there are risk premiums in the international equity markets designed to cover uncertainty about the exchange risk on shares bought in weak-currency countries. These premiums do not apply to foreign-owned (therefore hard-currency country) subsidiaries that operate in soft-currency countries. (3) Internally financed growth. Kindleberger's (1973) early explanation holds that foreign direct investment results from both the expansion of a firm's market and its use of internally generated funds. When firms attempt to maximise their sales' growth rates, they have to set up plants wherever large markets exist. As the internally generated funds are cheaper than externally raised funds, they should be used for expansion.

In the last decade or so, research on FDI has been spurred on by developments in the practice of FDI and multinational enterprises as well as relevant economic theories and approaches. On the one hand, the acceleration of economic globalisation and knowledge-based economy and the more rapid growth of some economies have been changing market scopes and competition in the world. As a result, MNEs are inclined to take a global perspective. In adopting global strategies, MNEs from different countries penetrate into markets of each other. As services and technology play an increasingly important role, international economic activity is organised in innovative ways and motivations for FDI are becoming increasingly complex. At the same time, FDI from developing countries expands. On the other hand, progress has been made in economic analysis during the past decades. For example, the new trade theory has been advanced by incorporating market imperfection into traditional general equilibrium trade models. Such progress supplies economists and business researchers with new approaches or an improved theoretical basis for the analysis of FDI.

2.2. *Macroeconomic Theories of FDI*

Macroeconomic theories approach FDI in a framework essentially based on neoclassical economics, based on the critical assumptions of profit maximisation and a perfectly competitive market. They offer an explanation of FDI flows when certain aspects of market imperfections are recognised.

2.2.1. *Factor-endowments approach*

Factor-endowment approach can be traced back to an analysis by Robert A. Mundell (1957), which shows how a prohibitive tariff would induce capital movement from a capital abundant country as a substitute for trade in goods. This capital movement causes the equilibrium production point in the capital receiving country to shift in such a direction that the capital-intensive industry (i.e. that country's comparatively disadvantaged industry) expands while the less capital-intensive industry (i.e. that country's comparatively advantaged industry) contracts. This pattern of output change is predicted by the well-known Rybczynski theorem (1955). Exactly the opposite phenomenon is observed in the capital investing country. As a consequence, the basis for

trade, that is, the existing pattern of comparative advantage between the two countries, is progressively eroded by the capital movement.

Mundell's argument implies that the same equilibrium in terms of commodity prices, factor prices and welfare can be achieved by trade in goods or by FDI. It follows that FDI is attributable to the imposition of prohibitive barriers to trade. This is obviously inconsistent with empirical observation: the last decades have witnessed both enormous growth of FDI and reduction in trade barriers manifested in the rapid progress towards regionalisation and globalisation. The weakness of Mundell's argument is that he shows FDI in the context of a two-by-two Heckscher-Ohlin model with zero trade costs in both goods and factors as well as identical technologies in the two countries. Cheng, Sachs and Yang (1999) show that it is transaction efficiencies rather than endowments that play a critical role in determining the range of the international division of labour and therefore the trade pattern between two countries. With increasing improvement in transaction efficiencies, the general equilibrium jumps from autarky to partial international division of labour and further to complete division of labour between two countries. There are two preconditions for a capital abundant country to export capital-intensive goods. One is that the transaction efficiencies in both the exporting and importing countries are sufficiently high. Another is that the exporting country has no comparative technological disadvantage in producing the capital-intensive goods, or even if it has, the country's technological disadvantage is dominated by its comparative endowment advantage. Their claims imply that it is transaction conditions that determine the emergence of FDI between countries as well as the nature of the relationship between FDI and trade. The relationship represented by Mundell is an extremely special case under the condition that the transaction efficiencies in the two countries are not too low and most likely the home country also has comparative technological advantage in the investing sector.

Also focusing on the relationship between FDI (or factor movement) and trade, Kiyoshi Kojima (1978) advances a different theorem to explain Japan's foreign investment in manufacturing. According to Kojima, there are two types of FDI, namely anti-trade-oriented FDI and trade-oriented complementary FDI. If outward FDI occurs in the industry with internationally comparative or monopolistic advantage, this FDI is trade substitute, which means it will result in contraction of export of this industry's goods as

the production moved abroad by the FDI will reduce foreign country's import of these goods. The basic conjecture is that comparatively advantaged industries should serve foreign markets by exports rather than by FDI. Conversely, if outward FDI takes place in the industry where the home country has been losing international competitive advantage, FDI will contract home production of this industry further. Factors thus released can contribute to the expansion of industries with ever-growing international comparative advantage. For the host country, the first type of FDI may contribute little to or even worsen the national economy if the invested industry is the disadvantaged one. However, as the host economy is less developed than the home economy, it is likely to possess comparative advantage in the less capital-intensive industry. With inward FDI, the host country's production frontier expands in such a direction that that country's comparatively advantageous industry expands while the capital-intensive industry, i.e. that country's comparatively disadvantaged industry, contracts. The result is an enhancement of the basis for trade. So FDI may promote free trade and mutual prosperity if it facilitates relocation of production corresponding to the international shift of comparative advantages.

In contrast to Mundell, Kojima has included in the context of analysis the technological comparative advantages in the formation of FDI. However, he still ignores the critical role of transaction efficiencies in FDI and trade. Therefore, his theorem cannot answer if the investing country (Japan) would still invest in countries where the transaction efficiencies are too low to sustain inward FDI. It also fails to answer the rationale for cross investment between developed countries within the same industries, and for investment from developing countries in developed countries.

In the framework of the new trade theory, James Markusen *et al* (Markusen *et al*, 1996; Markusen, 1997) advance a "knowledge-capital model", which interprets motivations for horizontal and vertical investment and foreign affiliates' pattern of production for local markets versus production for exports as functions of country characteristics such as market sizes, size differences, and relative endowments differences. This model sets out from three assumptions: (1) services of knowledge-based and knowledge-generating activities, such as R&D, can be geographically separated from production and supplied to production facilities at low cost; (2) these knowledge-intensive activities are

skilled-labour intensive relative to production; and (3) knowledge-based services have a (partial) joint-input characteristic: they can be supplied to additional production facilities at low cost. The first two characteristics give rise to vertical multinational investment and the last one gives rise to horizontal investment. This model suggests that the volume of FDI from a source country to a host country is a function of the sum of their economic size, their similarity in size, the relative abundance of skilled-labour of the source country, and the interaction between economic size and relative endowment differences.

This model has captured more phenomena than Mundell's and Kojima's theorems do by integrating imperfect competition into the analysis. However, it fails to identify the economic meaning of national economic size in determining FDI and trade. In the meantime, it does not pay enough attention to the importance of transaction efficiency in determining international trade and FDI: it does not recognise differences in transaction efficiencies for different goods and factors within and between countries, even though it does include a variable called "trade costs". In addition, the assumption of international immobility of all factors is neither consistent with the conventional definitions about factors, goods and FDI, nor consistent with the economic reality. As a result of these weaknesses, this model contradicts some empirical observations. For example, the United States has a huge amount of oil extracting investment in some oil rich countries in the Middle East. However, that fact in no way implies that the United States and these countries are "somewhat similar in size" as the model claims⁶.

2.2.2. Product cycle and FDI

The investigation into the relationship between product life cycle and outward investment was started by Raymond Vernon (1966)⁷. This approach relates FDI and technology transfer by MNEs to the diffusion of innovations. Some researchers use this insight to demonstrate a similar relation between the development stages of a product and the

⁶ "Vertical multinationals dominate when the countries are sufficiently dissimilar in relative endowments but somewhat similar in size" (Markusen et al, 1996, p.28).

⁷ Vernon's product life cycle theorem uses a microeconomic concept - the product cycle - to explain a macroeconomic phenomenon: the foreign activity of US multinationals. It lies between or integrates the micro and macro analysis and therefore is not strictly within either of the two approaches.

number of firms producing it (Klepper and Graddy, 1990).

According to Vernon, FDI normally takes place in the course of the process of technology diffusion. Most inventions and innovations, the model assumes, are labour saving. Process innovations substitute capital for labour or reduce input requirements of labour relative to capital. Product inventions and innovations such as household durable goods substitute capital for labour in the production of utility within the household. The value of such inventions and innovations is therefore greatest in countries where wages and, therefore, the value of people's time, are highest relative to the use cost of capital. So inventions and innovations tend to be concentrated in high-income countries. Demand and supply forces tie in the early stages of production closely to the high-income geographical market. The buying power supports a strong take-up rate of the invention or innovation, while the ready supply of scientists, engineers and high-skilled workers facilitates improvements of the product as well as the process. High uncertainty, low price elasticities of demand, small market size, and low levels of competition are likely to prevail. Therefore, production as well as consumption of the invention or innovation sticks to the high-income market. As the invented or innovated process or product is progressing towards maturity, a growing number of imitators enter the competition for the higher profit of the new industry (or new product). In the meantime, large-scale production becomes technically feasible, reducing the real cost of production. This leads to exporting the product to other developed countries to meet the demand from local high-income consumers for the product. When competition becomes more intensified and the process or product becomes more standardised, the shift of production to low cost production locations overseas, normally first to other developed countries and later to developing countries, is both necessary and feasible.

Obviously, product cycle theory tells a special case of FDI, i.e., the FDI motivated by exploiting respective differentials in product and related process technology between countries. Therefore it cannot explain other types of FDI.

2.2.3. Dynamic position of foreign direct investment

Some economists attempt to explain the dynamic position of inward and outward FDI of a country in terms of stages of economic development. This approach can be traced back to

the thought about the relationships between foreign investment, the balance of trade, and the economic growth that stretched from J. E. Cairnes through F. W. Taussig and on to W. Arthur Lewis. They hold that there is likely a sequence whereby nations move from being immature debtors (with net borrowing and an import trade balance) to mature debtors (with net debt repayment and an export trade balance), to immature creditors (with net lending and an export trade balance), and last to mature creditors (receiving net debt repayment and running an import trade balance). Gordon quotes Taussig's classic account about how the process was supposed to have been played out in the United States in the nineteenth century:

The loan being made (in our assumed case) by British to Americans ... an excess of exports develops in Great Britain. ... In the United States an excess of imports gradually appears. ... The people of Great Britain send merchandise to the United States, and add to the tangible equipment of the Americans, or to their consumable goods, giving up for the time being some of their own possessions and adding to those of the Americans (Taussig, 1927, quoted from Gordon, 1961, p.37).

In a similar view, the *investment development path* (IDP)⁸ was advanced by John H. Dunning (Kumar and McLeod, 1981; Dunning, 1986) as an analytical framework to interpret the relationship between economic development and the FDI position of a country. This framework has been revised and extended in several papers and books (Narula, 1996).

The IDP theorem is empirically based on observation of the historical FDI evidence of many developing and developed countries and theoretically on Dunning's eclectic theory (see Section 2.3.1 below). The FDI position of a country "will rest on the extent and pattern of the competitive or ownership specific (O) advantages of the indigenous firms of the countries concerned, relative to those of firms of other countries; the competitiveness of the location-bound resources and capabilities of that country, relative to those of other countries (the L specific advantages of that country); and the extent to

⁸ The investment development path (IDP) was originally called investment development cycle (Dunning,

which indigenous and foreign firms choose to utilise their O specific advantages jointly with the location-bound endowments of home or foreign countries through internalising the cross-border market for those advantages, rather than by some other organisational route" (Dunning and Narula, 1997, p.1).

The IDP paradigm suggests that as a country develops, its international direct investment position tends to go through five main stages of development. The first stage is characterised by very low income levels (i.e. GDP per capita) and little or no FDI inflows. Neither domestic market nor resources (or particular, the created assets⁹) offer opportunity for corporate profits, nor do indigenous firms possess the necessary competitive advantages to undertake outward investment. As income and domestic demand rise, and local resource capabilities improve through education and training and by provision of more infrastructure, the country moves to the second stage, at which inward FDI of import substitution or resource-based activities occurs. Outward FDI emerges in this stage but remains restrained by the fact that indigenous enterprises have not generated sufficient ownership advantages of their own to overcome the barriers to foreign production. At the third stage, the country has the ability to undertake outward FDI at a relatively large scale, provided the government chooses to participate in the international specialisation of trade and production instead of promoting economic self-sufficiency. At the same time, the rate of growth of inward direct investment gradually decreases. When the country moves to the fourth stage, it becomes a net outward investor, "because the real costs of indigenous immobile resources become less favourable than those offered by other countries and/or because their comparative advantages become increasingly concentrated in the production of intermediate products such as management and organisational skills, advanced technology, information, etc, which are easily transferable abroad" (Dunning, 1986). However, there is a possibility that the country moves further to the fifth stage, in which a re-convergence of outward

1986).

⁹ According to Dunning (1994; Dunning and Narula, 1997), resources can be grouped into two categories: (i) *natural assets* consisting of the "fruits of the earth" and the stock of unskilled labour; and (ii) *created assets* which are those derived from the upgrading of natural assets. The latter assets may be tangible or intangible, and include capital and technology as well as those pertaining to skilled labour, such as technological, managerial and organisational expertise.

and inward investment flows emerges due to the growth of intra-industry rationalised FDI. The intra-industry rationalised FDI itself is based not primarily on factor endowments but rather on the advantages of internalising international markets. The five stages and the changing pattern of the net outward investment (e.g., outward FDI minus inward FDI - NOI) position of a country across these stages are illustrated in Figure 1.

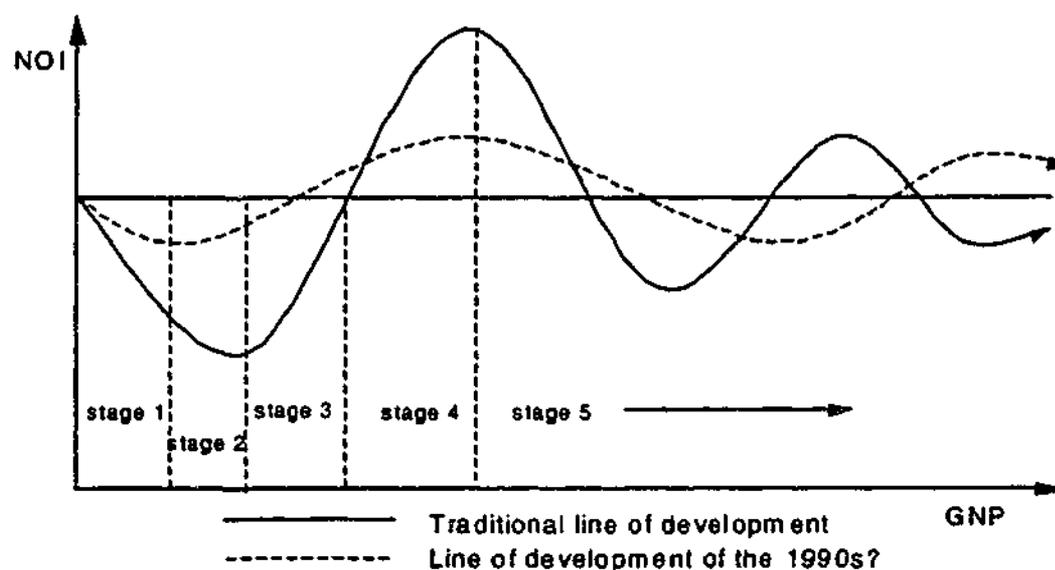


Figure 1 Pattern of the investment development path

Note: Not drawn to scale – for illustration purpose only

Source: Dunning and Narula (1997)

According to Dunning, the speed and direction of a country's investment development path depends on the structure of its indigenous resource endowments, including cultural endowments; its interaction with the rest of the world economy, its trading position; the extent of its ethnic communities abroad; the size of the local market; its economic system; the role played by government policy and the nature of the markets for the kind of transactions its own companies wish to engage in with foreign entities.

With a similar approach, Ozawa (1992) advanced a paradigm of FDI as a means to facilitate structural upgrading along the process of economic development. His model stresses economic structural change and upgrading, and is based on the recognition of the basic structural characteristics of the world economy: (1) inter-economy divergences in supply and demand conditions; (2) firms being creators and traders of intangible assets; (3) a hierarchy of economies; (4) natural (stage-compatible) sequencing of structural

upgrading and development; and (5) a strong trend away from inward-looking towards outward-looking trade and investment policy. In a world economy with such characteristics, the economic development in a country is likely to experience different stages, which are specified by Michael Porter (1990) as (i) factor-driven; (ii) investment driven; (iii) innovation-driven; and (iv) wealth-driven. At different stages the economy has different structures and different comparative advantages and disadvantages. The favourable pattern (nature and direction) of FDI, both inward and outward, at a particular stage is that it is compatible with the use and improvement of the comparative advantages at this stage, and the pattern of FDI should change *pari passu* with the structural transformation of the economy. Dynamically, when the economy moves from the stage of factor-driven to investment-driven and further to innovation-driven, the inward FDI should change from that of factor-seeking to market-seeking and further to market/technology-seeking; while outward FDI from trade-supporting and resource-seeking to low-cost-labour seeking and further to market/technology-seeking and surplus-recycling.

2.3. *Microeconomic Theories of FDI*

Many approaches to the theory of FDI are built on the various approaches to the theory of the firm, which was developed to explain why firms expand beyond the size of the small and relatively anonymous units contemplated in the textbook models of perfectly competitive industries. Stephen Hymer's 1960 doctoral thesis, *The International Operations of National Firms: A Study of Direct Foreign Investment*, is a pioneering work in this direction. By using Joseph Bain's concepts of market power, Hymer argues that firms go abroad to exploit their power more fully, and their market power explains why the investing firms can survive in competition with local host-country firms (Hymer, 1960). In other words, in order to operate multinationally, a firm must possess some sort of advantage over local competitors in the host country, as foreign operation often bears more transaction costs than local firms mainly because of being "foreign". The specific advantages identified by Hymer are (1) economies of scale that can be realised by integrating operations owned by a single firm across more than one market and (2) "marketing skills". Most authors now would include as ownership advantages other intangible assets such as proprietary products and process technologies, ability to create

new technologies, organisational and managerial skills other than marketing, and intellectual property not technological in nature.

The research based on the firm during the 1970s and 1980s divided quickly into two broad streams: one stressing transaction cost, and the other focusing on market power.

2.3.1. Transaction cost approach

This approach uses concepts from institutional economics, such as Ronald Coase's and Oliver Williamson's transaction cost, to explain why FDI takes place, why MNEs exist, and how they are structured. Peter Buckley and Mark Casson (1976) apply transaction-cost analysis explicitly to the MNE. MNEs exist, they argue, because the transaction cost of doing business through an "internalised" network of wholly owned subsidiaries is in many cases lower than that of arm's length relationships (Buckley and Casson, 1976). Their argument is based on the observation that modern production is a process involving the participation or input of various units, with each specialising in a different aspect of economic activity, such as manufacturing, marketing, research and development, human resources development, procurement, and management of financial assets. These units are interdependent, and the process forms a value-added chain by a flow of tangible intermediate products including materials, components and semi-finished goods and of intangible and knowledge-based intermediate goods such as patents, engineering expertise, management and marketing skills, and quality control. Market imperfections due to information asymmetries and asset specificity make it difficult and inefficient to use the market to organise transactions of intermediate products. The cost saving efficiency of exchange and transaction through a hierarchy urges firms to bypass the market and create an internal market that brings the related intermediate product markets and production under common ownership and control. The MNE is therefore the result of the process of internalisation of markets across national boundaries.

This explanation of FDI and multinationals is supported by the indirect pricing theory of the firm. By stressing the pricing of factor and goods, Cheung (1983) argues that the firm, rather than replacing the market with a non-market institution, replaces the market for intermediate goods with the market for labour that is hired to produce the intermediate

goods. By formalising and developing Cheung's idea, Yang and Ng (1995) show that a firm is a structure of residual rights between trade partners such that one party (the employer) has the authority to allocate the labour of the other party (the employee) and claims the residual of the contracts between the two parties that specify payment for the labour of the employees. The institution of the firm can be used to include in the division of labour the activities involving intangible outputs and effort inputs, for which the pricing efficiency is prohibitively low. By doing so, the direct pricing and marketing of these activities can be avoided, and therefore the transaction costs are reduced and the division of labour is promoted.

As international markets are more imperfect than domestic markets, and multinationals to a large extent integrate international division of labour with the division of labour within the firm, Yang and Ng's model is most likely to provide some ground for a better understanding of FDI. For example, FDI can be seen as a method to price indirectly the investing firm's intangible intermediate goods such as managerial know-how in the context of international economy. Also, transaction cost saving should be the driving force for both such indirect pricing and the intra-firm international division of labour. Nevertheless, theoretical development in this direction has to make a special effort to stress the differences in transaction efficiencies for goods and factors within and between countries. Otherwise, Buckley and Casson's theory of FDI cannot explain why a firm would invest abroad to save transaction costs rather than doing so at home.

Noting the importance of host country characteristics in determining FDI and multinational activities, Dunning (1977) advances a trinity paradigm of ownership, location and internalisation advantages (OLI). This paradigm represents a bridge between the industrial organisation/firm approach and more traditional trade economics. While also seeing internalisation as key to the MNE, Dunning argues that internalisation consideration alone cannot tell why an MNE goes to country A instead of country B. Hence, there must be something that makes country A more favourable than country B for the MNE's operation. He designates the favourable conditions which a country possesses as "location advantage". His 'eclectic approach', introduced roughly at the same time as Buckley and Casson's internalisation model, explains how MNEs use internalisation to exploit the advantages of locating production abroad (Dunning, 1977). As to the

transaction costs which lead to internalisation, Dunning (1994) specifies seven categories: (1) search and negotiation costs; (2) costs of broken contracts; (3) cost associated with buyer's uncertainty about the nature or value of inputs; (4) costs associated with lack of futures markets; (5) costs associated with government intervention in markets; (6) costs associated with conditions of sale; and (7) costs associated with moral hazard and adverse selection.

Dunning's eclectic theory of FDI, while capturing many features of FDI, is basically composed of loose conjectures without analytical modelling, and some of the arguments are logically inconsistent. These limit the explanatory power of the eclectic paradigm.

2.3.2. Industrial organisation approach

Richard Caves's (1971) article on multinationals has become the classic statement on how to marry industrial organisation (IO) economics and the study of FDI and MNEs. He agrees with Hymer that firms need a firm-specific advantage to compete successfully with local host country firms, because the latter benefits in various ways from being at home. But he goes further to define the various sources of such advantage and provides conceptual links between IO economists' treatment of market power at home and abroad. He stresses product differentiation and argues that the market power of MNEs allows them to differentiate products in the market and secure a time stream of cash flows.

Some scholars take the IO approach further by introducing ideas from risk and game theories. Edward Graham (1978) develops a model of strategic interaction between MNEs, where the firms follow each other abroad or reciprocate each other's moves. He hypothesises that when a large firm in MNE-prone industries finds its domestic market invaded by a new subsidiary of a foreign MNE, it is likely to retaliate by invading the foreign MNE's home turf. Its proprietary assets can aid its subsidiary to earn a nominal profit once its strategic value is counted. The strategic value arises if the subsidiary on the invader's turf establishes both a means of retaliation and a hostage that can be staked out in any subsequent understanding between the two parents. So both the following each other abroad and reciprocating each other's moves result from the drive to reduce uncertainty in an interdependent world. Another risk-reducing strategy, argues Bruce Kogut (1983), is sequential investment in foreign locations, which could be considered

options that the MNE would exercise later, depending on exogenous trends.

2.3.3. Learning option and signal effects .

Peng (1995) argues that given the sequential nature of FDI, MNEs' investment behaviour can be interpreted in terms of the incremental approach prescribed by option theory. When an investor has entered the option market, he is entitled to make an optional choice in the future. If the market situation becomes favourable, the investor will exercise his option to make a deal. And if the market situation becomes worse, he can forfeit his right and only bear a relatively small loss. This principle can be used in FDI. Typically, a small amount of FDI is initially made in a host country. As the MNE gradually gains market knowledge and operating experience, more investments may be pulled into that country. In terms of the mode of entry, FDI may be used initially to acquire a minor equity in a foreign agent, later to establish a joint venture with foreign partner, and eventually to set up a wholly owned subsidiary abroad. Viewed through such an "option lens", FDI can be conceptualised as an option to maintain access to technology and innovation in host countries, thus permitting the MNE wider strategic choices for future growth.

The firm-oriented theory of FDI focuses on replacement of the market by internalising transactions via foreign direct investment. However, the firm still relies on the market in its business operation. This raises questions about the rationality of the market and therefore the theory of FDI. Scott X. Liu (1997) seeks to explain FDI by drawing on signal theory. He argues that a firm's possession of superior know-how gives it the incentive and capability to become a multinational enterprise. FDI not only enables the firm to bypass the market and its asymmetric information, but also to convey information to less-informed outsiders and tell them something about the quality of the firm's intangible assets. As a result, the firm's FDI action becomes a market signal which influences the perceptions of market participants. This signalling effect may give the firm an additional incentive to pursue the path of multinationalisation.

The foregoing brief description shows that the existing firm-oriented theories of FDI, including the transaction cost theories and industrial organisation theories, are essentially independent of trade. This leaves a big gap between the respective literatures of FDI and

trade, two closely linked forms of organisation of international economic activity. To bridge that gap is a major goal of our research.

2.4. Export, Licensing and FDI

In the context of cross-border business, firms regard exports, production abroad, licensing, and other forms of non-equity linkages as alternative ways to deliver goods and services to foreign markets. As each of these ways has specific benefits and incurs specific costs, the mode of serving overseas target markets becomes an important strategic decision. Over the past decade, the nature of competition has been altered fundamentally by accelerating technological advancement and the globalisation of business. In order to balance the dynamic tension between multiple forces which need to be managed simultaneously -- geographic, product, market, technological, firms have extended their presence all over the globe for a multitude of purposes and through a multitude of forms (Contractor and Lorange, 1988). Correspondingly, there has been an increasing amount of scholarly work aimed towards understanding the timing and nature of foreign market entry decision (e.g., Gomes-Casseres, 1989; Kim and Hwang, 1992; Contractor, 1990; Anderson and Gatignon, 1998; Root, 1987; Erramilli and Rao, 1993).

The choice among foreign direct investment, export and licensing has been discussed and modelled by Hirsch (1976) and Horst (1973) and the explanation is further extended by Rugman (1985). Hirsch (1976) emphasises cost comparisons between different ways the MNE serves an overseas target market. In this respect, the MNE has two groups of variables to consider in the decision-making, namely country-specific costs and special costs. The former are the normal costs of production of the good in the home country (C) or in the host country (C^*). The latter are costs associated specially with one of the three modalities as the MNE chooses the best alternative, i.e., the exporting costs (M^*), including insurance, transport, and tariffs; the additional costs to multinational firms operating in the foreign country (A^*), especially environmental, cultural, and political information costs; and the knowledge dissipation costs associated with the risk of compromising the firm-specific advantage once a license is granted (D^*). When all other things are assumed constant, the MNE will choose the mode for serving a foreign market according to the following conditions:

1. Export if $C+M^* < \text{Min}\{C^*+A^*, C^*+D^*\}$;
2. FDI if $C^*+A^* < \text{Min}\{C+M^*, C^*+D^*\}$;
3. License if $C^*+D^* < \text{Min}\{C^*+A^*, C+M^*\}$.

This framework can be applied to the cost effective provision for the domestic market by adding the additional marketing cost associated with importing (M). The MNE has three choices for serving the domestic market: (1) produce at home; (2) produce abroad for the domestic market; or (3) license a foreign firm to produce for export to the domestic market. The MNE will choose the mode for serving the domestic market according to the following conditions:

1. Produce at home if $C < \text{Min}\{C^*+M+A^*, C^*+M+D^*\}$;
2. Produce abroad for import if $C^*+M+A^* < \text{Min}\{C, C^*+M+D^*\}$;
3. License production abroad for import if $C^*+M+D^* < \text{Min}\{C^*+M+A^*, C\}$.

The Horst model (1973) is a partial-equilibrium model of the behaviour of a profit maximising MNE in the face of tariffs. Assume that the MNE can sell its product in two countries (Home and Foreign) and faces downward-sloping demand curves in each market. Home is the MNE's base where it will always maintain production. The MNE's costs of production in each country depend on the amount produced there. Then the firm's locational decision reflects these variables: (1) the difference in relative real costs between the two markets -- the classic forces of comparative advantage (as costs affect the production pattern for the country as a whole) and absolute advantage (as these costs appear to producers in a particular industry); (2) scale economies in production; (3) differences in prices and thus marginal revenues between the two countries; (4) tariff levels in the importing country.

More specifically, the firm's marginal cost (c_1), demand (p_1), and marginal revenue (r_1) curves in the Home market are shown in Panel A. Panel C similarly shows demand conditions in Foreign and the firm's marginal cost function (c_2) if it becomes an MNE and undertakes production abroad. Panel B shows the behaviour of an MNE. Under the condition that there are no scale economies, when the firm starts to export from home, it will incur rising marginal costs as output expands and higher marginal revenue as the number of units sold in the Home market contracts. For example, if the firm faced a fixed price of M at which it could sell abroad, it would choose to produce Q_1 , selling S_1 of it at

home and exporting S_1Q_1 . The domestic price would become P_1 instead of the lower price that would prevail if there were no exports. From panel C, an analogous construction can be derived by allowing the firm the possibility of importing various quantities of its products for resale at prices such as M_1 . If M_1 is less than the firm's no-imports level of marginal cost in local production, it transfers some imports, cutting back its local production and expanding its sales. Given M_1 , the firm would produce Q_2 and sell S_2 in Foreign and import Q_2S_2 from Home.

When the MNE enjoys scale economies in production and thus the marginal cost curves slope downward rather than upward, the firm will not both produce in a market and transfer exports to it. It may produce only in either Home or Foreign and export to the country where no production is undertaken. The choice of the production location depends on the tariff regime, absolute advantage in production costs (at any given scale) and the sizes of Home's and Foreign's national markets. When the market of one country is large enough to enable the firm to enjoy scale economies, the firm will locate its production in this country in spite of the absolute advantage in production costs in the other country.

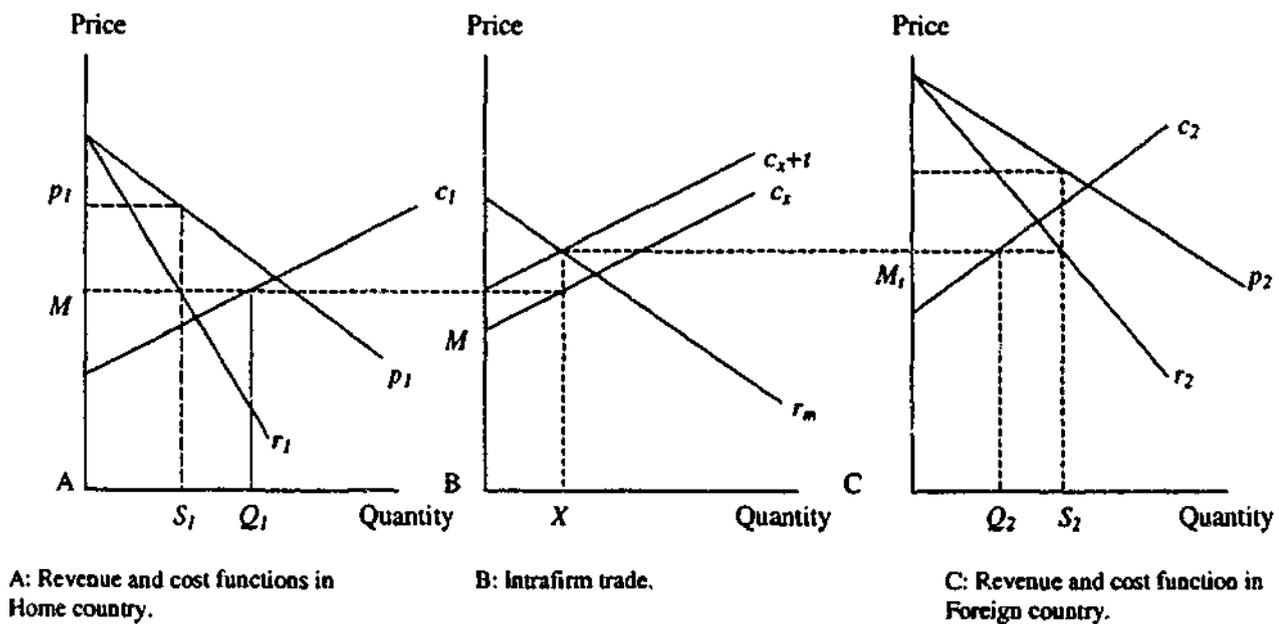


Figure 2 Locations for production and trade

2.5. Interpretation of FDI from Developing Countries

2.5.1. Research on FDI from developing countries

FDI from developing countries – the so-called Third World FDI (TWFDI) - as the rule rather than exception has generally occurred only (Table 1, above) during the last three decades. The 1990s witnessed a big jump of TWFDI: its share in the world total FDI outflow reached about 15 per cent, approximately trebling that of the 1980s¹⁰. As TWFDI is highly concentrated geographically in terms of source countries - several East Asian countries plus a few Latin American countries accounting for the major proportion of TWFDI - the growth of TWFDI is very impressive. In addition, multinational enterprises headquartered in developing countries have been increasing in number, size, complexity of organisation, and transnationality. Among the 50 top multinational enterprises from developing countries in 1998, there are 29 with foreign assets above US\$1 billion, and two are ranked in the world's top 100 multinationals 43rd and 73rd place (UNCTAD, 1998, pp.48-49; pp.36-38).

The expansion and increasing importance of TWFDI have caught academic attention since the late 1970s. It is acknowledged that Lecraw's 1977 paper, *Direct Investment by Firms from Less Developed Countries*, signified the start of TWFDI as a subject of considerable research interest (Dunning *et al.*, 1997). Based on a survey covering 200 local and foreign invested firms (including 20 TWFDI established firms¹¹) in Thailand, Lecraw (1977) characterises TWFDI as involving labour-intensive technologies for small-scale production of mature and undifferentiated goods. Investors from developing countries prefer a minority interest in joint ventures with local partners, and family and

¹⁰ There are big discrepancies among data on TWFDI from different sources as well as in some cases between different periods of a given source. Dunning *et al.* (1997) gave an example, "Dunning (1993) and Narula (1996) utilised estimates based on the US Department of Commerce which the total outward FDI stock from developing countries in 1980 was \$15.3 billion, while UNCTAD (1994) and Tolentino (1993) place the figure at a fifth of that level, or \$3.4 billion. Even more curiously, discrepancies exist in publications by the same source; for example, the estimate for 1980 published in UNCTAD (1995) gives the same stock figure at \$6.1 billion, twice that of UNCTAD (1994), one year previously." In this research we use UNCTAD's data as the main source for TWFDI. Even though this source is quite conservative, its data on TWFDI still suggest strong trends in the expansion of TWFDI.

¹¹ Home countries for these firms were: India (9), Taiwan (6), Singapore (2), and Malaysia (3).

ethnic links with local groups play an important role in business. Compared with FDI from developed countries, TWFDI affiliates have higher autonomy and retain larger proportions of earnings for further development.

Thereafter, interest from economists and business researchers grew, leading to a boom in the research of TWFDI between the late 1970s and 1980s. This boom offered a theoretical justification for the specific characteristics of FDI and international operations of firms from developing countries. Representative theoretical publications during this period include Lall (1983a, b), Wells (1983), and Riemens (1989). The research in the 1990s further contributed to the body of knowledge of TWFDI. Seminal contributions in this period include Ferrantino (1992), Tolentino (1993), Dunning *et al.* (1997), and Yeung (1998).

In spite of the progress, the amount of studies on TWFDI is relatively thin compared to that on FDI from developed countries (Pananond, 1998/1999). The existing literature on TWFDI is mainly empirical studies within the framework of conventional theories of FDI. The descriptions are often made by comparing FDI (and MNEs) from developing countries with that from developed countries, with focus on specific cases of certain countries, business operations of certain types of firms, or specific functional issues of some firms. Investigations of TWFDI concentrate prominently on flows to other developing countries.

2.5.2. Explanations for FDI from developing countries

2.5.2.1. *The ownership advantages for TWFDI*

Setting out from the conventional framework for FDI, many analyses try to probe the nature and source of comparative advantages supporting TWFDI in an alien market. It is said that the importance of such advantages for TWFDI is no less than for FDI from developed countries. TWFDI affiliates often have to compete not only with local companies, but also with other, usually much larger, multinationals from developed countries. Though MNEs from developing countries tend (for the time being) to bear more resemblance to local firms in outlook, size, and product lines, these firms are widely believed to hold distinct competitive advantages *vis-à-vis* all their rivals (Riemens, 1989,

p.30). These advantages are basically ownership advantages in the sense that they belong to the investing firms in relation to their foreign rivals. However, they may not all be generated within the investing firms. Rather, they might be derived from external country-specific factors such as the possession of ethnic specific knowledge or cheaper labour cost.

One of the most frequently quoted advantages for TWFDI is the technology adaptation and basic design capability. Empirical evidence shows that most MNEs from developing countries engage in very active technical effort to assimilate and adapt imported technologies to particular domestic needs and raw materials. For example, Hong Kong firms are strong on product improvements to meet changing demands in developed countries, and they also undertake efforts to reduce (rather than increase) labour intensity (Chen, 1983). Indian and Argentinean firms tend to be particularly strong on production engineering and basic design capacity (Lall, 1983a, b; Katz and Kosacoff, 1983). As many developing countries have similarities in technological base, factor structure, industrialisation goals as well as market size (small), TWFDI affiliates of certain types even have advantages over those by MNEs from developed countries. The sources of these advantages include: (1) less use of special-purpose equipment, which enables them to use local low-level inputs and even substitutes; (2) mature and more universal products, which well match the lower standard of machinery and equipment in local downstream firms; (3) low specialisation of TWFDI affiliates, which can reduce the efficient economic scale to the extent of small local market; and (4) the flexibility stemming from lower specialisation and higher universality of machinery and equipment, which enables firms to change their products when business environment and market conditions change (Wells, 1983).

Small scale of operation is another quoted advantage for investors from developing countries. It is often argued that the smallness of their home market for manufactures gives MNEs in TWFDI an edge over Western MNEs when similar circumstances in other developing countries call for a smaller scale of production. Wells (1983) terms this process "de-scaling" and suggests that it is a type of technology unfamiliar to, and unfavoured by Western MNEs, but at the same time, it still embodies an amount of know-how not readily available to local firms.

The lower management cost and more autonomous subsidiaries are another source of comparative advantages for TWFDI. Most FDI firms from developing countries are small in size in comparison with those from developed countries. Management levels have been thus reduced and the flexibility increased. This feature brings about management cost saving effects and higher autonomy to TWFDI affiliates (Wells, 1983).

Ethnic specific knowledge is also an advantage for TWFDI. When a country has large ethnic communities abroad, the possession of intimate knowledge of the local market in terms of tastes and opportunities, and access to channels of distribution enable firms from the country to save enormous costs involved in the collection of such information. Similarly, the knowledge of special manufacturing processes and products with ethnic characters gives its possessors a monopolistic advantage over competitors (Wells, 1983). In reality, this advantage is most likely to relate TWFDI to developed countries. The reason is that most "ethnic" products are relatively simple to manufacture, and therefore generally produced by local entrepreneurs in developing countries. However, developed countries are more open to the external funding and managing of such lines of production, and their markets represent much stronger buying power. It seems that the satisfaction of the "ethnic" demand provides a foothold for some TWFDI, especially if they are able to capture some non-ethnic customers as well. But the scope of these markets is constrained (Riemens, 1989, 38).

2.5.2.2. *The timing of TWFDI*

It is generally acknowledged in the literature that the emergence and development of FDI from a developing country are to a large extent determined by the level of technology accumulation and economic development in that country.

Tolentino (1993) argues that FDI is a choice for firms from developing countries to exploit their proprietary advantages which are based on their imitated and innovated technology. She reaches this view by combining Vernon's (1966) product cycle model and Lall's (1983b) theory of localised technological change. According to Tolentino (1993, ch.4), the competitive advantages of firms from developing countries are assumed to rest on their ability to (1) imitate and adapt foreign technology in accordance with developing countries' markets and production conditions; (2) innovate on essentially

different lines from those of the more advanced countries, i.e. innovations that are based on lower levels of research, size, technological experience and skills; and (3) achieve improvements by modernising older technique, including foreign outdated technology. Though the imitated and innovated technology embodied in machinery is easily codified, the method used in exploiting machinery and firms' accumulated experience as a result of learning by doing and learning by using are not codifiable. In effect, the imitated and innovated technology is largely implicit in the skills and experience of employees and is therefore not easily codified or embodied in patents, blueprints or trademarks. This drives developing countries' firms with imitated and innovated technology to internalise these advantages via outward FDI. This interpretation implies that the emergence and development of FDI from developing countries correspond to the generation of imitated and innovated technology in these countries. More generally, as Tolentino (1993, ch.4) indicates, world FDI pattern can be viewed as a pecking order of different countries in which a particular country's position is determined by its ability to produce a particular product and the internationalisation of firms from developing countries as a stage in the product life cycle.

Dunning reaches similar views in a different framework. From the perspective of the investment development path (IDP) theorem, Dunning views the development of FDI as a process, attributable to the country's economic development. Whether a developing country can start its outward FDI depends on whether its firms have generated sufficient ownership advantages to overcome the initial barriers to foreign production. The subsequent expansion of FDI is determined by the further accumulation of ownership advantages (Dunning, 1988). He argues that so far TWFDI has progressed into its second wave and the research on TWFDI in the late 1970s to early 1980s (we quoted above) is mainly a description of the first wave TWFDI. While the first wave consists mainly of some Asian and Latin American countries, e.g. India, Philippines, Argentina, Mexico and Columbia, the second wave consists mainly of newly industrialising economies in East Asia such as Taiwan, South Korea, Hong Kong, China, Singapore and Malaysia. According to Dunning *et al* (1997), the second wave can best be characterised as an intermediate stage in the evolution of MNE activity, between the first wave TWMNEs and conventional MNEs. Specifically, the second wave TWFDI has distinct features in destination, motivation, industrial areas and ownership advantages, which are specified in

comparison with the first wave FDI and conventional FDI in Table 2. These features reflect the structural upgrade in the home economy in response to economic globalisation and the improvement of investors' ownership advantages along with the structural upgrading. A holistic and integrated government policy towards industry development in the home economy is important for the transition from first wave to second wave in the country's outward foreign investment.

Table 2 Characteristics of outward FDI at different stages of the IDP

	First Wave (Stage 2)	Second Wave (Stage 3)	Conventional MNEs (Stage 4 and 5)
Destination	Regional FDI: neighbouring countries and other LDCs	Majority still regional, but expanding to global basis	Global basis
Motivation	Resource-seeking and market-seeking in LDCs	In LDC: resource- and market-seeking; In DC: asset-seeking and market-seeking	Efficiency-seeking: MNE motivation aimed at optimising use of each country's comparative and competitive advantages
Types of outward FDI	In LDCs natural-asset intensive, small scale production in light industries (Heckscher-Ohlin), moving towards undifferentiated Smithian industries	In LDCs: natural-asset intensive sectors as in first wave; In DCs: (a) Assembly-type, market-seeking primarily in Smithian industries (b) Asset-seeking investment in Schumpeterian industries	Capital- and knowledge-intensive (Schumpeterian) sectors, capital/labour ratio dependent on natural/created asset of host
Ownership advantages	Primarily country-of-origin-specific. Fundamental O _a advantages, not O _t advantages	Both firm- and country-specific	Mainly firm-specific Advanced O _a and O _t advantages.
Examples of ownership advantages (adapted and modified version of Lall (1983, p.7)	<ol style="list-style-type: none"> 1. Conglomerate group ownership 2. Technology (mostly adapted) 3. Management adapted to LDC conditions 4. Low cost inputs (including managerial and technical personnel) 5. 'Ethnic' advantages 	<ol style="list-style-type: none"> 1. Conglomerate group ownership 2. Management adapted to LDC conditions 3. Low cost inputs (including managerial and technical personnel) 4. 'Ethnic' advantages 5. Some product differentiation 6. Limited marketing skills 7. Vertical control over factor/product markets 8. Subsidised capital 	<ol style="list-style-type: none"> 1. Large size - economies of scale 2. Access to capital markets 3. Technology 4. Product differentiation 5. Marketing know-how 6. Cross-country management skills 7. Globally efficient intra-firm activity 8. Vertical control over factor/product markets

Note: O_a --- Asset-type ownership advantage; O_t ----- Transaction-type ownership advantage
Source: Dunning *et al* (1997, Table 4).

2.5.2.3. Geographical distribution of TWFDI

Given the importance of ownership advantages in FDI, it follows that FDI from developing countries is likely to be directed to countries with geographical, economic,

cultural and ethnic proximity. Such investment enables the investing firms to lessen disadvantages in FDI, to take advantage of cultural and ethnic knowledge, and to facilitate communication between subsidiaries and their parents as well. When the investing firms, through this kind of investment, have gained international business experience, acquired better skills and more access to improved technologies and international networks, they are most likely to extend their area of operation to regions with larger geographical, cultural or ethnic distance (Ferrantino, 1992).

Earlier research shows that, as a reflection of this strategy, FDI from developing countries is characterised by a heavy regional concentration. Firms from Hong Kong, Taiwan, South Korea and India preferred to invest in the neighbouring countries of Indonesia, Malaysia, Thailand and the Philippines. The bulk of Argentinean firms' direct investment went to Brazil, Peru and Uruguay. Most of Brazilian firms' foreign direct investment went to Latin American countries (O'Brien and Monkiewicz, 1981; UNCTC, 1983).

2.6. Concluding Remarks

This brief survey has presented an overview of the existing research on foreign direct investment. This survey shows that the theoretical studies of FDI and MNEs, while covering a wide range of topics, mainly proceed along two separate lines. One is the macroeconomic approach by mainstream economists who attempt to adapt the neoclassical theory of international trade, and the other is the microeconomic approach which departs from the theory of the firm. This separation results in a gap between the two streams of theories. The macro theories of FDI formally treat FDI as ordinary capital movement and now still lack the investigation of the more specific mechanisms for FDI. Conversely, the micro theories of FDI essentially ignore national and international characteristics and proceed independent of other international activities such as trade.

Due to the empirical evidence on which the theoretical foundation of FDI is based, the existing theories of FDI are dominated by supply-side focused theories. Endowment advantages or technological advantages are often stressed. Transaction efficiencies have not attracted enough attention in the literature. This is one of the main reasons that the

conventional theories of FDI are inefficient in explaining the changing pattern of FDI, especially FDI from developing countries and cross investment flows between developed countries in the same industries.

To fill these two gaps is the main objective of our models. This task is carried out by using inframarginal analysis. Our unified Walrasian general equilibrium models cover different economic organisations ranging from autarky to complete international division of labour, and they capture differences in transaction efficiencies for goods and factors within and between countries. The approach of inframarginal analysis makes models different from the mainstream theorems in the literature of FDI. The results of the analysis show the crucial roles of transaction efficiencies for factors and goods in determining the general equilibrium structure, the pattern of FDI, as well as the relationship between FDI and other international activities including trade. The models show that FDI is essentially a method to price indirectly the investing firm's intangible intermediate goods such as managerial know-how in an open economy. The results of the analysis are consistent with some existing findings in the literature such as Casson's internalisation theory of FDI.

3. Transaction Efficiency, Division of Labour and FDI: A Unified Model

3.1. Introduction

The purpose of this chapter is to develop a general equilibrium model of foreign direct investment that captures the mechanisms for the emergence and development of FDI by using inframarginal analysis. Motives for such effort come from our observation of the gaps in the literature of mainstream economics and FDI.

Mainstream economic theory has extensively explored economic organisation from two perspectives, namely, price and hierarchy, and the market and the firm (e.g., Coase, 1937; Williamson, 1975). It is basically held that the market uses the price system to organise transactions between firms, and that the firm organises internal activities via hierarchy. However, there is relatively little exploration of the location of economic activity, another crucial feature of economic organisation. Due to various reasons, the market is not universal and homogenous, but consists of different markets at different locations for different factors and products, and economic activity can take place in different regions, including at home and abroad. In addition, the firm is not deemed to be a single-plant production unit with all firm activities in a single location. The multinational enterprise, the main subject of FDI and a consequence of such investment, illustrates this feature.

In the perspective of economic organisation, the institution of the MNE involves not only the classical question of the boundary between the administrative allocation of resources within the firm and the market allocation of resources between firms, but also the question of the geographical setting of the boundary between the firm and the market as well as the question of the form of hierarchy. It is an important issue in economic organisation why multinationals expand their administrative boundaries internationally rather than domestically. A related issue is why some firms expand their administrative boundaries internationally but others do not. In principle it is natural that, in a market economy, entrepreneurs are free to displace market transactions by increasing the scope of allocations made administratively within their firms, and the most profitable pattern of

enterprise organisation should ultimately prevail. Where more profitable results can be obtained from

placing plants under common administrative control, there multi-plant enterprises will predominate and single-plant firms will merge or go out of business. But the mechanisms for the situation where multi-plant firms prevail are not that clear. The literature is even less certain about the prevalence of multi-plant transnational enterprises, i.e., multinational enterprises which involve more than one economy and market conditions vary between economies. Buckley and Casson (1976) argue that MNEs exist because the transaction cost of doing business through an internalised network of wholly-owned subsidiaries is in many cases lower than that of arm's length relationships. However, their theory falls short of explaining why firms have to invest abroad to bypass the external market rather than investing at home for the same purpose. In addition, research in this stream "was often (at best) partial equilibrium in nature and focused on individual firms rather than on explaining the pattern of direct investment in relation to country and industry characteristics" (Markusen and Maskus, 1999, p.2).

For centuries international division of labour was essentially carried out indirectly through arm's length trade in goods. The classical division of labour through trade implied that the developing countries almost exclusively exported raw materials to the industrialised countries. In exchange they received the processed goods which were manufactured in the industrialised countries. However, the situation has been changing since the late 19th century when FDI began to play an ever-increasing role in the world economy (Dunning, 1997, pp.17-18). The relocation and establishment of industry by MNEs from developed countries implied a considerable change in the international division of labour, as some developing countries began to export industrial goods (Martinussen, 1997, p.115). In addition, when created assets become more important in determining national comparative advantages, FDI aimed at exploiting firm-specific assets and acquiring strategic resources can find a suitable investment environment in developed countries. As a consequence, North America, the EU and Japan are not only the main investors, but also the main destinations for FDI: more than 80 per cent of world FDI is directed to industrialised countries (Graham and Krugman, 1991; Markusen, 1995).

A notable feature of FDI's role in the division of labour is the internalised international division of labour that the MNE achieves via FDI. Here the hierarchy of the MNE replaces the market in the organisation of division of labour. In contrast to the division of labour by arm's length trade, the internalised international division of labour depends on the extent of the intra-firm "market". As a result of rapidly growing FDI, MNEs' internal trade, which mainly reflects the intra-firm international division of labour, is impressive in volume. It alone accounts for about 1/3 of world trade and their combined internal trade and related public market trade by MNEs accounts for about 2/3 of world trade (UNCTAD, 1999).

Internalised international division of labour forms cross-border specialisation within the firm. The contemporary concentration of FDI in developed countries reflects the fact that the division of labour in its advanced state has now extended to what Casson (1988) calls a "division of thought", i.e., advanced intellectual specialisation, which can easily find the technical base in developed countries.

Nevertheless, as Yang (2001, pp.10-11) indicates that the division of labour has been essentially ignored since Walras and Marshall, the interdependence between division of labour and FDI attracts little attention in mainstream economics. Correspondingly, the literature of FDI does not consider the associated division of labour. Except for a few scraps in describing multinational activities, the division of labour is excluded from the existing models and theorems of FDI and MNEs, no matter whether they are general equilibrium models or partial equilibrium models, or whether they stress transaction costs or market power.

This chapter develops a Walrasian general equilibrium model to investigate the mechanisms for the emergence and development of international direct investment. It yields rich findings regarding the organisation of FDI and other international activities. It shows that FDI is a form of organising international activity and division of labour. Via FDI the investing firm indirectly prices intangible intermediate goods in the context of the international economy by expanding the firm's governance boundary to the host country. When other factors are given, high transaction efficiency for ordinary labour (or all factors other than the indirectly priced factors) in the host country and high transaction and transfer efficiencies for professionals (including all factors related to the indirect

pricing) from the home country encourage FDI between the two countries. The relationships between FDI and trade in final goods and trade in intermediate goods (e.g., foreign licensing) are determined and shaped by the transaction efficiencies for goods and factors within and between countries.

This chapter proceeds as follows. Section 3.2 describes the model. Section 3.3 identifies equilibrium and its comparative statics and explains the main findings. The final section concludes the chapter.

3.2. *The basic model*

Consider the world economy consisting of Country i and Country j , each with a continuum of *ex ante* identical consumer-producers of mass M_i and M_j , respectively. This assumption implies that the population size is very large. It therefore avoids the integer problem of the numbers of different specialists, which may lead to the non-existence of equilibrium with the division of labour. For avoiding unnecessarily complex patterns of economic structures, we assume that both countries are of similar size so that $\frac{M_i}{M_j}$ is neither too large nor too small.

There is one consumer good y and one intangible intermediate good x , which is an essential input for the production of good y . Each individual consumes the consumer good and produces at least one of the two goods. Both goods can either be self-provided or be purchased in the markets. We assume that all goods of the same "type" (x or y), no matter whether self-supplied or purchased from the market, are perfect substitutes. We use x to represent the quantity of self-provided good x and y the quantity of self-provided good y . In a similar way, we use x^s and y^s to present the quantities of goods x and y supplied in the markets, respectively, and x^d and y^d the quantities of goods x and y purchased in the markets, respectively. Market transactions absorb resources. This fact is captured by an "iceberg" type transaction cost model such that the fraction $(1-k)$ of the good sold is dissipated in the domestic transaction¹². Conversely, k ($0 \leq k \leq 1$) represents

¹² The specification of such iceberg transaction cost is a common practice in modelling issues involving

the transaction efficiency as the proportion of the purchased that is left after transaction. Larger values of k indicate better transaction conditions. Subscripts x and y identify the good concerned. So k_x and k_y are the transaction efficiency coefficients for goods x and y in the markets respectively. Accordingly, $k_x x^d$ and $k_y y^d$ represent the respective net quantities of x and y that an individual obtains when purchasing x and y . Similarly, s denotes the transaction efficiency coefficient for labour in the domestic market, where $0 < s < 1$. Specifically, s_x and s_y are the transaction efficiency coefficients for labour specific to x (i.e., specialist producer of x) and for labour specific to y (i.e., specialist producer of y) in the market respectively.

We further use subscripts i and j to identify the country where an activity takes place. For example, in Country i , the self-provided quantities of goods x and y are x_i and y_i , the quantities sold in the markets are x_i^s and y_i^s , and the quantities purchased in the markets are x_i^d and y_i^d , respectively. Where both good-denoting subscripts (x and y) and country-denoting subscripts (i and j) are applicable, the latter become sub-subscripts. So the quantities of good x and good y an individual in Country i obtains from purchasing them locally are $k_x x_i^d$ and $k_y y_i^d$ respectively. These conventions apply symmetrically in Country j .

The utility function of each individual in Country i is represented by:

$$(2.1) \quad U_i = y_i + k_{y_i} y_i^d + \theta k_{y_j} y_j^d \quad 0 < \theta < 1$$

where θ is the international transaction efficiency coefficient for goods, capturing an iceberg-type international transaction cost: in the case of a cross-border purchase, in addition to the loss of $1-k$ due to domestic transaction cost in the sourcing country, a fraction of $1-\theta$ is lost in international transit for each unit of a good purchased from the other country.

We assume that both goods x and y are freely tradable domestically and internationally. However, while labour producing good x is internationally mobile, labour producing

transactions in the market (Krugman, 1995). It enables the analyses to avoid formidable index sets of

good y is internationally immobile. The assumption of the international immobility of y producers is intended to simplify the analysis. It also captures the economic reality that, compared with high mobility of professionals and managerial personnel, the international movement of the ordinary work force incurs formidably high relative cost (cost/value-added per head) due to national barriers. The international movement of x producers incurs international personnel movement costs, e.g., transport cost, adaptation cost for settling down in the local environment, etc., all together are captured by an international transaction cost coefficient $1-\delta$, where $0 < \delta < 1$. δ is the international transaction efficiency coefficient for labour, and is similar to θ , the cross-border transaction efficiency coefficient for goods.

An individual's production function for the intermediate good in Country i is:

$$(2.2) \quad x_i + x_i^s = \text{Max}\{0, l_{x_i} - b_{x_i}\}$$

where $x_i + x_i^s$ is the output of good x , and l_{x_i} is an individual's level of specialisation in, as well as his amount of labour allocated to, the production of good x , ($0 < l < 1$). Parameter b_{x_i} is the fixed learning cost in producing good x in Country i . It exhibits the degree of economies of specialisation, and its value is positive but less than each individual's time endowment, i.e., $b_{x_i} \in (0,1)$. This indicates that each individual can save on repeated learning costs by specialising in producing the intermediate good with the higher technological content.

An individual's production function for the consumer good in Country i is:

$$(2.3) \quad y_i + y_i^s = \left(x_i + k_{x_i} x_i^d + \theta k_{x_j} x_j^d \right)^a l_{y_i} \quad a \in (0,1)$$

where x_i^d is the amount of the intermediate good purchased from the domestic market and x_j^d is the amount of the intermediate good purchased from abroad.

destinations and origin of trade flows.

$x_i + k_{x_i} x_i^d + \theta k_{x_j} x_j^d$ is the total amount of intermediate good which is employed by a y producer in the production of the consumer good y in Country i . l_{y_i} is an individual's level of specialisation in as well as his amount of labour allocated to the production of good y . $y_i + y_i^s$ is the output of the consumer good. The parameter a represents the degree of economies of specialisation in producing the consumer good.

The time endowment constraint for each individual in Country i is given as follows:

$$(2.4) \quad l_{x_i} + l_{y_i} = 1$$

The above equations can be applied to Country j by replacing country denoting subscript i with j and j with i .

3.3. Configuration and Economic Structure

Each individual makes decisions concerning his production and consumption. In other words, he makes decisions about which good to produce as well as about his demand for and supply of any traded good to maximise his utility. A given profile of production and trade activities for an individual is defined as a *configuration*, and the combination of configurations of the M individuals in a country is defined as a market structure or *structure* in short. Each configuration has a corner equilibrium. In order to derive an individual's optimum decision, the Kuhn-Tucker theorem can be used to rule out the interior solutions. So does the market structure.

Yang (2000) re-establishes and refines Wen's theorem based on Kuhn-Tucker conditions for the model with intermediate goods:

Lemma: an individual sells at most one good and does not buy and self-provide the same good. He self-provides the consumer good if he sells it. If $a \in (0.5, 1)$, he does not self-provide the intermediate good unless he produces the final good.

3.3.1. Structures and corner equilibriums

3.3.1.1. Closed economy

In a closed economy, no individuals carry out production or trade across countries. For such an economy there are four possible structures, namely, Autarky, Simple domestic division of labour (*SD*), Firm owned and run by the producer of good *y* (*FY*), and Firm owned and run by the producer of good *x* (*FX*) (Yang and Ng, 1995). The defining features of these alternative structures are shown in Figure 3.

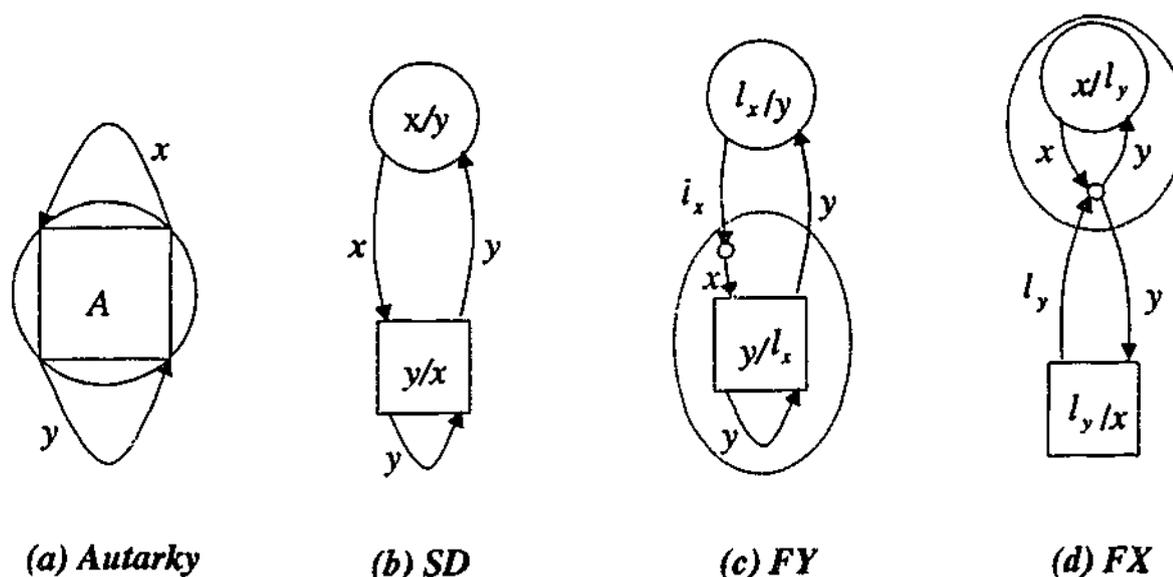


Figure 3 Structures in a closed economy

Note: The arrowheads indicate the flow of goods or factors.

- **Structure A: autarky**

In the structure of autarky, each individual chooses a configuration with $x^s = y^s = x^d = y^d = 0$. The decision problem for each individual in this structure is:

$$\begin{aligned}
 (3.1a) \quad & \text{Max} \quad U = y \\
 & \text{s.t.} \quad y = x^a l_y \\
 & \quad \quad x = l_x - b_x \\
 & \quad \quad l_x + l_y = 1
 \end{aligned}$$

The solution for this structure is:

$$(3.1b) \quad l_x = \frac{a + b_x}{a + 1}$$

$$(3.1c) \quad l_y = \frac{1 - b_x}{a + 1}$$

$$(3.1d) \quad U_A = a^a \left(\frac{1 - b_x}{a + 1} \right)^{a+1}$$

• **Structure SD: simple domestic division of labour**

This structure comprises configuration (x/y) and configuration (y/x) in a country. There is no asymmetric distribution of residual rights in this structure. Individuals exchange goods for goods in a condition where no institution of the firm and a related labour market exist.

The decision problem for each individual choosing configuration (x/y) in this structure is:

$$(3.2a) \quad \begin{aligned} \text{Max} \quad & U_x = k_y y^d \\ \text{s.t.} \quad & x^s = l_x - b_x \quad \quad \quad l_x = 1 \\ & P_x x^s = P_y y^d \end{aligned}$$

where P_x and P_y are the prices for goods x and y , respectively.

The decision problem for each individual choosing configuration (y/x) in this structure is:

$$(3.2b) \quad \begin{aligned} \text{Max} \quad & U_y = y \\ \text{s.t.} \quad & y + y^s = (k_x x^d)^a l_y \quad \quad \quad l_y = 1 \\ & P_x x^d = P_y y^s \end{aligned}$$

Having considered the market clearing and utility equalisation conditions and the number of individuals in the structure, the corner equilibrium can be derived as follows:

$$(3.2c) \quad U_{SD} = a^a (1 - a)^{1-a} [k_x k_y (1 - b_x)]^a$$

$$(3.2d) \quad \frac{P_x}{P_y} = \left[\frac{k_y (1 - b_x)}{1 - a} \right]^{a-1} (a k_x)^a$$

$$(3.2e) \quad M_x = \frac{ak_y M}{1-a+ak_y}$$

$$(3.2f) \quad M_y = \frac{(1-a)M}{1-a+ak_y}$$

where U_{SD} is the per capita income and $\frac{P_x}{P_y}$ the relative price of the two goods. M_x is the number of individuals selling good x and M_y the number of individuals selling good y . The total number of individuals in the two groups is $M=M_x+M_y$.

• **Structure FY: Y's Firm**

This structure comprises configuration (y/l_x) and configuration (l_x/y) in one country. (y/l_x) is a specialist producer of y who hires workers and directs them to specialise in producing intermediate good x within his firm. And (l_x/y) denotes a worker who is hired to produce the intermediate good x within his boss's firm and buys the final good with his wage.

The decision problem for the individual choosing configuration (y/l_x) in this structure is:

$$(3.3a) \quad \text{Max: } U_y = y$$

$$\text{s.t. } y + y^s = (x^d)^a l_y$$

$$x^s = s_x l_x - b_x$$

$$l_x = 1 \quad l_y = 1$$

$$x^d = N x^s$$

$$P_y y^s = W_x N l_x = W_x N$$

Where, s_x is the transaction efficiency coefficient for each unit of labour hired, W_x is the wage rate, and N the number of workers hired by the employer.

The decision problem for the individual choosing configuration (l_x/y) in this structure is:

$$(3.3b) \quad \text{Max: } U_x = k_y y^d$$

$$\text{s.t. } P_y y^d = W_x l_x^s$$

$$y^d = \frac{W_x}{P_y}$$

Having considered the market clearing and utility equalisation conditions and the number of individuals in the structure, the corner equilibrium can be derived as follows:

$$(3.3c) \quad U_{FY} = a^a (1-a)^{1-a} [k_y (s_x - b_x)]^a$$

$$(3.3d) \quad \frac{W_x}{P_y} = \left(\frac{k_y}{1-a} \right)^{a-1} [a(s_x - b_x)]^a$$

$$(3.3e) \quad M_x = \frac{ak_y M}{1-a+ak_y}$$

$$(3.3f) \quad M_y = \frac{(1-a)M}{1-a+ak_y}$$

• **Structure FX: X's Firm**

This structure comprises configuration (x/l_y) and configuration (l_y/x) in one country. (x/l_y) is a specialist producer of x who hires workers and directs them to specialise in producing the final good y by using his production of x within his firm. And (l_y/x) denotes a worker who is hired to produce the final good y by using the intermediate good within his boss's firm and buys the final good with his wage.

The decision problem for the individual choosing configuration (x/l_y) in this structure is:

$$(3.4a) \quad \text{Max: } U_x = Y$$

$$\text{s.t. } Y + Y^s = Ny^s$$

$$y^s = (x^d)^a s_y l_y \quad l_y = 1$$

$$x^d = \frac{x^s}{N}$$

$$x^s = l_x - b_x \quad l_x = 1$$

$$P_y Y^s = W l_y N = WN$$

The decision problem for the individual choosing configuration (l_y/x) in this structure is:

$$(3.4b) \text{ Max: } U_y = k_y y^a$$

$$\text{s.t. } P_y y^a = W l_y = W$$

$$U_y = k_y \frac{W}{P_y}$$

Having considered the market clearing and utility equalisation conditions and the number of individuals in the structure, the corner equilibrium can be derived as follows:

$$(3.4c) \quad U_{FX} = a^a (1-a)^{1-a} s_y k_y^{1-a} (1-b_x)^a$$

$$(3.4d) \quad \frac{W}{P_y} = \left[\frac{(1-b_x)a}{k_y} \right]^a s_y (1-a)^{1-a}$$

$$(3.4e) \quad M_x = \frac{aM}{a + (1-a)k_y}$$

$$(3.4f) \quad M_y = \frac{(1-a)k_y M}{a + (1-a)k_y}$$

3.3.1.2. Open economy

We define an open economy as that which involves some kind of complete division of labour between countries (S. Ng, 1998). In other words, in our assumed open economy, individuals in one country produce the same good and their production and consumption depend on exchanges with individuals of the other country for the other good. Such division of labour can be realised through barter trade in goods or by involving international movement of factors. After taking into consideration the assumed international division of labour, the location of production, and the ownership of the firm, there are three possible structures for an open economy, namely, Simple international division of labour (*SI*), Trade in intermediate good (*FL*), and International firm (*MS*). Each type of structure has two symmetric variants. While *SI* denotes the structure in which individuals of Country *i* export good *x* to and import good *y* from Country *j*, *SI** denotes the structure in which individuals of Country *j* export *x* to and import *y* from Country *i*. *FL* denotes the structure in which *x* specialist of Country *i* is employed in Country *j* and imports *y* from Country *j*; and *FL** denotes the structure in which *x* specialist of Country *j* is employed in Country *i* and imports *y* from Country *i*. Here the

owner of the firm is the local specialist producer of y . MS denotes the structure in which x specialist from Country i undertakes outward FDI in Country j and imports y from the host country; and MS^* denotes the structure in which x specialist from Country j undertakes outward FDI in Country i and imports y from the host country. Here the owner of the firm is the foreign specialist producer of x . The distribution and combination of these structures are shown in Figure 4, and their features are shown in Figure 5.

Figure 4 Distribution and composition of structures for an open economy

		Configuration in Country j							
		○	□	●	■	○	□	●	■
Configuration in Country i	○	-	○-□	-	○-■	-	Dark	-	○-■
	□	□-○	-	Dark	-	Dark	-	Dark	-
	●	-	Dark	-	~	-	●-□	-	~
	■	■-○	-	~	-	Dark	-	~	-
	○	-	Dark	-	Dark	-	Dark	-	Dark
	□	Dark	-	□-●	-	Dark	-	Dark	-
	●	-	Dark	-	~	-	Dark	-	~
	■	■-○	-	~	-	Dark	-	~	-

Notes: 1. ○----- x ; □----- y ; Dark----- Owner of the firm; Underlined-----Location of the firm.

2. ■-○ and ■-○ are the same structure that y specialist from Country i imports x from Country j (i.e. employs x specialist from Country j). Similarly, ○-■ and ○-■ are the same structure that y specialist from Country j imports x from Country i (i.e. employs x specialist from Country i). Therefore there are six possible structures for the complete international division of labour.

3. Main reasons for the non-existence of a structure:

- Dark----- Immobility of labour producing y .
- No division of labour to sustain the production of good x or good y .
- ~----- No employees to form a firm.

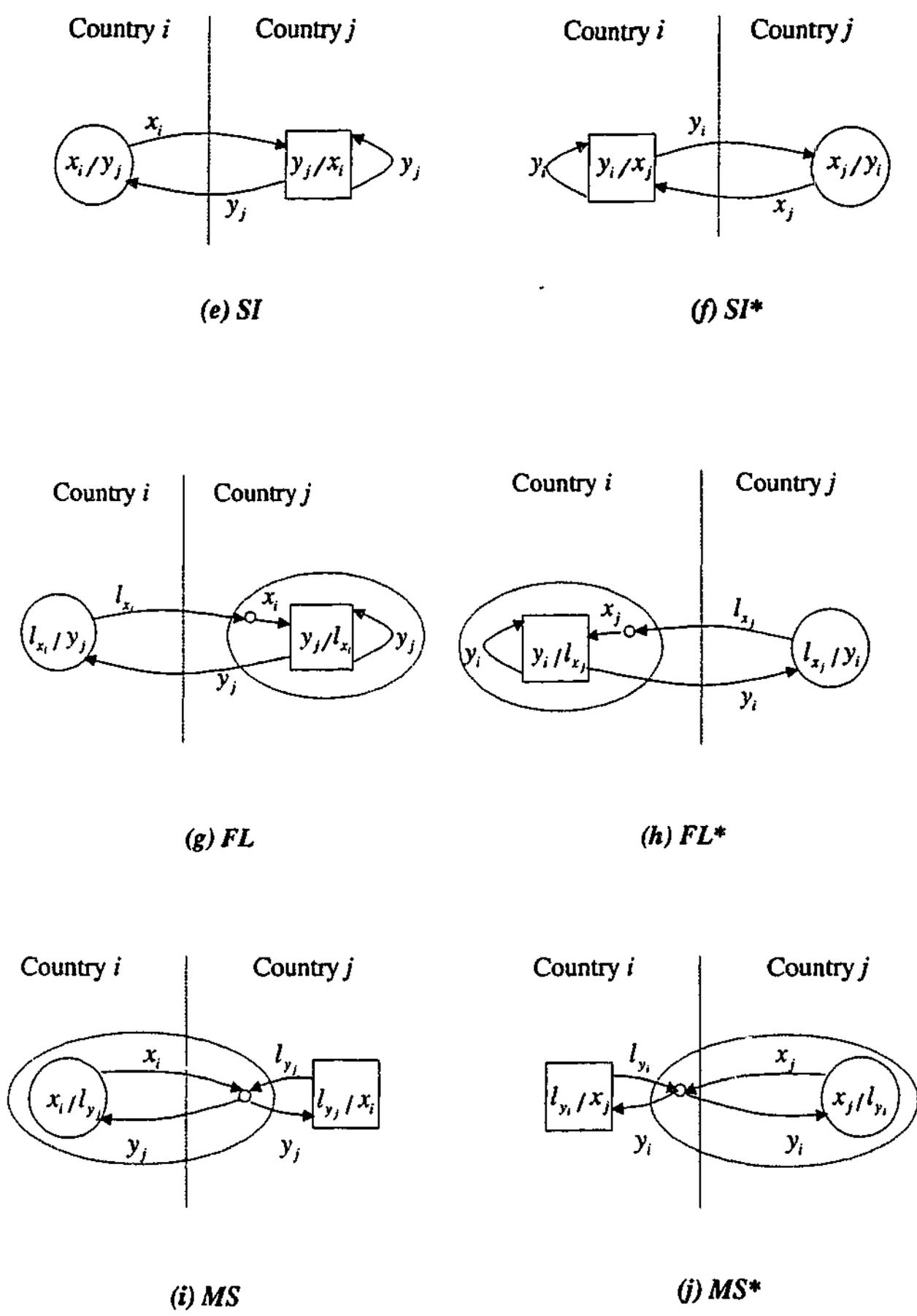


Figure 5 Structures in an open economy

In the following section we examine the structures without superscript *, i.e. *SI*, *FL* and *MS*. Given symmetry within each pair of variants, the specifications and results apply directly to the corresponding structures identified by *.

- **Structure *SI*: simple international division of labour**

This structure comprises configuration (x_i/y_j) in Country i and configuration (y_j/x_i) in Country j . There is no asymmetric distribution of residual rights in this structure. Individuals exchange goods for goods in a condition where no institution of the firm or a related labour market exist.

The decision problem for each individual in Country i in this structure is:

$$(3.5a) \quad \text{Max} \quad U_{x_i} = \theta k_{y_j} y_j^d$$

$$\text{s.t.} \quad x_i^s = l_{x_i} - b_{x_i} \quad l_{x_i} = 1$$

$$P_{x_i} x_i^s = P_{y_j} y_j^d$$

where P_{x_i} and P_{y_j} are the prices of goods x and y , respectively.

The decision problem for each individual in Country j in this structure is:

$$(3.5b) \quad \text{Max} \quad U_{y_j} = y_j$$

$$\text{s.t.} \quad y_j + y_j^s = (\theta k_{x_i} x_i^d)^a l_{y_j} \quad l_{y_j} = 1$$

$$P_{x_i} x_i^d = P_{y_j} y_j^s$$

Having considered the market clearing requirements and the number of individuals in each country in the structure, the corner equilibrium can be derived as follows:

$$(3.5c) \quad U_{SI_i} = a \theta^{1+a} k_{x_i}^a k_{y_j} (1 - b_{x_i})^a \left(\frac{M_i}{M_j} \right)^{a-1}$$

$$(3.5d) \quad U_{SI_j} = (1 - a) \left[\theta k_{x_i} (1 - b_{x_i}) \right]^a \left(\frac{M_i}{M_j} \right)^a$$

$$(3.5e) \quad \frac{P_{x_i}}{P_{y_j}} = a(\theta k_{x_i})^a \left[(1 - b_{x_i}) \frac{M_i}{M_j} \right]^{\alpha-1}$$

where U_{SI_i} and U_{SI_j} are the per capita income in Country i and Country j , respectively,

and $\frac{P_{x_i}}{P_{y_j}}$ is the relative price of the two goods. M_i is the number of individuals selling

good x as well as the whole population in Country i and M_j the number of individuals selling good y as well as the total population in Country j .

• **Structure FL: trade in intermediate goods**

This structure comprises configuration (l_{x_i}/y_j) in Country i and configuration (y_j/l_{x_i}) in Country j . (y_j/l_{x_i}) is a specialist producer of y who hires and directs another country's producers of x to specialise in producing the intermediate good x within his firm. And (l_{x_i}/y_j) denotes a producer of x who is hired by a foreign boss to produce the intermediate good x within his boss's firm in the boss's home country and imports the final good to his native country.

The decision problem for the individual choosing configuration (y_j/l_{x_i}) in this structure is:

$$(3.6a) \quad \text{Max: } U_{y_j} = y_j$$

$$\text{s.t.} \quad y_j + y_j^s = (x_i^d)^a l_{y_j} \quad l_{y_j} = 1$$

$$x_i^s = \delta s_{x_i} l_{x_i} - b_{x_i} \quad l_{x_i} = 1$$

$$x_i^d = N x_i^s$$

$$P_{y_j} y_j^s = W_j N l_{x_i} = W_j N$$

The decision problem for the individual choosing configuration (l_{x_i}/y_j) in this structure is:

$$(3.6b) \quad \text{Max: } U_{x_i} = \theta k_{y_j} y_i^d$$

$$\text{s.t.} \quad P_{y_j} y_i^d = W_j l_{x_i}$$

Having considered the market clearing and the number of individuals in the structure, the corner equilibrium can be derived as follows:

$$(3.6c) \quad U_{FL_i} = \theta a \left(\frac{M_j}{M_i} \right)^{1-a} k_{y_j} (\delta s_{x_i} - b_{x_i})^a$$

$$(3.6d) \quad U_{FL_j} = (1-a) \left(\frac{M_i}{M_j} \right)^a (\delta s_{x_i} - b_{x_i})^a$$

$$(3.6e) \quad \frac{W_j}{P_{y_j}} = \left(\frac{M_j}{M_i} \right)^{1-a} a (\delta s_{x_i} - b_{x_i})^a$$

• **Structure MS: international firm**

This structure stretches across two countries and comprises configuration (l_{y_j}/x_i) and configuration (x_i/l_{y_j}) . (x_i/l_{y_j}) is a specialist producer of x from Country i who sets up a firm in Country j where he hires local workers and directs them to specialise in producing the final good y by using his output of x within his firm. And (l_{y_j}/x_i) denotes a worker who is hired to produce the final good y by using the intermediate good within his foreign boss's firm and buys the final good with his wage.

The decision problem for the individual choosing configuration (x_i/l_{y_j}) in this structure is:

$$(3.7a) \quad \text{Max:} \quad U_{x_i} = \theta Y_j$$

$$\text{s.t.} \quad Y_j + Y_j^s = N y_j^s$$

$$y_j^s = (x_i^d)^a s_{y_j} l_{y_j} \quad l_{y_j} = 1$$

$$x_i^d = \frac{x_i^x}{N}$$

$$x_i^s = \delta l_{x_i} - b_{x_i} \quad l_{x_i} = 1$$

$$P_{y_j} Y_j^s = W_j l_{y_j} N = W_j N$$

The decision problem for the individual choosing configuration (l_{y_j}/x_i) in this structure is:

$$(3.7b) \text{ Max: } U_{y_j} = k_{y_j} y_j^d$$

$$\text{s.t. } P_{y_j} y_j^d = W_j l_{y_j} = W_j$$

Having considered the market clearing and the number of individuals in the structure, the corner equilibrium can be derived as follows:

$$(3.7c) \quad U_{MS_i} = \theta a \left(\frac{M_j}{M_i} \right)^{1-a} s_{y_j} (\delta - b_{x_i})^a$$

$$(3.7d) \quad U_{MS_j} = (1-a) \left(\frac{M_i}{M_j} \right)^a k_{y_j} s_{y_j} (\delta - b_{x_i})^a$$

$$(3.7e) \quad \frac{W_j}{P_{y_j}} = \left(\frac{M_i}{M_j} \right)^a (1-a) s_{y_j} (\delta - b_{x_i})^a$$

The structures of all configurations and their utilities in both closed and open economy scenarios are shown in Table 3. The relative prices of the two goods and wages in various structures are shown in Table 4. And the number of specialists in each structure in the closed economy is specified in Table 5.

Table 3

Configurations and utilities

	Structure	Form	Utility in Country i	Utility in Country j
I	A	A	$a^a \left(\frac{1-b_{x_i}}{1+a} \right)^{1+a}$	$a^a \left(\frac{1-b_{x_j}}{1+a} \right)^{1+a}$
	SD		$a^a (1-a)^{1-a} [k_{x_i} k_{y_i} (1-b_{x_i})]^a$	$a^a (1-a)^{1-a} [k_{x_j} k_{y_j} (1-b_{x_j})]^a$
	FY		$a^a (1-a)^{1-a} [k_{y_i} (s_{x_i} - b_{x_i})]^a$	$a^a (1-a)^{1-a} [k_{y_j} (s_{x_j} - b_{x_j})]^a$
	FX		$a^a (1-a)^{1-a} s_{y_i} k_{y_i}^{1-a} (1-b_{x_i})^a$	$a^a (1-a)^{1-a} s_{y_j} k_{y_j}^{1-a} (1-b_{x_j})^a$
II	SI		$a\theta^{1+a} k_{x_i}^a k_{y_i} (1-b_{x_i})^a \left(\frac{M_j}{M_i} \right)^{1-a}$	$(1-a) [\theta k_{x_j} (1-b_{x_j})]^a \left(\frac{M_i}{M_j} \right)^a$
	FL		$\theta a \left(\frac{M_j}{M_i} \right)^{1-a} k_{y_i} (\delta s_{x_i} - b_{x_i})^a$	$(1-a) \left(\frac{M_i}{M_j} \right)^a (\delta s_{x_j} - b_{x_j})^a$
	MS		$\theta a \left(\frac{M_j}{M_i} \right)^{1-a} s_{y_i} (\delta - b_{x_i})^a$	$(1-a) \left(\frac{M_i}{M_j} \right)^a k_{y_j} s_{y_j} (\delta - b_{x_j})^a$
III	SI*		$(1-a) [\theta k_{x_j} (1-b_{x_j})]^a \left(\frac{M_j}{M_i} \right)^{1-a}$	$a\theta^{1+a} k_{x_i}^a k_{y_i} (1-b_{x_i})^a \left(\frac{M_i}{M_j} \right)^{1-a}$
	FL*		$(1-a) \left(\frac{M_j}{M_i} \right)^a (\delta s_{x_j} - b_{x_j})^a$	$\theta a \left(\frac{M_i}{M_j} \right)^{1-a} k_{y_i} (\delta s_{x_j} - b_{x_j})^a$
	M:*		$(1-a) \left(\frac{M_j}{M_i} \right)^a k_{y_i} s_{y_i} (\delta - b_{x_j})^a$	$\theta a \left(\frac{M_i}{M_j} \right)^{1-a} s_{y_i} (\delta - b_{x_j})^a$

Note: ○---x; □---y; Shaded---Boss; Underlined---Location of the firm.

Table 4

Relative price

	Structure	Country i	Country j
	A	N/A	N/A
	SD	$\frac{P_{x_i}}{P_{y_i}} = \left[\frac{k_{y_i}(1-b_{x_i})}{1-a} \right]^{a-1} (ak_{x_i})^a$	$\frac{P_{x_j}}{P_{y_j}} = \left[\frac{k_{y_j}(1-b_{x_j})}{1-a} \right]^{a-1} (ak_{x_j})^a$
I	FY	$\frac{W_{x_i}}{P_{y_i}} = \left(\frac{k_{y_i}}{1-a} \right)^{a-1} \left[a(s_{x_i} - b_{x_i}) \right]^a$	$\frac{W_{x_j}}{P_{y_j}} = \left(\frac{k_{y_j}}{1-a} \right)^{a-1} \left[a(s_{x_j} - b_{x_j}) \right]^a$
	FX	$\frac{W_{y_i}}{P_{y_i}} = \left[\frac{(1-b_{x_i})a}{k_{y_i}} \right]^a s_{y_i} (1-a)^{1-a}$	$\frac{W_{y_j}}{P_{y_j}} = \left[\frac{(1-b_{x_j})a}{k_{y_j}} \right]^a s_{y_j} (1-a)^{1-a}$
	SI	$\frac{P_{x_i}}{P_{y_j}} = a(\theta k_{x_i})^a \left[(1-b_{x_i}) \frac{M_i}{M_j} \right]^{a-1}$	
II	FL	$\frac{W_j}{P_{y_j}} = \left(\frac{M_j}{M_i} \right)^{1-a} a(\delta s_{x_i} - b_{x_i})^a$	
	MS	$\frac{W_j}{P_{y_j}} = \left(\frac{M_j}{M_i} \right)^a (1-a)s_{y_j} (\delta - b_{x_i})^a$	
	SI*	$\frac{P_{x_i}}{P_{y_i}} = a(\theta k_{x_i})^a \left[(1-b_{x_i}) \frac{M_j}{M_i} \right]^{a-1}$	
III	FL*	$\frac{W_i}{P_{y_i}} = \left(\frac{M_i}{M_j} \right)^{1-a} a(\delta s_{x_i} - b_{x_i})^a$	
	MS*	$\frac{W_i}{P_{y_i}} = \left(\frac{M_i}{M_j} \right)^a (1-a)s_{y_i} (\delta - b_{x_i})^a$	

Table 5 **Number of specialists in the closed economy**

Structure	Country <i>i</i>	Country <i>j</i>
<i>A</i>	N/A	N/A
<i>SD</i>	$\frac{M_{x_i}}{M_{y_i}} = \frac{ak_{y_i}}{1-a}$	$\frac{M_{x_j}}{M_{y_j}} = \frac{ak_{y_j}}{1-a}$
<i>FY</i>	$\frac{M_{x_i}}{M_{y_i}} = \frac{ak_{y_i}}{1-a}$	$\frac{M_{x_j}}{M_{y_j}} = \frac{ak_{y_j}}{1-a}$
<i>FX</i>	$\frac{M_{x_i}}{M_{y_i}} = \frac{a}{(1-a)k_{y_i}}$	$\frac{M_{x_j}}{M_{y_j}} = \frac{a}{(1-a)k_{y_j}}$

3.3.2. **General equilibrium and evolution of structures**

This section partitions the parameter space into subspaces within each of which a particular structure occurs in equilibrium. The method used here is based on the Yao theorem (see Yang, 2001, p.156): in an economy with a continuum of *ex ante* identical consumer-producers who have rational and convex preferences and production functions which display individual specific economies of specialisation, a Walrasian general equilibrium exists; it is the Pareto optimum corner equilibrium. Here, the Pareto optimum corner equilibrium is the corner equilibrium with the highest per capita real income. As both individuals and production functions in our model meet the relevant conditions in the Yao theorem, all we have to do in solving for the general equilibrium is to identify the Pareto optimum corner equilibrium from the 20 corner equilibria we have examined above. We let per capita real incomes in each pair of structures be equal and then obtain equations which partition the parameter space of 14 dimensions set by 14 parameters $(a, \theta, \delta, b_{x_i}, b_{x_j}, k_{x_i}, k_{x_j}, k_{y_i}, k_{y_j}, s_{x_i}, s_{x_j}, s_{y_i}, s_{y_j}, \frac{M_i}{M_j})$ into subspaces.

Then we identify which structure is the general equilibrium structure within each of the subspaces.

Part I in Table 3 contains closed economy configurations. Both countries have the same

configuration with respect to each structure. Parts II and III contain configurations involving complete international division of labour between the two countries, and any two configurations in the same row constitute an inseparable pair of structures for the two countries. As the pairs SI and SI^* , FL and FL^* , and MS and MS^* are each symmetrical, the result of analysis for SI_i , FL_i , and MS_i is applicable for SI_j^* , FL_j^* and MS_j^* and that for SI_j , FL_j , and MS_j is applicable for SI_i^* , FL_i^* and MS_i^* . Therefore, we only need to analyse configurations in Parts I and II. The results of the analysis of Part II are applicable to Part III by making some appropriate changes.

Comparisons between per capita real incomes in each pair of structures in Parts I and II for the parameter subspaces yield the results of the general equilibrium and its inframarginal comparative statics, which are summarised in Table 6.

Table 6 The general equilibrium and its inframarginal comparative statics

Values of k_{x_i} and k_{x_j}	$k_{x_i} < r_i$ $k_{x_j} < r_j$											
Values of k_{y_i} and k_{y_j}	$k_{y_i} < v_{iia}$ $k_{y_j} < v_{jia}$						$k_{y_i} > v_{iia}$ $k_{y_j} > v_{jia}$					
Values of $\frac{M_j}{M_i}, k_{y_i}$ and k_{y_j}	$\frac{M_j}{M_i} < v_{ia}$	$\frac{M_j}{M_i} > v_{ia}$	$\frac{M_j}{M_i} < v_{ib}$	$\frac{M_j}{M_i} > v_{ib}$	$\frac{M_j}{M_i} < v_{if}$	$\frac{M_j}{M_i} > v_{if}$	$k_{y_i} < v_{id}$	$k_{y_i} > v_{id}$	$k_{y_i} < v_{ic}$	$k_{y_i} > v_{ic}$	$k_{y_i} < v_{ie}$	$k_{y_i} > v_{ie}$
	$\frac{M_i}{M_j} < v_{ja}$	$\frac{M_i}{M_j} > v_{ja}$	$\frac{M_i}{M_j} < v_{jb}$	$\frac{M_i}{M_j} > v_{jb}$	$\frac{M_i}{M_j} < v_{jf}$	$\frac{M_i}{M_j} > v_{jf}$	$k_{y_j} < v_{jd}$	$k_{y_j} > v_{jd}$	$k_{y_j} < v_{jc}$	$k_{y_j} > v_{jc}$	$k_{y_j} < v_{je}$	$k_{y_j} > v_{je}$
Equilibrium structure	A	MS	A	FL	A	SI	A	FY	A	FX	A	SD
Values of k_{x_i} and k_{x_j}	$k_{x_i} > r_i$ $k_{x_j} > r_j$											
Values of k_{y_i} and k_{y_j}	$k_{y_j} < v_{ji}$ $k_{y_i} < v_{ji}$						$k_{y_j} > v_{ji}$ $k_{y_i} > v_{ji}$					
Values of $\frac{M_j}{M_i}, k_{y_i}$ and k_{y_j}	$\frac{M_j}{M_i} < v_{ia}$	$\frac{M_j}{M_i} > v_{ia}$	$\frac{M_j}{M_i} < v_{ib}$	$\frac{M_j}{M_i} > v_{ib}$	$\frac{M_j}{M_i} < v_{if}$	$\frac{M_j}{M_i} > v_{if}$	$k_{y_i} < v_{ic}$	$k_{y_i} > v_{ic}$	$k_{y_i} < v_{ie}$	$k_{y_i} > v_{ie}$	$k_{y_i} < v_{id}$	$k_{y_i} > v_{id}$
	$\frac{M_i}{M_j} < v_{ja}$	$\frac{M_i}{M_j} > v_{ja}$	$\frac{M_i}{M_j} < v_{jb}$	$\frac{M_i}{M_j} > v_{jb}$	$\frac{M_i}{M_j} < v_{jf}$	$\frac{M_i}{M_j} > v_{jf}$	$k_{y_j} < v_{jc}$	$k_{y_j} > v_{jc}$	$k_{y_j} < v_{je}$	$k_{y_j} > v_{je}$	$k_{y_j} < v_{jd}$	$k_{y_j} > v_{jd}$
Equilibrium structure	A	MS	A	FL	A	SI	A	FX	A	SD	A	FY

Where the values of the variables are listed in the following table.

$r_i \equiv \frac{s_{x_i} - b_{x_i}}{1 - b_{x_i}}$ $r_j \equiv \frac{s_{x_j} - b_{x_j}}{1 - b_{x_j}}$	$v_{i_1} \equiv \tilde{k}_{y_j} \equiv s_{y_j} \left(\frac{\delta - b_{x_i}}{\delta s_{x_i} - b_{x_i}} \right)^a$ $v_{j_1} \equiv \tilde{k}_{y_j} \equiv \frac{1}{s_{y_j}} \left(\frac{\delta s_{x_i} - b_{x_i}}{\delta - b_{x_i}} \right)^a$	$v_{i_{1a}} \equiv \tilde{k}_{y_i} \equiv s_{y_i}^{\frac{1}{2a-1}} \left(\frac{1 - b_{x_i}}{s_{x_i} - b_{x_i}} \right)^{\frac{a}{2a-1}}$ $v_{j_{1a}} \equiv \tilde{k}_{y_j} \equiv s_{y_j}^{\frac{1}{2a-1}} \left(\frac{1 - b_{x_j}}{s_{x_j} - b_{x_j}} \right)^{\frac{a}{2a-1}}$
$v_{i_a} \equiv \frac{\tilde{M}_j}{M_i} \equiv \frac{(1 - b_{x_i})^{\frac{1+a}{1-a}}}{a(1+a)^{\frac{1+a}{1-a}} (\theta s_{y_j})^{\frac{1}{1-a}} (\delta - b_{x_i})^{\frac{a}{1-a}}}$ $v_{j_a} \equiv \frac{\tilde{M}_i}{M_j} \equiv \frac{a}{(\delta - b_{x_i}) [(1-a)k_{y_j} s_{y_j}]^{\frac{1}{a}}} \left(\frac{1 - b_{x_j}}{1+a} \right)^{\frac{1+a}{a}}$	$v_{i_b} \equiv \frac{\tilde{M}_j}{M_i} \equiv \frac{1}{a(\theta k_{y_j})^{\frac{1}{1-a}} (1+a)^{\frac{1+a}{1-a}}} \left[\frac{(1 - b_{x_i})^{1+a}}{(\delta s_{x_i} - b_{x_i})^a} \right]^{\frac{1}{1-a}}$ $v_{j_b} \equiv \frac{\tilde{M}_i}{M_j} \equiv \frac{a}{(1+a)^{\frac{1+a}{a}} (1-a)^{\frac{1}{a}}} \frac{(1 - b_{x_j})^{\frac{1+a}{a}}}{(\delta s_{x_i} - b_{x_i})}$	$v_{i_c} \equiv \tilde{k}_{y_i} \equiv \frac{(1+a)^{\frac{a+1}{a-1}}}{1-a} \left(\frac{1 - b_{x_i}}{s_{y_i}} \right)^{\frac{1}{1-a}}$ $v_{j_c} \equiv \tilde{k}_{y_j} \equiv \frac{(1+a)^{\frac{a+1}{a-1}}}{1-a} \left(\frac{1 - b_{x_j}}{s_{y_j}} \right)^{\frac{1}{1-a}}$
$v_{i_d} \equiv \tilde{k}_{y_i} \equiv \left[\frac{1}{(1+a)^{1+a} (1-a)^{1-a}} \right]^{\frac{1}{a}} \frac{(1 - b_{x_i})^{\frac{1+a}{a}}}{s_{x_i} - b_{x_i}}$ $v_{j_d} \equiv \tilde{k}_{y_j} \equiv \left[\frac{1}{(1+a)^{1+a} (1-a)^{1-a}} \right]^{\frac{1}{a}} \frac{(1 - b_{x_j})^{\frac{1+a}{a}}}{s_{x_j} - b_{x_j}}$	$v_{i_e} \equiv \tilde{k}_{y_i} \equiv \frac{1}{k_{x_i}} \left[\frac{1 - b_{x_i}}{(1+a)^{1+a} (1-a)^{1-a}} \right]^{\frac{1}{a}}$ $v_{j_e} \equiv \tilde{k}_{y_j} \equiv \frac{1}{k_{x_j}} \left[\frac{1 - b_{x_j}}{(1+a)^{1+a} (1-a)^{1-a}} \right]^{\frac{1}{a}}$	$v_{i_f} \equiv \frac{\tilde{M}_j}{M_i} \equiv \frac{1}{a} \left[\frac{1}{\theta(1+a)} \right]^{\frac{1+a}{1-a}} \left(\frac{1 - b_{x_i}}{k_{x_i}^a k_{y_j}} \right)^{\frac{1}{1-a}}$ $v_{j_f} \equiv \frac{\tilde{M}_i}{M_j} \equiv \frac{a}{[(1-a)(1+a)^{1+a}]^{\frac{1}{a}} \theta k_{x_i}} \frac{(1 - b_{x_j})^{\frac{1+a}{a}}}{(1 - b_{x_i})}$

* See Appendix 2 for calculations.

In the following sections we interpret the results of Table 6. For simplicity, we assume the value of a is close to 0.5 but does not equal 0.5 in the analysis.

3.3.2.1. *The range of the division of labour*

A precondition for the existence of the international division of labour is that the international transaction efficiency coefficient for final goods (θ) and the international transfer efficiency coefficient for cross-border movement of professionals (δ) are not close to zero. Otherwise, cross-border transaction costs would exhaust the product with the result that utilities in SI_i , FL_i , MS_i tend to zero. Due to the inseparability of SI_i and SI_j , FL_i and FL_j , and MS_i and MS_j , this would in turn result in the non-existence of SI_j , FL_j , MS_j .

Given this precondition, the occurrence of the international division of labour in general equilibrium depends on the transaction conditions for labour and goods in the two countries. There are two scenarios in which a structure with international division of labour might be the general equilibrium.

Scenario 1: $k_{yi} < v_{i14}$ and $k_{yj} < v_{j14}$ when $k_{xi} < r_i$ and $k_{xj} < r_j$

This means that when each country's domestic transaction efficiency coefficient for intermediate goods is smaller than each country's $\frac{s_x - b_x}{1 - b_x}$, the general equilibrium would

be one of the structures with international division of labour provided that each country's

transaction efficiency for final goods is lower than $s_y^{\frac{1}{2a-1}} \left(\frac{1 - b_x}{s_x - b_x} \right)^{\frac{a}{2a-1}}$. The term

$k_x < \frac{s_x - b_x}{1 - b_x}$ means that the transaction efficiency for x specialists is sufficiently high in

relation to the transaction efficiency for x goods that the output of a specialist of x employed in a y 's firm is larger than the net quantity of his product received by a buyer under self-employed condition. Under such a condition, a structure with international division of labour could be the general equilibrium if the transaction efficiency for producers of final goods is also relatively high in relation to transaction efficiency for

final goods (i.e., $k_y < \left(\frac{s_y}{k_x^a}\right)^{\frac{1}{2a-1}}$) in both countries.

When a is slightly larger than 0.5, the slightly higher transaction efficiency for producers of good y compared with the transaction efficiency for intermediate goods increases the possibility that structures with international division of labour become general equilibrium. When a is slightly smaller than 0.5, we see the opposite outcome.

Scenario 2: $k_y < \min\{v_{i1}, v_{j1}\}$ when $k_{xi} > r_i$ and $k_{xj} > r_j$

This means that provided the transaction efficiency coefficient for intermediate goods is larger than $\frac{s_x - b_x}{1 - b_x}$ in both countries, the general equilibrium will involve international

division of labour so long as final goods transactions in the host country are sufficiently efficient. Specifically, it requires that the transaction efficiency coefficient for final

goods in the host country is smaller than the smaller one of $s_{y_j} \left(\frac{\delta - b_{x_i}}{\delta s_{x_i} - b_{x_i}}\right)^a$ and

$\frac{1}{s_{y_j}} \left(\frac{\delta s_{x_i} - b_{x_i}}{\delta - b_{x_i}}\right)^a$. Here the value of the international transfer efficiency coefficient for

cross-border movement of professionals, δ , is critical. If $s_{y_j} \left(\frac{\delta - b_{x_i}}{\delta s_{x_i} - b_{x_i}}\right)^a$ is smaller than

$\frac{1}{s_{y_j}} \left(\frac{\delta s_{x_i} - b_{x_i}}{\delta - b_{x_i}}\right)^a$, then the emergence of international division of labour hinges on

whether the value of δ is sufficiently large relative to the value of b_{x_i} . When

$s_{y_j} \left(\frac{\delta - b_{x_i}}{\delta s_{x_i} - b_{x_i}}\right)^a$ is larger than $\frac{1}{s_{y_j}} \left(\frac{\delta s_{x_i} - b_{x_i}}{\delta - b_{x_i}}\right)^a$, we see the opposite situation.

Correspondingly, there are two cases where the general equilibrium involves structures without international division of labour. One occurs when both countries' transaction

efficiency coefficient for intermediate goods is smaller than $\frac{s_x - b_x}{1 - b_x}$, but their respective

transaction efficiency for final goods is larger than $s_y \frac{1}{2a-1} \left(\frac{1-b_x}{s_x-b_x} \right)^{\frac{a}{2a-1}}$. The other arises that when the transaction efficiency coefficient for intermediate goods in both countries is larger than $\frac{s_x - \delta_x}{1-b_x}$ and the transaction efficiency coefficient for final goods in the host

country is also larger than the larger one of $s_{y_j} \left(\frac{\delta - b_{x_i}}{\delta s_{x_i} - b_{x_i}} \right)^a$ and $\frac{1}{s_{y_j}} \left(\frac{\delta s_{x_i} - b_{x_i}}{\delta - b_{x_i}} \right)^a$. The

impacts of relevant variables on determining the general equilibrium structure are opposite to the situation with international division of labour.

The results of the above analysis lead to Proposition 1. As general equilibrium analysis of closed economies is not the intention of this chapter, we confine the discussion of the findings about domestic structures in Proposition 1.

Proposition 1: The range of division of labour is essentially dependent upon transaction efficiencies for labour and goods in and between the two countries.

Closed economy: If the international transaction efficiency for goods (θ) and the international transfer efficiency for professionals (δ) are extremely low, the international division of labour cannot emerge. Under such a condition,

(1) If the domestic transaction efficiencies for goods and labour in both countries are also sufficiently close to zero, utilities in all structures with domestic or international trade and division of labour tend to zero. Hence, transactions are prohibitively costly, and the Autarky corner equilibrium is the general equilibrium.

(2) If domestic transaction efficiencies for goods and labour are sufficiently high, then a structure with domestic division of labour will occur in general equilibrium due to endogenous comparative advantage which is generated by the fixed learning cost in producing intermediate goods.

(2.1) If transaction efficiencies for intermediate goods and final goods are sufficiently higher than transaction efficiencies for labour producing these two kinds of goods, domestic division of labour will be achieved by the markets for intermediate and final goods in the absence of labour exchange and the associated institution of the firm.

(2.2) If transaction efficiencies for final goods and labour producing final goods or intermediate goods are sufficiently higher than transaction efficiency for intermediate goods, then domestic division of labour will be organised by the markets for final good and labour and associated with the institution of the firm. The relative value of s_x in terms of s_y determines which kind of specialists will be the owner of the firm. If s_x is sufficiently larger than

s_y , the y specialist is the owner. Otherwise, the x specialist is the owner.

Open economy: If international transaction efficiency for goods (θ) and international transfer efficiency for professionals (δ) are sufficiently high, the international division of labour may occur in general equilibrium due to exogenous comparative advantage in technology ($b_{x_i} \neq b_{x_j}$) and transaction conditions for goods and labour.

Specifically, if both countries' transaction efficiencies for intermediate goods and final goods are sufficiently low in relation to transaction efficiencies for their producers, a structure with international division of labour will be the general equilibrium; If both countries' transaction efficiencies for intermediate goods are relatively high in relation to transaction efficiencies for the two types of labour producing them, the emergence of the international division of labour depends upon whether the transaction efficiency coefficient for final goods in the host country is sufficiently small, relative to the values of transaction efficiency coefficient for labour and fixed learning cost in producing final goods in home country, as well as international transfer efficiency coefficient for professionals.

3.3.2.2. Trade in final goods, trade in intermediate goods, or FDI

When international division of labour prevails, which of the three structures (i.e., SI --trade in final goods, FL --trade in intermediate goods and MS --foreign direct investment) in the general equilibrium depends upon the value of $\frac{M_j}{M_i}$ (i.e., the relative size of the two countries) in terms of values of other variables in and between the two countries.

- Structure SI , international trade in final goods, is the general equilibrium if

$$\frac{M_j}{M_i} \in (v_{ij}, 1/v_{jf}), \text{ where}$$

$$v_{ij} \equiv \frac{1}{a} \left[\frac{1}{\theta(1+a)} \right]^{\frac{1+a}{1-a}} \left(\frac{1-b_{x_i}}{k_{x_i}^a k_{y_j}} \right)^{\frac{1}{1-a}},$$

$$\frac{1}{v_{jf}} \equiv \frac{[(1-a)(1+a)^{1+a}]^{\frac{1}{a}} \theta k_{x_i} (1-b_{x_i})}{a (1-b_{x_j})^{\frac{1+a}{a}}}.$$

- Structure FL , international trade in intermediate goods, is the general equilibrium if

$\frac{M_j}{M_i} \in (v_{ib}, 1/v_{jb})$, where

$$v_{ib} \equiv \frac{1}{a(\theta k_{y_j})^{\frac{1}{1-a}}(1+a)^{\frac{1+a}{1-a}} \left[\frac{(1-b_{x_i})^{1+a}}{(\delta s_{x_i} - b_{x_i})^a} \right]^{\frac{1}{1-a}}}$$

$$\frac{1}{v_{jb}} \equiv \frac{(1+a)^{\frac{1+a}{a}}(1-a)^{\frac{1}{a}}(\delta s_{x_i} - b_{x_i})}{a(1-b_{x_j})^{\frac{1+a}{a}}}$$

• Structure with international direct investment, i.e., *MS*, is the general equilibrium, if

$\frac{M_j}{M_i} \in (v_{ia}, 1/v_{ja})$, where

$$v_{ia} \equiv \frac{(1-b_{x_i})^{\frac{1+a}{1-a}}}{a(1+a)^{\frac{1+a}{1-a}}(\theta s_{y_j})^{\frac{1}{1-a}}(\delta - b_{x_i})^{\frac{a}{1-a}}}$$

$$\frac{1}{v_{ja}} \equiv \frac{(\delta - b_{x_i}) \left[(1-a)k_{y_j}s_{y_j} \right]^{\frac{1}{a}} \left(\frac{1+a}{1-b_{x_j}} \right)^{\frac{1+a}{a}}}{a}$$

For a given $\frac{M_j}{M_i}$, comparison of the values of each pair of v_i and v_j for two adjacent structures can generate the terms for which the general equilibrium jumps from one structure to another.

Comparing values of v_{if} and v_{ib} , $1/v_{jf}$ and $1/v_{jb}$ generates the term for the threshold between

SI and *FL*: $\bar{k}_{x_{j\beta}} \equiv \frac{\delta s_{x_i} - b_{x_i}}{\theta(1-b_{x_i})}$. When $k_{x_i} > \bar{k}_{x_{j\beta}}$, Structure *SI* is superior to Structure *FL*.

When the relative value of k_{x_i} changes from $k_{x_i} > \bar{k}_{x_{j\beta}}$ to $k_{x_i} < \bar{k}_{x_{j\beta}}$, Structure *FL* will replace *SI* as the general equilibrium solution. This change can be a result of sufficient improvements in international transfer efficiency for labour and/or home country's transaction efficiency for professionals (x producers), or sufficient reduction in international transaction efficiency for final goods and/or in transaction efficiency for intermediate goods at home.

This leads to Proposition 2.

Proposition 2: International trade in final goods would be superior to that in intermediate goods if international transaction efficiency for final goods is sufficiently high but international transfer efficiency and home country's transaction efficiency for producers of intermediate goods are sufficiently low. When international transfer efficiency for cross-border movement of labour and home country transaction efficiency for labour are sufficiently improved, or international transaction efficiency for final goods and transaction efficiency for intermediate goods at home are sufficiently reduced, international trade in final goods becomes less profitable and international trade in intermediate goods becomes the general equilibrium.

Comparing values of v_{ia} and v_{ib} , $1/v_{ja}$ and $1/v_{jb}$ generates the terms for the critical point

between *MS* and *FL*: $\bar{k}_{y_{ai}} \equiv s_{y_j} \left(\frac{\delta - b_{x_i}}{\delta s_{x_i} - b_{x_i}} \right)^a$ for country *i* and $\bar{k}_{y_{aj}} \equiv \frac{1}{s_{y_j}} \left(\frac{\delta s_{x_i} - b_{x_i}}{\delta - b_{x_i}} \right)^a$ for

country *j*. When $k_{y_j} > \bar{k}_{y_{ai}}$ and $k_{y_j} < \bar{k}_{y_{aj}}$, or $s_{y_j}^{\frac{1}{a}} \left(\frac{\delta - b_{x_i}}{\delta s_{x_i} - b_{x_i}} \right) < 1$, Structure *FL* is

superior to Structure *MS*. When the relative values of k_{y_j} change from $k_{y_j} > \bar{k}_{y_{ai}}$ and

$k_{y_j} < \bar{k}_{y_{aj}}$ to $k_{y_j} < \bar{k}_{y_{ai}}$ and $k_{y_j} > \bar{k}_{y_{aj}}$, or from $s_{y_j}^{\frac{1}{a}} \left(\frac{\delta - b_{x_i}}{\delta s_{x_i} - b_{x_i}} \right) < 1$ to $s_{y_j}^{\frac{1}{a}} \left(\frac{\delta - b_{x_i}}{\delta s_{x_i} - b_{x_i}} \right) > 1$,

Structure *MS* will take the place of *FL* to become the superior structure. This change is mainly a result of sufficient improvements in host country's transaction efficiency for ordinary labour (*y* producers). In addition, improvements in home country's transaction efficiency and international transfer efficiency for professionals (*x* producers) would also help such change since the improvements cause the overseas transaction efficiency coefficient for professionals, δs_{x_i} , closer to b_{x_i} than δ to b_{x_i} .

This leads to Proposition 3.

Proposition 3: International trade in intermediate goods is superior to FDI if host country's transaction efficiency for ordinary labour is sufficiently low. When there are sufficient improvements in host country's transaction efficiency for ordinary labour and a certain degree of improvement in home country's transaction efficiency and international transfer efficiency for professionals, international trade in intermediate goods becomes less profitable and foreign direct investment becomes the superior structure.

Comparing values of v_{ia} and v_{if} , $1/v_{ja}$ and $1/v_{jf}$ can generate the terms for the critical point

between *MS* and *SI*: $\bar{k}_{y_f} \equiv s_{y_j} \left[\frac{\delta - b_{x_i}}{\theta k_{x_i} (1 - b_{x_i})} \right]^a$ for country *i* and $\bar{k}_{y_B} \equiv \frac{1}{s_{y_j}} \left[\frac{\theta k_{x_i} (1 - b_{x_i})}{\delta - b_{x_i}} \right]^a$

for country *j*. When $k_{y_j} > \bar{k}_{y_f}$ and $k_{y_j} < \bar{k}_{y_B}$, or $s_{y_j}^{\frac{1}{a}} \left[\frac{\delta - b_{x_i}}{\theta k_{x_i} (1 - b_{x_i})} \right] < 1$, Structure *SI* is

superior to *MS*. When the relative values of k_{y_j} change from $k_{y_j} > \bar{k}_{y_f}$ and $k_{y_j} < \bar{k}_{y_B}$ to

$k_{y_j} < \bar{k}_{y_f}$ and $k_{y_j} > \bar{k}_{y_B}$, or from $s_{y_j}^{\frac{1}{a}} \left[\frac{\delta - b_{x_i}}{\theta k_{x_i} (1 - b_{x_i})} \right] < 1$ to $s_{y_j}^{\frac{1}{a}} \left[\frac{\delta - b_{x_i}}{\theta k_{x_i} (1 - b_{x_i})} \right] > 1$,

Structure *MS* will take the place of *SI* as the superior structure. This change could be the result of sufficient improvement in the host country transaction efficiency for ordinary labour (*y* producers) and improvements in the international mobility of professionals. This change could also be a result of reduction in international transaction efficiency for final goods and home country's transaction efficiency for professionals (*x* producers).

This leads to Proposition 4.

Proposition 4: International trade in final goods is superior to FDI if international transaction efficiency for final goods and home country's transaction efficiency for intermediate goods are sufficiently high but host country's transaction efficiency for ordinary labour and international transfer efficiency for professionals are sufficiently low. Sufficient improvements in host country's transaction efficiency for ordinary labour and international transfer efficiency for professionals and/or sufficient reduction in international transaction efficiency for final goods and home country's transaction efficiency for intermediate goods would result in FDI becoming the superior structure.

The core ideas of the above three propositions are illustrated in Figure 6.

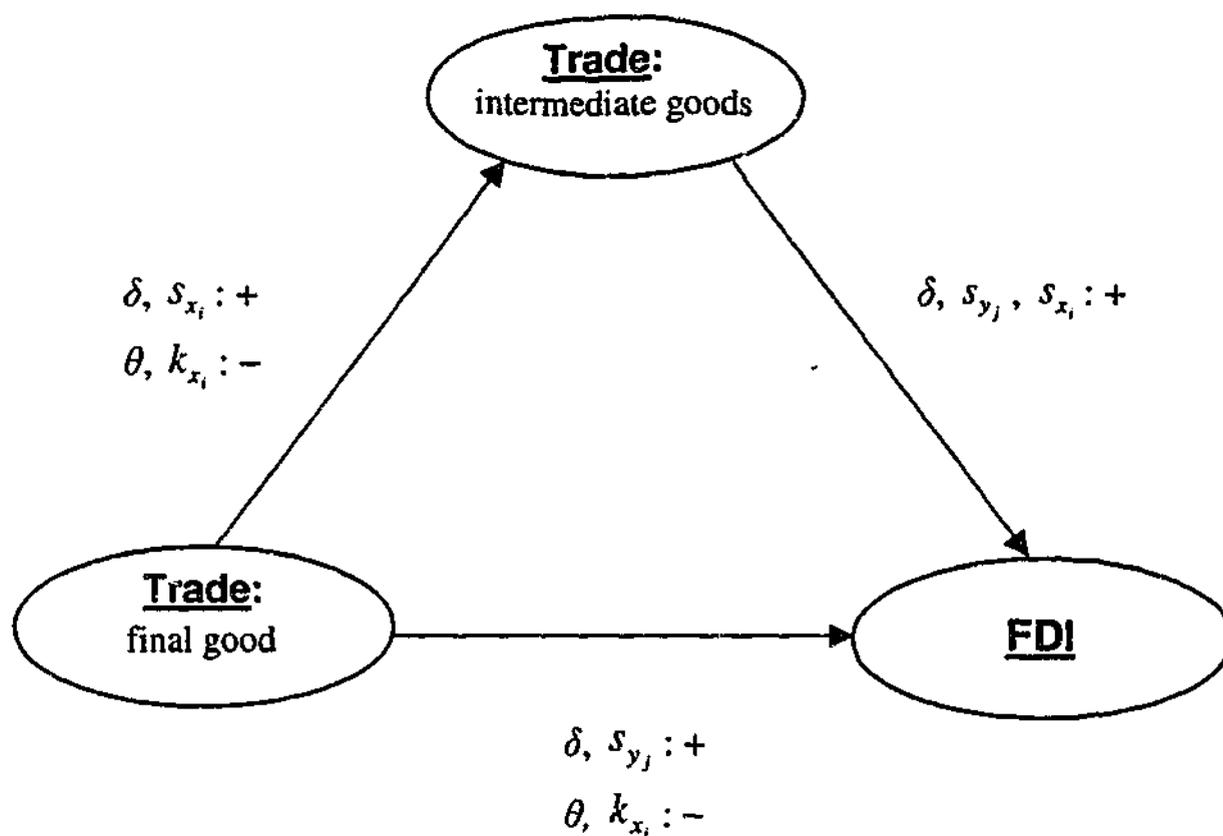


Figure 6 General equilibrium structure and its determining factors

Notes: +: Positive impact; -: Negative impact
 → Direction of change of general equilibrium structure

Synthesising Proposition 2, 3 and 4 leads to Proposition 5 about the general equilibrium structure for organising international activities.

Proposition 5: The general equilibrium in the form of organising international activity depends on the transaction efficiencies for goods relative to transaction efficiencies for labour within and between the two countries.

(5.1) If international transfer efficiency for professionals (δ), home country's transaction efficiency for professionals (s_{x_i}) and host country's transaction efficiency for ordinary labour (s_{y_j}) are sufficiently low, but international transaction efficiency (θ) and host country's transaction efficiency for final goods (k_{y_j}) and home country's transaction efficiency for intermediate goods (k_{x_i}) are sufficiently high, the international division of labour is organised via markets for final goods and intermediate goods in the absence of FDI and MNE.

(5.2) If international transfer efficiency and home country's transaction efficiency for professionals (δ, s_{x_i}) and host country's transaction efficiency for ordinary

labour (s_y) are sufficiently high, but home country's transaction efficiency for intermediate goods (k_x) is sufficiently low, the international division of labour will be organised via FDI and MNE.

3.3.2.3. *Brief discussion*

The advanced Walrasian general equilibrium model yields rich insights into the organisation of foreign direct investment and other international activities. First of all, the decisive factors for the international division of labour are the international transaction efficiency for goods and international transfer efficiency for professionals. This finding is consistent with the evolution of the international division of labour. International trade, the traditional form of international division of labour, involves cross-border movement of goods and merchants. For a long time, difficulties in transportation and communications were the main barriers to trade, and therefore measures to tackle or reduce such barriers were the major concern in trade. Up to the 19th century at least, it was generally quicker and cheaper to conduct commerce across water than by land. Because of this, overseas trade was concentrated around coastal areas, such as the shores of the Mediterranean and the Baltic and North Seas (Reynolds, 1983). According to Kuznets (1967), the sum of exports and imports grew at an average rate of 50.3 and 39.5 per cent per decade during 1850-1880 and 1881-1913, respectively. The ratio of world trade to world output was thus rising quite rapidly, reaching 33 per cent by 1913. Reynolds (1983) stresses that the rapid growth of trade in the 1850-1914 period could scarcely have been realised without the improvement and cheapening of transport, which mainly involved replacement of sailing ships by steam-driving steel ships, which reduced ocean freight rates by 1913 to about 30 per cent of their 1870 level; a world-wide railroad boom, which peaked in the years 1870-1914, and which produced even more spectacular reduction in overland transport costs; and building of a world-wide telegraph network linking would-be sellers and buyers. Completion of the Suez Canal in 1869 was a particularly important development for Asian countries trading with Europe. Similarly, the almost uninterrupted growth of FDI in the thirty-five years since the end of the Second World War was to a large extent sustained by the fact that the aftermath produced an international economic and political climate particularly favourable to foreign business activities (Dunning, 1983, pp.93-94).

When other factors are given, high transaction efficiency for ordinary labour (or for all factors other than those priced indirectly) in the host country and high transaction and transfer efficiencies for professionals from the home country (including all factors related to the indirect pricing) encourage FDI between the two countries. This finding is especially important for explaining FDI from less developed countries to more developed countries, a phenomenon which has puzzled the academic community for a long time. Following our finding, it is easy to understand why the United State, the world most developed country, is the world largest recipient of FDI. Its free market policy and high efficiency contribute to the huge amount inflow of FDI.

The relationships between FDI and other forms of international division of labour, i.e., trade in final goods and trade in intermediate goods, are neither simply complementary nor simply supplementary. As the general equilibrium structure is dependent on the interaction between the specific transaction efficiencies for goods and factors within and between countries, it is meaningless to talk about which relationship should be maintained for a country without considering the prevailing transaction conditions in the relevant countries.

One of the policy implications of our findings is that a country should formulate its foreign economic policies with explicit attention to its technological advantage and transaction efficiencies for goods and factors, relative to those of other countries. For developing countries, the improvement in transaction efficiency for both professional labour and ordinary labour is crucially important for attracting foreign direct investment.

3.4. *Concluding Remarks*

This chapter developed a Walrasian general equilibrium model to investigate the forces that drive the emergence and development of international direct investment. It yields rich findings regarding the organisation of foreign direct investment and other international activities. The methodology of inframarginal analysis differentiates this model from the mainstream theorems in the literature of FDI. So far there is a lack of general equilibrium models in the existing theories of FDI. The limitation of partial equilibrium approaches and descriptions has greatly affected the expressions of some

original ideas. This in turn has affected the exploration of the changing pattern of FDI in the era of globalisation and knowledge economy. Our model contributes in methodology and theory in changing this situation.

This model incorporates various structures ranging from individual autarky in a closed economy to those involving highly international division of labour in an open economy. This facilitates the research on FDI to have a wide perspective and integrated view. We hope this could be of help to incorporate some existing original ideas while to reduce their limits.

3.5. Appendix

3.5.1. Parameters partitioning space

	Parameters for country <i>i</i>	Conditions		Parameters for country <i>j</i>	Conditions
v_{i1}	$k_{y_j} = s_{y_j} \left(\frac{\delta - b_{x_i}}{\delta s_{x_i} - b_{x_i}} \right)^a$	$U_{FLi} = U_{MSi}$	v_{j1}	$k_{y_j} = \frac{1}{s_{y_j}} \left(\frac{\delta s_{x_i} - b_{x_i}}{\delta - b_{x_i}} \right)^a$	$U_{FLj} = U_{MSj}$
v_{i2}	$k_{y_j} = s_{y_j} \left[\frac{\delta - b_{x_i}}{\theta k_{x_i} (1 - b_{x_i})} \right]^a$	$U_{Sii} = U_{MSi}$	v_{j2}	$k_{y_j} = \frac{1}{s_{y_j}} \left[\frac{\theta k_{x_i} (1 - b_{x_i})}{\delta - b_{x_i}} \right]^a$	$U_{Sij} = U_{MSj}$
v_{i3}	$k_{x_i} = \frac{\delta s_{x_i} - b_{x_i}}{\theta (1 - b_{x_i})}$	$U_{Sii} = U_{FLi}$	v_{j3}	$k_{x_i} = \frac{\delta s_{x_i} - b_{x_i}}{\theta (1 - b_{x_i})}$	$U_{Sij} = U_{FLj}$
v_{i4}	$k_{y_i} = \left(\frac{a M_j}{1 - a M_i} \right) \left(\frac{\theta s_{y_j}}{s_{y_i}} \right)^{\frac{1}{1-a}} \left(\frac{\delta - b_{x_i}}{1 - b_{x_i}} \right)^{\frac{a}{1-a}}$	$U_{FXi} = U_{MSi}$	v_{j4}	$k_{y_j} = \frac{a M_j (1 - b_{x_j})}{1 - a M_i \delta - b_{x_i}}$	$U_{FXj} = U_{MSj}$
v_{i5}	$k_{y_i} = \left(\frac{a M_j}{1 - a M_i} \right) \left(\frac{\theta k_{y_j}}{s_{y_i}} \right)^{\frac{1}{1-a}} \left(\frac{\delta s_{x_i} - b_{x_i}}{1 - b_{x_i}} \right)^{\frac{a}{1-a}}$	$U_{FXi} = U_{FLi}$	v_{j5}	$k_{y_j} = \left[\frac{1 - a M_i \delta s_{x_i} - b_{x_i}}{a M_j (1 - b_{x_j})} \right]^{\frac{a}{1-a}} s_{y_j}^{\frac{1}{a-1}}$	$U_{FXj} = U_{FLj}$
v_{i6}	$k_{y_i} = \frac{a M_j}{1 - a M_i} \theta^{\frac{1+a}{1-a}} k_{x_i}^{\frac{a}{1-a}} k_{y_j}^{\frac{1}{1-a}}$	$U_{FXi} = U_{Sii}$	v_{j6}	$k_{y_j} = \left[\frac{1 - a M_i \theta k_{x_i} (1 - b_{x_i})}{a M_j (1 - b_{x_j})} \right]^{\frac{a}{1-a}} s_{y_j}^{\frac{1}{a-1}}$	$U_{FXj} = U_{Sij}$

v_{i7}	$k_{y_i} = \left(\frac{a M_j}{1-a M_i} \right)^{\frac{1-a}{a}} (\theta s_{y_j})^{\frac{1}{a}} \frac{\delta - b_{x_i}}{k_{x_i} (1-b_{x_i})}$	$U_{SDi} = U_{MSi}$	v_{j7}	$k_{y_j} = \left[\frac{1-a M_i}{a M_j} \frac{\delta - b_{x_i}}{(1-b_{x_j}) k_{y_j}} \right]^{\frac{a}{a-1}} s_{y_j}^{\frac{1}{a-1}}$	$U_{SDj} = U_{MSj}$
v_{i8}	$k_{y_i} = \left(\frac{a M_j}{1-a M_i} \right)^{\frac{1-a}{a}} (\theta k_{y_j})^{\frac{1}{a}} \frac{\delta s_{x_i} - b_{x_i}}{k_{x_i} (1-b_{x_i})}$	$U_{SDi} = U_{FLi}$	v_{j8}	$k_{y_j} = \frac{1-a M_i}{a M_j} \frac{\delta s_{x_i} - b_{x_i}}{k_{x_j} (1-b_{x_j})}$	$U_{SDj} = U_{FLj}$
v_{i9}	$k_{y_i} = \left(\frac{a M_j}{1-a M_i} \right)^{\frac{1-a}{a}} \theta^{\frac{1-a}{a}} k_{y_j}^{\frac{1}{a}}$	$U_{SDi} = U_{Si}$	v_{j9}	$k_{y_j} = \frac{1-a M_i}{a M_j} \frac{\theta k_{x_i} (1-b_{x_i})}{k_{x_j} (1-b_{x_j})}$	$U_{SDj} = U_{Sj}$
v_{i10}	$k_{y_i} = \left(\frac{s_{y_i}}{k_{x_i}^a} \right)^{\frac{1}{2a-1}}$	$U_{SDi} = U_{FXi}$	v_{j10}	$k_{y_j} = \left(\frac{s_{y_j}}{k_{x_j}^a} \right)^{\frac{1}{2a-1}}$	$U_{SDj} = U_{FXj}$
v_{i11}	$k_{y_i} = \left[\left(\frac{a}{1-a} \right) \frac{M_j}{M_i} \right]^{\frac{1-a}{a}} (\theta s_{y_j})^{\frac{1}{a}} \frac{\delta - b_{x_i}}{s_{x_i} - b_{x_i}}$	$U_{FYi} = U_{MSi}$	v_{j11}	$k_{y_j} = \left[\frac{1-a M_i}{a M_j} \frac{\delta - b_{x_i}}{s_{x_j} - b_{x_j}} \right]^{\frac{a}{a-1}} s_{y_j}^{\frac{1}{a-1}}$	$U_{FYj} = U_{MSj}$
v_{i12}	$k_{y_i} = \left[\left(\frac{a}{1-a} \right) \frac{M_j}{M_i} \right]^{\frac{1-a}{a}} (\theta k_{y_j})^{\frac{1}{a}} \frac{\delta s_{x_i} - b_{x_i}}{s_{x_i} - b_{x_i}}$	$U_{FYi} = U_{FLi}$	v_{j12}	$k_{y_j} = \frac{1-a M_i}{a M_j} \frac{\delta (s_{x_i} - b_{x_i})}{s_{x_j} - b_{x_j}}$	$U_{FYj} = U_{FLj}$
v_{i13}	$k_{y_i} = \left(\frac{a M_j}{1-a M_i} \right)^{\frac{1-a}{a}} \theta^{\frac{1-a}{a}} k_{y_j}^{\frac{1}{a}} \frac{k_{x_i} (1-b_{x_i})}{s_{x_i} - b_{x_i}}$	$U_{FYi} = U_{Si}$	v_{j13}	$k_{y_j} = \frac{1-a M_i}{a M_j} \frac{\theta k_{x_i} (1-b_{x_i})}{s_{x_j} - b_{x_j}}$	$U_{FYj} = U_{Sj}$
v_{i14}	$k_{y_i} = s_{y_i}^{\frac{1}{2a-1}} \left(\frac{1-b_{x_i}}{s_{x_i} - b_{x_i}} \right)^{\frac{a}{2a-1}}$	$U_{FYi} = U_{FXi}$	v_{j14}	$k_{y_j} = s_{y_j}^{\frac{1}{2a-1}} \left(\frac{1-b_{x_j}}{s_{x_j} - b_{x_j}} \right)^{\frac{a}{2a-1}}$	$U_{FXj} = U_{FYj}$

r_i	$k_{x_i} = \frac{s_{x_i} - b_{x_i}}{1 - b_{x_i}}$	$U_{SDi} = U_{FYi}$	r_j	$k_{x_j} = \frac{s_{x_j} - b_{x_j}}{1 - b_{x_j}}$	$U_{SDj} = U_{FYj}$
v_{ia}	$\frac{M_j}{M_i} = \frac{(1 - b_{x_i})^{\frac{1+a}{1-a}}}{a(1+a)^{\frac{1+a}{1-a}} (\theta s_{y_j})^{\frac{1}{1-a}} (\delta - b_{x_i})^{\frac{a}{1-a}}}$	$U_{Ai} = U_{MSi}$	v_{ja}	$\frac{M_i}{M_j} = \frac{a}{(\delta - b_{x_i}) [(1-a)k_{y_j} s_{y_j}]} \left(\frac{1 - b_{x_j}}{1 + a} \right)^{\frac{1+a}{a}}$	$U_{Aj} = U_{MSj}$
v_{ib}	$\frac{M_j}{M_i} = \frac{1}{a(\theta k_{y_j})^{\frac{1}{1-a}} (1+a)^{\frac{1+a}{1-a}}} \left[\frac{(1 - b_{x_i})^{1+a}}{(\delta s_{x_i} - b_{x_i})^a} \right]^{\frac{1}{1-a}}$	$U_{Ai} = U_{FLi}$	v_{jb}	$\frac{M_i}{M_j} = \frac{a}{(1-a)^{\frac{1}{a}} (\delta s_{x_i} - b_{x_i})} \left(\frac{1 - b_{x_j}}{1 + a} \right)^{\frac{1+a}{a}}$	$U_{Aj} = U_{FLj}$
v_{ic}	$k_{y_i} = \frac{(1+a)^{\frac{a+1}{a-1}} (1 - b_{x_i})^{\frac{1}{1-a}}}{1 - a} \left(\frac{1}{s_{y_i}} \right)^{\frac{1}{1-a}}$	$U_{Ai} = U_{FXi}$	v_{jc}	$k_{y_j} = \frac{(1+a)^{\frac{a+1}{a-1}} (1 - b_{x_j})^{\frac{1}{1-a}}}{1 - a} \left(\frac{1}{s_{y_j}} \right)^{\frac{1}{1-a}}$	$U_{Aj} = U_{FXj}$
v_{id}	$k_{y_i} = \left[\frac{1}{(1+a)^{1+a} (1-a)^{1-a}} \right]^{\frac{1}{a}} \frac{(1 - b_{x_i})^{\frac{1+a}{a}}}{(s_{x_i} - b_{x_i})}$	$U_{Ai} = U_{FYi}$	v_{jd}	$k_{y_j} = \left[\frac{1}{(1+a)^{1+a} (1-a)^{1-a}} \right]^{\frac{1}{a}} \frac{(1 - b_{x_j})^{\frac{1+a}{a}}}{(s_{x_j} - b_{x_j})}$	$U_{Aj} = U_{FYj}$
v_{ie}	$k_{y_i} = \frac{1}{k_{x_i}} \left[\frac{1 - b_{x_i}}{(1+a)^{1+a} (1-a)^{1-a}} \right]^{\frac{1}{a}}$	$U_{Ai} = U_{SDi}$	v_{je}	$k_{y_j} = \frac{1}{k_{x_j}} \left[\frac{1 - b_{x_j}}{(1+a)^{1+a} (1-a)^{1-a}} \right]^{\frac{1}{a}}$	$U_{Aj} = U_{SDj}$
v_{if}	$\frac{M_j}{M_i} = \frac{1}{a} \left[\frac{1}{\theta(1+a)} \right]^{\frac{1+a}{1-a}} \left(\frac{1 - b_{x_i}}{k_{x_i}^a k_{y_i}} \right)^{\frac{1}{1-a}}$	$U_{Ai} = U_{Sii}$	v_{jf}	$\frac{M_i}{M_j} = \left[\frac{1}{(1-a)(1+a)^{1+a}} \right]^{\frac{1}{a}} \frac{a(1 - b_{x_j})^{\frac{1+a}{a}}}{\theta k_{x_i} (1 - b_{x_i})}$	$U_{Aj} = U_{Sij}$

3.5.2. General equilibrium and its inframarginal comparative statics¹³

a. Terms for Country *i*

1. Where $k_{x_i} < \frac{s_{x_i} - b_{x_i}}{1 - b_{x_i}} = r_i$ or $v_{i14} < v_{i13} < v_{i12} < v_{i11} < v_{i10} < v_{i9} < v_{i8} < v_{i7} < v_{i6} < v_{i5} < v_{i4} < v_{i3} < v_{i2} < v_{i1}$

$U_{FY} > U_{SD}$	iff $k_{y_i} < r$
$U_{FY} > U_{FX}$	iff $k_{y_i} > v_{i14}$
$U_{FY} > U_{Sii}$	iff $k_{y_i} > v_{i13}$
$U_{FY} > U_{FLi}$	iff $k_{y_i} > v_{i12}$
$U_{FY} > U_{MSi}$	iff $k_{y_i} > v_{i11}$
$U_{SD} > U_{FX}$	iff $k_{y_i} > v_{i10}$
$U_{SD} > U_{Sii}$	iff $k_{y_i} > v_{i9}$
$U_{SD} > U_{FLi}$	iff $k_{y_i} > v_{i8}$
$U_{SD} > U_{MSi}$	iff $k_{y_i} > v_{i7}$
$U_{FX} > U_{Sii}$	iff $k_{y_i} > v_{i6}$
$U_{FX} > U_{FLi}$	iff $k_{y_i} > v_{i5}$
$U_{FX} > U_{MSi}$	iff $k_{y_i} > v_{i4}$
$U_{Sii} > U_{FLi}$	iff $k_{x_i} > v_{i3}$
$U_{Sii} > U_{MSi}$	iff $k_{y_i} > v_{i2}$
$U_{FLi} > U_{MSi}$	iff $k_{y_i} > v_{i1}$

¹³ The comparison is carried out within the same country. For simplicity, subscripts denoting countries in domestic structures are omitted.

MS_i	MS_i	MS_i	MS_i	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY	FY
FL_i	FL_i	FL_i	FY	MS_i	MS_i	MS_i	MS_i	SD	SD	SD	SD	SD	SD	SD	SD
SI_i	SI_i	FY	FL_i	FL_i	FL_i	FL_i	SD	MS_i	MS_i	MS_i	FX	FX	FX	FX	FX
FX	FY	SI_i	SI_i	SI_i	SI_i	SD	FL_i	FL_i	FL_i	FX	MS_i	MS_i	SI_i	SI_i	SI_i
FY	FX	FX	FX	FX	SD	SI_i	SI_i	SI_i	FX	FL_i	FL_i	SI_i	MS_i	MS_i	FL_i
SD	SD	SD	SD	SD	FX	FX	FX	FX	SI_i	SI_i	SI_i	FL_i	FL_i	FL_i	MS_i
V_{i14}	V_{i13}	V_{i12}	V_{i11}	V_{i10}	V_{i9}	V_{i8}	V_{i7}	V_{i6}	V_{i5}	V_{i4}	V_{i3}	V_{i2}	V_{i1}		

2. Where $k_{x_i} > \frac{s_{x_i} - b_{x_i}}{1 - b_{x_i}} = r_i$ OR $V_{i14} > V_{i13} > V_{i12} > V_{i11} > V_{i10} > V_{i9} > V_{i8} > V_{i7} > V_{i6} > V_{i5} > V_{i4} > V_{i3} > V_{i2} > V_{i1}$

- $U_{SD} > U_{FY}$ iff $k_{yi} < r_i$
- $U_{FY} > U_{FX}$ iff $k_{yi} > V_{i14}$
- $U_{FY} > U_{Sii}$ iff $k_{yi} > V_{i13}$
- $U_{FY} > U_{FLi}$ iff $k_{yi} > V_{i12}$
- $U_{FY} > U_{MSi}$ iff $k_{yi} > V_{i11}$
- $U_{SD} > U_{FX}$ iff $k_{yi} > V_{i10}$
- $U_{SD} > U_{Sii}$ iff $k_{yi} > V_{i9}$
- $U_{SD} > U_{FLi}$ iff $k_{yi} > V_{i8}$
- $U_{SD} > U_{MSi}$ iff $k_{yi} > V_{i7}$
- $U_{FX} > U_{Sii}$ iff $k_{yi} > V_{i6}$
- $U_{FX} > U_{FLi}$ iff $k_{yi} > V_{i5}$
- $U_{FX} > U_{MSi}$ iff $k_{yi} > V_{i4}$
- $U_{Sii} > U_{FLi}$ iff $k_{xi} > V_{i3}$
- $U_{Sii} > U_{MSi}$ iff $k_{yj} > V_{i2}$
- $U_{FLi} > U_{MSi}$ iff $k_{yj} > V_{i1}$

<i>MS_i</i>	<i>FL_i</i>	<i>FL_i</i>	<i>SI_i</i>	<i>SI_i</i>	<i>SI_i</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>SD</i>	<i>SD</i>	<i>SD</i>	<i>SD</i>	<i>SD</i>
<i>FL_i</i>	<i>MS_i</i>	<i>SI_i</i>	<i>FL_i</i>	<i>FL_i</i>	<i>FX</i>	<i>SI_i</i>	<i>SI_i</i>	<i>SI_i</i>	<i>SD</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>FY</i>
<i>SI_i</i>	<i>SI_i</i>	<i>MS_i</i>	<i>MS_i</i>	<i>FX</i>	<i>FL_i</i>	<i>FL_i</i>	<i>FL_i</i>	<i>SD</i>	<i>SI_i</i>	<i>SI_i</i>	<i>SI_i</i>	<i>SI_i</i>	<i>FY</i>	<i>FX</i>
<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>MS_i</i>	<i>MS_i</i>	<i>MS_i</i>	<i>SD</i>	<i>FL_i</i>	<i>FL_i</i>	<i>FL_i</i>	<i>FL_i</i>	<i>FY</i>	<i>SI_i</i>	<i>SI_i</i>
<i>SD</i>	<i>MS_i</i>	<i>MS_i</i>	<i>MS_i</i>	<i>MS_i</i>	<i>FY</i>	<i>FL_i</i>	<i>FL_i</i>	<i>FL_i</i>						
<i>FY</i>	<i>FY</i>	<i>MS_i</i>	<i>MS_i</i>	<i>MS_i</i>	<i>MS_i</i>									
<i>v_{i1}</i>	<i>v_{i2}</i>	<i>v_{i3}</i>	<i>v_{i4}</i>	<i>v_{i5}</i>	<i>v_{i6}</i>	<i>v_{i7}</i>	<i>v_{i8}</i>	<i>v_{i9}</i>	<i>v_{i10}</i>	<i>v_{i11}</i>	<i>v_{i12}</i>	<i>v_{i13}</i>	<i>v_{i14}</i>	

b. Terms for Country j

1. Where $k_{x_j} < \frac{s_{x_j} - b_{x_j}}{1 - b_{x_j}} = r_j$ or $v_{j14} < v_{j13} < v_{j12} < v_{j11} < v_{j10} < v_{j9} < v_{j8} < v_{j7} < v_{j6} < v_{j5} < v_{j4} < v_{j3} < v_{j2} < v_{j1}$

- $U_{FY} > U_{SD}$ iff $k_{yj} < r_j$
- $U_{FY} > U_{FX}$ iff $k_{yj} > v_{j14}$
- $U_{FY} > U_{SIj}$ iff $k_{yj} > v_{j13}$
- $U_{FY} > U_{FLj}$ iff $k_{yj} > v_{j12}$
- $U_{FY} > U_{MSj}$ iff $k_{yj} > v_{j11}$
- $U_{SD} > U_{FX}$ iff $k_{yj} > v_{j10}$
- $U_{SD} > U_{SIj}$ iff $k_{yj} > v_{j9}$
- $U_{SD} > U_{FLj}$ iff $k_{yj} > v_{j8}$
- $U_{SD} > U_{MSj}$ iff $k_{yj} > v_{j7}$
- $U_{FX} > U_{SIj}$ iff $k_{yj} > v_{j6}$
- $U_{FX} > U_{FLj}$ iff $k_{yj} > v_{j5}$
- $U_{FX} > U_{MSj}$ iff $k_{yj} > v_{j4}$
- $U_{SIj} > U_{FLj}$ iff $k_{yj} > v_{j3}$
- $U_{SIj} > U_{MSj}$ iff $k_{yj} > v_{j2}$
- $U_{FLj} > U_{MSj}$ iff $k_{yj} > v_{j1}$

<i>MS_j</i>	<i>MS_j</i>	<i>MS_j</i>	<i>MS_j</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>
<i>FL_j</i>	<i>FL_j</i>	<i>FL_j</i>	<i>FY</i>	<i>MS_j</i>	<i>MS_j</i>	<i>MS_j</i>	<i>MS_j</i>	<i>SD</i>							
<i>SI_j</i>	<i>SI_j</i>	<i>FY</i>	<i>FL_j</i>	<i>FL_j</i>	<i>FL_j</i>	<i>FL_j</i>	<i>SD</i>	<i>MS_j</i>	<i>MS_j</i>	<i>MS_j</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>
<i>FX</i>	<i>FY</i>	<i>SI_j</i>	<i>SI_j</i>	<i>SI_j</i>	<i>SI_j</i>	<i>SD</i>	<i>FL_j</i>	<i>FL_j</i>	<i>FL_j</i>	<i>FX</i>	<i>MS_j</i>	<i>MS_j</i>	<i>SI_j</i>	<i>SI_j</i>	<i>SI_j</i>
<i>FY</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>SD</i>	<i>SI_j</i>	<i>SI_j</i>	<i>SI_j</i>	<i>FX</i>	<i>FL_j</i>	<i>FL_j</i>	<i>SI_j</i>	<i>MS_j</i>	<i>MS_j</i>	<i>FL_j</i>
<i>SD</i>	<i>SD</i>	<i>SD</i>	<i>SD</i>	<i>SD</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>SI_j</i>	<i>SI_j</i>	<i>SI_j</i>	<i>FL_j</i>	<i>FL_j</i>	<i>FL_j</i>	<i>MS_j</i>
<i>v_{j14}</i>	<i>v_{j13}</i>	<i>v_{j12}</i>	<i>v_{j11}</i>	<i>v_{j10}</i>	<i>v_{j9}</i>	<i>v_{j8}</i>	<i>v_{j7}</i>	<i>v_{j6}</i>	<i>v_{j5}</i>	<i>v_{j4}</i>	<i>v_{j3}</i>	<i>v_{j2}</i>	<i>v_{j1}</i>		

2. Where $k_{x_j} > \frac{s_{x_j} - b_{x_j}}{1 - b_{x_j}} = r_j$ or $v_{j14} > v_{j13} > v_{j12} > v_{j11} > v_{j10} > v_{j9} > v_{j8} > v_{j7} > v_{j6} > v_{j5} > v_{j4} > v_{j3} > v_{j2} > v_{j1}$

- $U_{SD} > U_{FY}$ iff $k_{y1} < r_j$
- $U_{FY} > U_{FX}$ iff $k_{y1} > v_{j14}$
- $U_{FY} > U_{SIj}$ iff $k_{y1} > v_{j13}$
- $U_{FY} > U_{FLj}$ iff $k_{y1} > v_{j12}$
- $U_{FY} > U_{MSj}$ iff $k_{y1} > v_{j11}$
- $U_{SD} > U_{FX}$ iff $k_{y1} > v_{j10}$
- $U_{SD} > U_{SIj}$ iff $k_{y1} > v_{j9}$
- $U_{SD} > U_{FLj}$ iff $k_{y1} > v_{j8}$
- $U_{SD} > U_{MSj}$ iff $k_{y1} > v_{j7}$
- $U_{FX} > U_{SIj}$ iff $k_{y1} > v_{j6}$
- $U_{FX} > U_{FLj}$ iff $k_{y1} > v_{j5}$
- $U_{FX} > U_{MSj}$ iff $k_{y1} > v_{j4}$
- $U_{SIj} > U_{FLj}$ iff $k_{y1} > v_{j3}$
- $U_{SIj} > U_{MSj}$ iff $k_{y1} > v_{j2}$
- $U_{FLj} > U_{MSj}$ iff $k_{y1} > v_{j1}$

<i>MS_j</i>	<i>FL_j</i>	<i>FL_j</i>	<i>SI_j</i>	<i>SI_j</i>	<i>SI_j</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>SD</i>	<i>SD</i>	<i>SD</i>	<i>SD</i>	<i>SD</i>
<i>FL_j</i>	<i>MS_j</i>	<i>SI_j</i>	<i>FL_j</i>	<i>FL_j</i>	<i>FX</i>	<i>SI_j</i>	<i>SI_j</i>	<i>SI_j</i>	<i>SD</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>FY</i>
<i>SI_j</i>	<i>SI_j</i>	<i>MS_j</i>	<i>MS_j</i>	<i>FX</i>	<i>FL_j</i>	<i>FL_j</i>	<i>FL_j</i>	<i>SD</i>	<i>SI_j</i>	<i>SI_j</i>	<i>SI_j</i>	<i>SI_j</i>	<i>FY</i>	<i>FX</i>
<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>FX</i>	<i>MS_j</i>	<i>MS_j</i>	<i>MS_j</i>	<i>SD</i>	<i>FL_j</i>	<i>FL_j</i>	<i>FL_j</i>	<i>FL_j</i>	<i>FY</i>	<i>SI_j</i>	<i>SI_j</i>
<i>SD</i>	<i>MS_j</i>	<i>MS_j</i>	<i>MS_j</i>	<i>MS_j</i>	<i>FY</i>	<i>FL_j</i>	<i>FL_j</i>	<i>FL_j</i>						
<i>FY</i>	<i>FY</i>	<i>MS_j</i>	<i>MS_j</i>	<i>MS_j</i>	<i>MS_j</i>									
<i>v_{j1}</i>	<i>v_{j2}</i>	<i>v_{j3}</i>	<i>v_{j4}</i>	<i>v_{j5}</i>	<i>v_{j6}</i>	<i>v_{j7}</i>	<i>v_{j8}</i>	<i>v_{j9}</i>	<i>v_{j10}</i>	<i>v_{j11}</i>	<i>v_{j12}</i>	<i>v_{j13}</i>	<i>v_{j14}</i>	

4. Production Specialisation in Intermediate Goods, Transaction and Transfer Efficiency, and the Size of FDI

4.1. Introduction

The purpose of this chapter is to investigate within an inframarginal model the determination of the size of foreign direct investment of a country. There are two reasons for carrying out this task. This topic has received relatively little attention in the existing literature on FDI, notwithstanding its importance in the macroeconomic context. As shown in the survey (Chapter 2), macroeconomic theories of FDI are essentially based on factor endowment theorems, which have been proven to be ineffective and challenged by empirical evidence (Arrow et al, 1961; Bhagwati, 1994). Therefore, even if there were any research on this topic, the reliability of the result would be doubtful. Secondly, by nature of its macro focus, this topic is excluded from the microeconomic theories of FDI.

The necessity of filling the gap in the existing literature is further strengthened by the rapid expansion of FDI. After the first wave in the 19th century and the rapid development in the 20th century (especially in the period after World War II), FDI is now in a stage of all round development. An increasing number of countries are generating outward direct investment. The areas in which multinational enterprises operate are expanding and their operations involve advances in the stock of knowledge of production and organisational techniques. Lastly, there are indications of convergence of the net outward direct investment position of the leading industrial nations. The accelerating globalisation and the leading economic role of knowledge are not only reshaping the behaviour of enterprises with regard to FDI but are also changing the attitudes of governments towards FDI. Accordingly, the extent of FDI engagement is important for relevant institutions, enterprises and governments alike.

Theoretically, factors which determine FDI would also be attributable to FDI flows, but

the determination of FDI need not consider the volume of FDI. An investigation into the size of FDI goes a step further from the investigation of the determination of FDI. The existing literature on the determination of FDI has generally stopped at the first step. Therefore the exploration of the determination of the volume of FDI would also help a better understanding of the determination of FDI, especially in the era of globalisation when FDI exhibits a very complex picture.

The determination of the volume of FDI focuses on prominent aspects of industrial organisation that are considered essential in international economic organisation. We assume that international economic activity is organised on the basis of the degree of international division of labour. Overseas production involves international movements of intermediate goods, of professional personnel from the home country to the host country for the production purpose, as well as international trade in final goods, flowing from the host country to the home country as return on the investment and the realisation of the international division of labour. We assume that transaction costs of trading intermediate goods are likely to differ from those for final goods within a country, and transaction costs for goods of same type may differ from country to country. In addition, we recognise that international trade incurs international transaction costs besides domestic transaction cost, and that there are cross-border barriers to the international movement of technical and managerial personnel. While technical and managerial professionals are assumed to be mobile internationally, ordinary labour cannot move between countries due to political and sovereign barriers as well as extremely high adaptation costs.

There are three types of international economic activity: trade in final goods, trade in intermediate goods (including international technology transfer and international movement of technical expertise), and FDI (overseas production). The equilibrium activity depends on endowments, trading efficiencies and production specialisations in the two countries. It is also influenced by factors that affect cross-border movements of factors and goods. Difference in the same type of variables between two countries and difference in different but related variables in the same country form the basis for international division of labour as well as specific types of organisation of international economic activities. FDI is the most complex organisation of international economic

activity since it involves overseas "production" as well as international trade in final and intermediate goods. Consequently, it is influenced by a larger set of variables than the alternative types of international activities.

The model generates unambiguous statements about the determination of the size of international direct investment and the nature of the influence of the determining variables. It shows that the volume of international direct investment is affected, positively by

- the host country's transaction efficiency for final goods and ordinary labour;
- the international transfer efficiency for cross-border movement of managerial and technical professionals;
- the home country's transaction efficiency for managerial and technical professionals;

and negatively by

- difficulty in the production of intermediate goods;
- transaction efficiency for managerial and technical professionals at home;
- international transaction efficiency for traded goods.

The results confirm some relevant arguments in the existing literature of FDI and trade about the size of FDI and its relationship with trade. At the same time they discuss some views inconsistent with each other due to the narrower focus in reaching these views in the existing literature. An example is Mundell's argument that a consequence of FDI is the elimination of the basis for trade between the two countries (Mundell, 1957).

The chapter proceeds as follows. Section 4.2 describes the basic model. Section 4.3 solves for equilibrium and its comparative statics. Section 4.4 explains the main findings. The final section presents some concluding observations.

4.2. Configuration and Economic Structure

4.2.1. The basic model

We set out from the basic model established in Chapter 3. It is a 2x2 model which

involves one consumer good y and one intangible intermediate good x in the context of a “global” economy consisting of countries i and j . Each country has a continuum number of *ex ante* identical consumer-producers of mass M_i and M_j respectively¹⁴.

The utility function of individual residents of Country i is represented by:

$$(2.1) \quad U_i = y_i + k_{y_i} y_i^d + \theta k_{y_j} y_j^d \quad \theta \in (0, 1)$$

An individual’s production function for the intermediate good x in Country i is:

$$(2.2) \quad x_i + x_i^s = \text{Max}\{0, l_{x_i} - b_{x_i}\}$$

An individual’s production function for the consumer good in Country i is:

$$(2.3) \quad y_i + y_i^s = \left(x_i + k_{x_i} x_i^d + \theta k_{x_j} x_j^d \right)^a l_{y_i} \quad a \in (0, 1)$$

And the time endowment constraint for each individual in Country i is given as follows:

$$(2.4) \quad l_{x_i} + l_{y_i} = 1$$

The above equations are applicable to Country j when their country denoting subscript i is replaced by j and j replaced by i .

Each individual makes decisions concerning his production and consumption. In other words, he makes decisions about which good to produce as well as his demand for and supply of any traded good to maximise his utility. A given profile of production and trade activities for an individual is defined as a *configuration*, and the combination of configurations of the M individuals in a country is defined as a market structure or *structure* for short. Each configuration has a corner equilibrium.

In order to derive an individual’s optimum decision, the Kuhn-Tucker theorem can be used to rule out the interior solutions. So does the market structure. Yang (2000) re-establishes and refines Wen’s theorem based on Kuhn-Tucker conditions for the model

¹⁴ Refer to Section 3.2 for details about the basic model.

with intermediate goods:

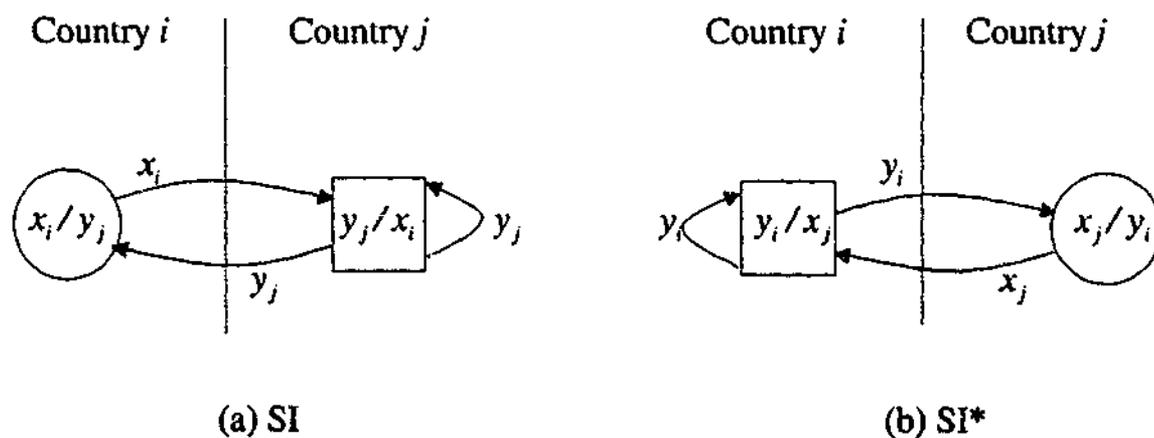
Lemma: an individual sells at most one good and does not buy and self-provide the same good. He self-provides the consumer good if she sells it. If $a \in (0.5, 1)$, he does not self-provide the intermediate good unless he produces the final good.

4.2.2. Structure and corner equilibrium

Economic openness affords greater opportunities for specialisation compared to a closed economy. Consequently, consumption performs depend on exchanges with individuals of the other country. Such division of labour can be realised through goods-for-goods trade or by international movement of labour (producers of x). Accordingly, there are four potential types of configuration and structure in an open economy.

- Simple international division of labour (*SI*),
- Export of intermediate good (*FL*),
- International firm (*MS*), and
- Domestic firm plus international firm (*FM*).

These structures distribute symmetrically in the two countries and become four pairs of structures, i.e., *SI*, *SI**, *FL*, *FL**, *MS*, *MS**, *FM*, and *FM**. As any structure in the open economy involves two countries on the basis of division of labour between them, for any country in any particular structure it holds its specific country structure. Thus, there are 16 possible country structures, namely, *SI_i*, *SI_j*, *SI_i**, *SI_j**; *FL_i*, *FL_j*, *FL_i**, *FL_j**; *MS_i*, *MS_j*, *MS_i**, *MS_j**; *FM_i*, *FM_j*, *FM_i**, and *FM_j**. Their features are shown in Figure 7.



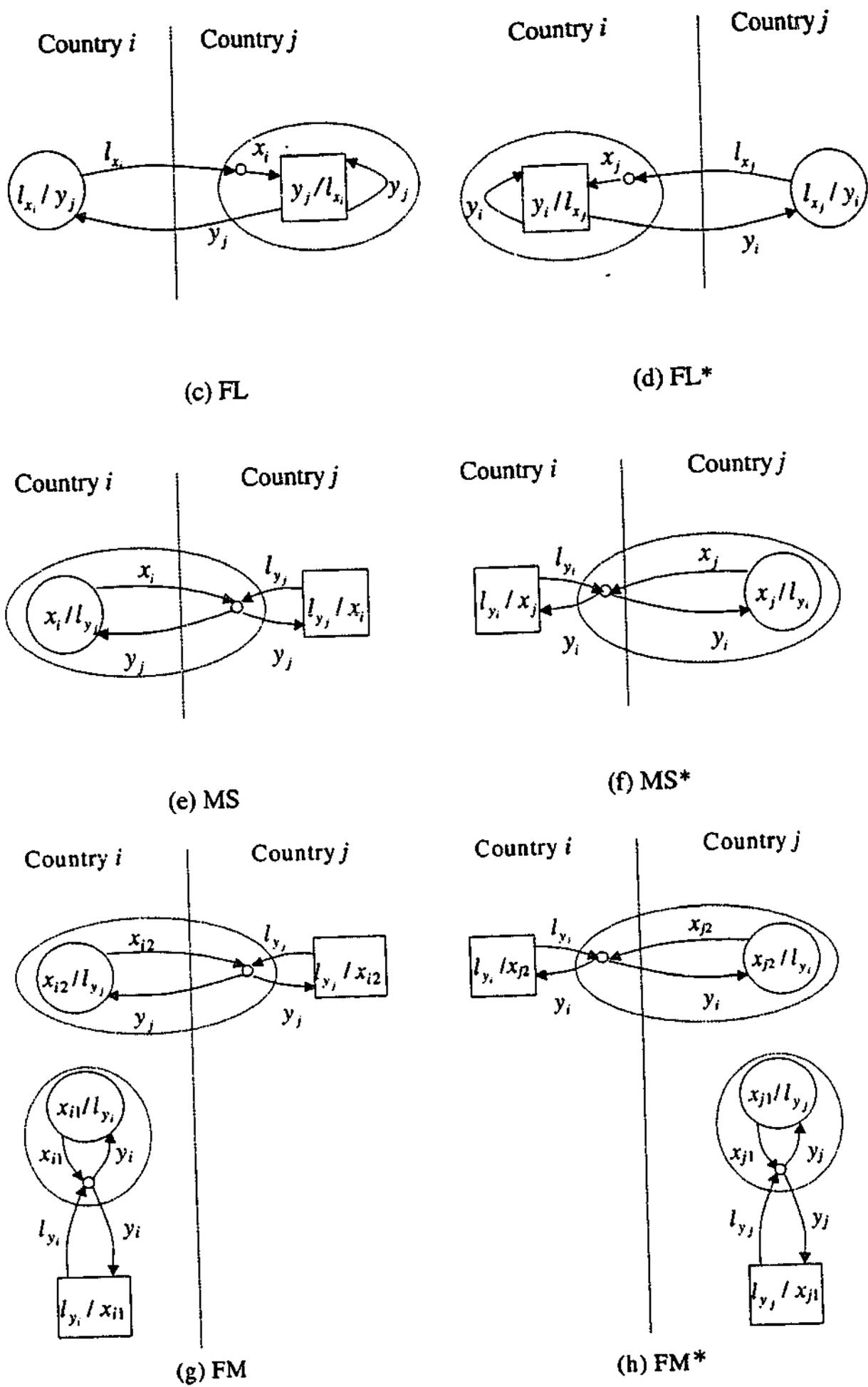


Figure 7 Symmetric structures in an open economy

In the following we examine the structures with subscript i . Due to the nature of symmetry between each other in a pair of structures, the specifications and results for one structure are those for another structure in the pair when subscript i is changed to j and j changed to i .

- **Structure SI : simple international division of labour**

This structure comprises configuration (x/y_j) in Country i and configuration (y/x_i) in Country j , i.e., each country specialises in the production of one good. There is no asymmetric distribution of residual rights in this structure. Individuals exchange goods for goods in a condition where the institution of the firm and its related labour market do not exist.

The decision problem for each individual in County i choosing configuration (x/y_j) in this structure is:

$$\begin{aligned}
 (3.1a) \quad \text{Max} \quad & U_{x_i} = \theta k_{y_j} y_j^d \\
 \text{s.t.} \quad & x_i^s = l_{x_i} - b_{x_i} \qquad \qquad \qquad l_{x_i} = 1 \\
 & P_{x_i} x_i^s = P_{y_j} y_j^d
 \end{aligned}$$

where P_{x_i} and P_{y_j} are the prices for good x and y , respectively.

The decision problem for each individual in Country j choosing configuration (y/x_i) , representing self-provision of the consumption good, is

$$\begin{aligned}
 (3.1b) \quad \text{Max} \quad & U_{y_j} = y_j \\
 \text{s.t.} \quad & y_j + y_j^s = (\theta k_{x_i} x_i^d)^a l_{y_j} \qquad \qquad \qquad l_{y_j} = 1 \\
 & P_{x_i} x_i^d = P_{y_j} y_j^s
 \end{aligned}$$

Having considered the market clearing and the number of individuals in each country in the structure, the corner equilibrium can be derived as follows:

$$(3.1c) \quad U_{Sl_i} = a\theta^{1+a}k_{x_i}^a k_{y_j} (1-b_{x_i})^a \left(\frac{M_i}{M_j}\right)^{a-1}$$

$$(3.1d) \quad U_{Sl_j} = (1-a)\left[\theta k_{x_i} (1-b_{x_i})\right]^a \left(\frac{M_i}{M_j}\right)^a$$

$$(3.1e) \quad \frac{P_{x_i}}{P_{y_j}} = a(\theta k_{x_i})^a \left[(1-b_{x_i})\frac{M_i}{M_j}\right]^{a-1}$$

where U_{Sl_i} and U_{Sl_j} are the per capita income in Country i and Country j , respectively. M_i is the number of individuals selling good x which constitutes in this configuration the whole population of Country i . M_j represents the number of individuals selling good y and, hence, the total population in Country j .

• **Structure FL: export of intermediate good**

This structure comprises configuration (l_x/l_y) in Country i and configuration (y/l_x) in Country j . (y/l_x) is a specialist producer of y who hires and directs another country's producers of x to specialise in producing intermediate good x within his firm. And (l_x/l_y) denotes a producer of x who is hired by a foreign boss to produce the intermediate good x within his boss's firm in the boss's home country and imports the final good to his native country.

The decision problem for the individual choosing configuration (y/l_x) is:

$$(3.2a) \text{ Max: } U_y = y_j$$

$$\text{s.t.} \quad y_j + y_j^s = (x_i^d)^a l_{y_j} \quad l_{y_j} = 1$$

$$x_i^s = \delta s_{x_i} l_{x_i} - b_{x_i} \quad l_{x_i} = 1$$

$$x_i^d = N x_i^s$$

$$P_{y_j} y_j^s = W_j N l_{x_i} = W_j N$$

The decision problem for the individual choosing configuration (l_x/l_y) is:

$$(3.2b) \text{ Max: } U_x = \theta k_y y_i^d$$

$$\text{s.t. } P_y y_i^d = W_j l_{x_i}$$

Having considered the market clearing and the number of individuals, the corner equilibrium can be derived as follows:

$$(3.2c) \quad U_{FL_i} = \theta a \left(\frac{M_j}{M_i} \right)^{1-a} k_{y_j} (\delta s_{x_i} - b_{x_i})^a$$

$$(3.2d) \quad U_{FL_j} = (1-a) \left(\frac{M_i}{M_j} \right)^a (\delta s_{x_i} - b_{x_i})^a$$

$$(3.2e) \quad \frac{W_j}{P_y} = \left(\frac{M_j}{M_i} \right)^{1-a} a (\delta s_{x_i} - b_{x_i})^a$$

• **Structure MS: international firm**

This structure stretches across two countries and comprises configuration (l_{y_j}/x_i) and configuration (x_i/l_{y_j}) . (x_i/l_{y_j}) is a specialist producer of x from Country i who sets up a firm in foreign country (Country j) in which he hires local workers and directs them to specialise in producing the final good y by using his output of x within his firm. And (l_{y_j}/x_i) denotes a worker who is hired to produce the final good y by using the intermediate good within his foreign boss's firm and buys the final good with his wage.

The decision problem for the individual choosing configuration (x_i/l_{y_j}) is:

$$(3.3a) \text{ Max: } U_{x_i} = \theta Y_j$$

$$\text{s.t. } Y_j + Y_j^s = N y_j^s$$

$$y_j^s = (x_i^d)^a s_{y_j} l_{y_j} \quad l_{y_j} = 1$$

$$x_i^d = \frac{x_i^x}{N}$$

$$x_i^s = \delta x_i - b_{x_i} \quad l_{x_i} = 1$$

$$P_y Y_j^s = W_j l_{y_j} N = W_j N$$

The decision problem for the individual choosing configuration (l_y/x_i) is:

$$(3.3b) \text{ Max: } U_{y_j} = k_{y_j} y_j^d$$

$$\text{s.t. } P_{y_j} y_j^d = W_j l_{y_j} = W_j$$

Having considered the market clearing and the number of individuals, the corner equilibrium can be derived as follows:

$$(3.3c) \quad U_{MS_i} = \theta a \left(\frac{M_j}{M_i} \right)^{1-a} s_{y_j} (\delta - b_{x_i})^a$$

$$(3.3d) \quad U_{MS_j} = (1-a) \left(\frac{M_i}{M_j} \right)^a k_{y_j} s_{y_j} (\delta - b_{x_i})^a$$

$$(3.3e) \quad \frac{W_j}{P_{y_j}} = \left(\frac{M_i}{M_j} \right)^a (1-a) s_{y_j} (\delta - b_{x_i})^a$$

• **Structure FM: domestic firm plus international firm**

This structure stretches across two countries and comprises four configurations, i.e., (x_{i1}/l_{y_i}) , (l_{y_i}/x_{i1}) , (x_{i2}/l_{y_j}) , and (l_{y_j}/x_{i2}) . (x_{i1}/l_{y_i}) is a specialist producer of x from Country i who sets up a local firm in which he hires local workers and directs them to specialise in producing the final good y by using his output of x within his firm. Correspondingly, (l_{y_i}/x_{i1}) is a worker in Country i who is hired to produce the final good y by using the intermediate good within the above firm and buys the final good with his wage. (x_{i2}/l_{y_j}) is a specialist producer of x from Country i who sets up a firm in the host country (Country j) where he hires local workers and directs them to specialise in producing the final good y by using his output of x within his firm. (l_{y_j}/x_{i2}) is a worker in Country j who is hired to produce the final good y by using the intermediate good within his foreign boss's firm and buys the final good with his wage.

The decision problem for the individual choosing configuration (x_{i1}/l_{y_i}) is:

$$(3.4a) \text{ Max: } U_{x_{i1}} = Y_i$$

$$\begin{aligned}
\text{s.t.} \quad & Y_i + Y_i^s = N_i y_i^s \\
& y_i^s = (x_{i1}^d)^a s_{y_i} l_{y_i} & l_{y_i} = 1 \\
& x_{i1}^d = \frac{x_{i1}^s}{N_i} \\
& x_{i1}^s = l_{x_{i1}} - b_{x_i} & l_{x_{i1}} = 1 \\
& P_{y_i} Y_i^s = W_{i1} l_{y_i} N_i = W_{i1} N_i
\end{aligned}$$

The decision problem for the individual choosing configuration (l_{y_i} / x_{i1}) is:

$$\begin{aligned}
(3.4b) \text{ Max:} \quad & U_{y_i} = k_{y_i} y_i^d \\
\text{s.t.} \quad & P_{y_i} y_i^d = W_{i1} l_{y_i} = W_i
\end{aligned}$$

The decision problem for the individual choosing configuration (x_{i2} / l_{y_j}) is:

$$\begin{aligned}
(3.4c) \text{ Max:} \quad & U_{x_{i2}} = \theta Y_j \\
\text{s.t.} \quad & Y_j + Y_j^s = N_j y_j^s \\
& y_j^s = (x_{i2}^d)^a s_{y_j} l_{y_j} & l_{y_j} = 1 \\
& x_{i2}^d = \frac{x_{i2}^s}{N_j} \\
& x_{i2}^s = \delta_{x_{i2}} - b_{x_i} & l_{x_{i2}} = 1 \\
& P_{y_j} Y_j^s = W_j l_{y_j} N_j = W_j N_j
\end{aligned}$$

The decision problem for the individual choosing configuration (l_{y_j} / x_{i2}) is:

$$\begin{aligned}
(3.4d) \text{ Max:} \quad & U_{y_j} = k_{y_j} y_j^d \\
\text{s.t.} \quad & P_{y_j} y_j^d = W_j l_{y_j} = W_j
\end{aligned}$$

Having considered the market clearing and the number of individuals in the structure, the corner equilibrium can be derived as follows:

$$(3.4e) \quad U_{FM_i} = \theta a \left(\frac{M_j}{M_{x_{i2}}} \right)^{1-a} s_{y_j} (\delta - b_{x_i})^a$$

$$(3.4f) \quad U_{FM_j} = k_{y_j} \left(\frac{M_{x_{i2}}}{M_j} \right)^a (1-a) s_{y_j} (\delta - b_{x_i})^a$$

$$(3.4f) \quad \frac{W_{i1}}{P_{y_{i1}}} = \frac{a^a (1-a)^{1-a} s_{y_j} (1-b_{x_i})^a}{k_{y_i}^a}$$

$$(3.4g) \quad \frac{W_j}{P_{y_j}} = \left(\frac{M_{x_{i2}}}{M_j} \right)^a (1-a) s_{y_j} (\delta - b_{x_i})^a$$

The structure of all configurations and their utilities in the economy are shown in Table 7. The relative prices of the two goods and wages in various structures are shown in Table 8. And the numbers of specialists in each structure in the economy is specified in Table 9.

Table 7 Configurations and utilities

	Structure	Utility in Country i	Utility in Country j
I	SI	$a\theta^{1+a} \left(\frac{M_j}{M_i}\right)^{1-a} k_{x_i}^a k_{y_j} (1-b_{x_i})^a$	$(1-a) \left(\frac{M_i}{M_j}\right)^a \left[\theta k_{x_i} (1-b_{x_i})\right]^a$
	FL	$\theta a \left(\frac{M_j}{M_i}\right)^{1-a} k_{y_j} (\delta s_{x_i} - b_{x_i})^a$	$(1-a) \left(\frac{M_i}{M_j}\right)^a (\delta s_{x_i} - b_{x_i})^a$
	MS	$\theta a \left(\frac{M_j}{M_i}\right)^{1-a} s_{y_j} (\delta - b_{x_i})^a$	$(1-a) \left(\frac{M_i}{M_j}\right)^a k_{y_j} s_{y_j} (\delta - b_{x_i})^a$
	FM	$\theta a \left(\frac{M_j}{M_{x_{j2}}}\right)^{1-a} s_{y_j} (\delta - b_{x_i})^a$	$(1-a) \left(\frac{M_{x_{j2}}}{M_j}\right)^a k_{y_j} s_{y_j} (\delta - b_{x_i})^a$
II	SI*	$(1-a) \left(\frac{M_j}{M_i}\right)^a \left[\theta k_{x_j} (1-b_{x_j})\right]^a$	$a\theta^{1+a} \left(\frac{M_i}{M_j}\right)^{1-a} k_{x_j}^a k_{y_i} (1-b_{x_j})^a$
	FL*	$(1-a) \left(\frac{M_j}{M_i}\right)^a (\delta s_{x_j} - b_{x_j})^a$	$\theta a \left(\frac{M_i}{M_j}\right)^a k_{y_i} (\delta s_{x_j} - b_{x_j})^a$
	MS*	$(1-a) \left(\frac{M_j}{M_i}\right)^a k_{y_i} s_{y_i} (\delta - b_{x_j})^a$	$\theta a \left(\frac{M_i}{M_j}\right)^{1-a} s_{y_i} (\delta - b_{x_j})^a$
	FM*	$(1-a) \left(\frac{M_{x_{j2}}}{M_i}\right)^a k_{y_i} s_{y_i} (\delta - b_{x_j})^a$	$\theta a \left(\frac{M_i}{M_{x_{j2}}}\right)^{1-a} s_{y_i} (\delta - b_{x_j})^a$

Table 8 Relative price

	Structure	Country <i>i</i>	Country <i>j</i>
I	SI	$\frac{P_{x_i}}{P_{y_j}} = a(\theta k_{x_i})^a \left[(1-b_{x_i}) \frac{M_i}{M_j} \right]^{a-1}$	
	FL	$\frac{W_j}{P_{y_j}} = \left(\frac{M_j}{M_i} \right)^{1-a} a(\delta s_{x_i} - b_{x_i})^a$	
	MS	$\frac{W_j}{P_{y_j}} = \left(\frac{M_i}{M_j} \right)^a (1-a)s_{y_j} (\delta - b_{x_i})^a$	
	FM	$\frac{W_{j1}}{P_{y_{j1}}} = \frac{a^a(1-a)^{1-a} s_{y_i} (1-b_{x_i})^a}{k_{y_i}^a}$	$\frac{W_j}{P_{y_j}} = \left(\frac{M_{x_{j2}}}{M_j} \right)^a (1-a)s_{y_j} (\delta - b_{x_i})^a$
II	SI*	$\frac{P_{x_j}}{P_{y_i}} = a(\theta k_{x_j})^a \left[(1-b_{x_j}) \frac{M_j}{M_i} \right]^{a-1}$	
	FL*	$\frac{W_i}{P_{y_i}} = \left(\frac{M_i}{M_j} \right)^{1-a} a(\delta s_{x_j} - b_{x_j})^a$	
	MS*	$\frac{W_i}{P_{y_i}} = \left(\frac{M_j}{M_i} \right)^a (1-a)s_{y_i} (\delta - b_{x_j})^a$	
	FM*	$\frac{W_i}{P_{y_i}} = \left(\frac{M_{x_{j2}}}{M_i} \right)^a (1-a)s_{y_i} (\delta - b_{x_j})^a$	$\frac{W_{j1}}{P_{y_{j1}}} = \frac{a^a(1-a)^{1-a} s_{y_j} (1-b_{x_j})^a}{k_{y_j}^a}$

Table 9 Number of specialists

Structure	Country <i>i</i>		Country <i>j</i>	
	x specialist	y specialist	x specialist	y specialist
<i>SI</i>	M_i	0	0	M_j
<i>FL</i>	M_i	0	0	M_j
<i>MS</i>	M_i	0	0	M_j
<i>FM</i>	$\frac{a(\delta - b_{x_2})^{\frac{a}{\beta-1}} (\theta_{s_{y_j}})^{\frac{1}{\beta-1}} M_i + (1 - b_{x_1})^{\frac{a}{\beta-1}} s_{y_i}^{\frac{1}{\beta-1}} M_j}{[a + (1 - a)k_{y_i} (\delta - b_{x_2})^{\frac{a}{\beta-1}} (\theta_{s_{y_j}})^{\frac{1}{\beta-1}}]}$	$\frac{[(1 - a)k_{y_i} (\delta - b_{x_2})^{\frac{a}{\beta-1}} (\theta_{s_{y_j}})^{\frac{1}{\beta-1}} M_i - a(1 - b_{x_1})^{\frac{a}{\beta-1}} s_{y_i}^{\frac{1}{\beta-1}} M_j]}{[a + (1 - a)k_{y_i} (\delta - b_{x_2})^{\frac{a}{\beta-1}} (\theta_{s_{y_j}})^{\frac{1}{\beta-1}}]}$	0	M_j

Structure	Country <i>i</i>		Country <i>j</i>	
	x specialist	y specialist	x specialist	y specialist
<i>SI*</i>	0	M_i	M_j	0
<i>FL*</i>	0	M_i	M_j	0
<i>MS*</i>	0	M_i	M_j	0
<i>FM*</i>	0	M_i	$\frac{a(\delta - b_{x_j})^{\frac{a}{\beta-1}} (\theta_{s_{y_i}})^{\frac{1}{\beta-1}} M_j + (1 - b_{x_1})^{\frac{a}{\beta-1}} s_{y_j}^{\frac{1}{\beta-1}} M_i}{[(1 - a)k_{y_j} + a(\delta - b_{x_j})^{\frac{a}{\beta-1}} (\theta_{s_{y_i}})^{\frac{1}{\beta-1}}]}$	$\frac{(1 - a)k_{y_j} (\delta - b_{x_j})^{\frac{a}{\beta-1}} (\theta_{s_{y_i}})^{\frac{1}{\beta-1}} - a(1 - b_{x_1})^{\frac{a}{\beta-1}} s_{y_j}^{\frac{1}{\beta-1}} M_i}{[(1 - a)k_{y_j} + a(\delta - b_{x_j})^{\frac{a}{\beta-1}} (\theta_{s_{y_i}})^{\frac{1}{\beta-1}}]}$

4.2.3. General equilibrium structures

This section partitions the parameter space into subspaces within each of which a particular structure occurs in equilibrium. The method used here is based on the Yao theorem (see Yang, 2001, p.156): in an economy with a continuum of *ex ante* identical consumer-producers who have rational and convex preferences and production functions which display individual specific economies of specialisation, a Walrasian general equilibrium exists. This equilibrium is the Pareto optimum corner equilibrium characterised by generating the highest per capita real income. As both individuals and production functions in our model meet the relevant conditions of the Yao theorem, we can solve for the general equilibrium by identifying the Pareto optimum corner equilibrium from the corner equilibria we have examined above.

In Table 7, any two configurations in the same row constitute a structure for the “global” economy composed of the two countries. Given the symmetry assumption, we only need to identify the Pareto optimum corner equilibrium from the 8 corner equilibria we have listed in Part I in Table 7. For simplicity, we assume $\alpha=0.5$ in the following analysis.

We let per capita real incomes in each pair of structures in Part I in Table 7 be equal and then obtain equations which partition the parameter space of 9 dimensions set by 9

parameters $(\theta, \delta, b_{x_i}, k_{x_i}, k_{y_j}, s_{x_i}, s_{y_j}, \frac{M_{x_{i2}}}{M_j}, \frac{M_i}{M_j})$ into subspaces for Country i and

Country j separately. Then we identify which structure is the “equilibrium” structure within each of the subspaces for Country i and Country j , respectively. Lastly, we obtain the general equilibrium structure within each of the subspaces for the “global” economy by combining the terms for the equilibrium structures within the same subspace for each individual Country. The general equilibrium and comparative statics so obtained are summarised in Table 10.

Table 10 shows that the emergence of *FM* as the general equilibrium structure is determined by two conditions regarding the value of the fixed learning cost in producing the intermediate good x and the transaction efficiency coefficient for that good. When

$k_{x_i} < \frac{\delta s_{x_i} - b_{x_i}}{\theta(1-b_{x_i})}$, *FM* occurs as the general equilibrium structure where b_{x_i} is smaller

than $b_{j4} \equiv \frac{\delta \left[\frac{M_i}{M_{x_{i2}}} s_{x_i} - (k_{y_j} s_{y_j})^{\frac{1}{\alpha}} \right]}{\frac{M_i}{M_{x_{i2}}} - (k_{y_j} s_{y_j})^{\frac{1}{\alpha}}}$. When $k_{x_i} > \frac{\delta s_{x_i} - b_{x_i}}{\theta(1-b_{x_i})}$, *FM* occurs as the general

equilibrium structure where b_{x_i} is smaller than $b_{i3} \equiv \frac{\theta \left(\frac{M_{x_{i2}}}{M_i} \right)^{\frac{1-\alpha}{\alpha}} k_{y_i} s_{y_j}^{\frac{1}{\alpha}} - \delta s_{y_j}^{\frac{1}{\alpha}}}{\theta \left(\frac{M_{x_{i2}}}{M_i} \right)^{\frac{1-\alpha}{\alpha}} k_{y_i} s_{y_j}^{\frac{1}{\alpha}} - s_{y_j}^{\frac{1}{\alpha}}}$.

The following section will explore terms for the emergence of structure *FM* as the general equilibrium structure. It focuses on the main factors which determine the size of FDI. As the motivation of this chapter is to explore the determination of the size of FDI, we do not analyse the jumps of general equilibrium from one structure to another. These changes were examined in Chapter 3.

Table 10 General equilibrium and its inframarginal statics*

	$k_{x_i} < \frac{\delta s_{x_i} - b_{x_i}}{\theta(1-b_{x_i})}$		$k_{x_i} > \frac{\delta s_{x_i} - b_{x_i}}{\theta(1-b_{x_i})}$	
$k_{y_j} < 1$	$b_{x_i} > b_{j2} \equiv \frac{\delta \left[(k_{y_j} s_{y_j})^{\frac{1}{\theta}} - s_{x_i} \right]}{(k_{y_j} s_{y_j})^{\frac{1}{\theta}} - 1}$		$b_{x_i} > b_{j1} \equiv \frac{\delta (k_{y_j} s_{y_j})^{\frac{1}{\theta}} - \theta k_{x_i}}{(k_{y_j} s_{y_j})^{\frac{1}{\theta}} - \theta k_{x_i}}$	
$\frac{M_{x_{i2}}}{M_i} < k_{y_j}^2$	$b_{x_i} < b_{j4} \equiv \frac{\delta \left[\frac{M_i}{M_{x_{i2}}} s_{x_i} - (k_{y_j} s_{y_j})^{\frac{1}{\theta}} \right]}{\frac{M_i}{M_{x_{i2}}} - (k_{y_j} s_{y_j})^{\frac{1}{\theta}}}$	$b_{x_i} > b_{i4} \equiv \frac{\delta \left[\left(\frac{M_{x_{i2}}}{M_i} \right)^{\frac{1-\theta}{\theta}} k_{y_j}^{\frac{1}{\theta}} s_{x_i} - s_{y_j}^{\frac{1}{\theta}} \right]}{\left(\frac{M_{x_{i2}}}{M_i} \right)^{\frac{1-\theta}{\theta}} k_{y_j}^{\frac{1}{\theta}} - s_{y_j}^{\frac{1}{\theta}}}$	$b_{x_i} < b_{i3} \equiv \frac{\theta \left(\frac{M_{x_{i2}}}{M_i} \right)^{\frac{1-\theta}{\theta}} k_{x_i} k_{y_j}^{\frac{1}{\theta}} - \delta s_{y_j}^{\frac{1}{\theta}}}{\theta \left(\frac{M_{x_{i2}}}{M_i} \right)^{\frac{1-\theta}{\theta}} k_{x_i} k_{y_j}^{\frac{1}{\theta}} - s_{y_j}^{\frac{1}{\theta}}}$	$b_{x_i} > b_{j3} \equiv \frac{\theta \frac{M_i}{M_{x_{i2}}} k_{x_i} - \delta (k_{y_j} s_{y_j})^{\frac{1}{\theta}}}{\theta \frac{M_i}{M_{x_{i2}}} k_{x_i} - (k_{y_j} s_{y_j})^{\frac{1}{\theta}}}$
Equilibrium Structure	FM	FL	FM	SI

*See Appendix for the calculation.

4.3. The Size of FDI

Now we focus on the structure of FM identified in Table 10 and explore the determination of the size of FDI.

4.3.1. Determination of the size of FDI

4.3.1.1. Learning cost in producing intermediate goods

From Table 10 we note that a strategic magnitude in the FDI structure of FM is $\frac{M_{x_{i2}}}{M_i}$.

Here, $M_{x_{i2}}$ is the number of the people from the source country who are engaged in the production of intermediate good x for FDI subsidiary, and M_i is the total population of the source country. This ratio represents the size of FDI in terms of the portion of people involved in FDI.

From $b_{x_i} < b_{jA} \equiv \frac{\delta \left[\frac{M_i}{M_{x_{i2}}} s_{x_i} - (k_{y_j} s_{y_j})^{\frac{1}{\alpha}} \right]}{\frac{M_i}{M_{x_{i2}}} - (k_{y_j} s_{y_j})^{\frac{1}{\alpha}}}$ we can see a negative relationship between

the ratio $\frac{M_{x_{i2}}}{M_i}$ and the value of b_{x_i} . The smaller the value of $\frac{M_{x_{i2}}}{M_i}$ is, the larger the scope is for FM to become general equilibrium with regarding to the value of b_{x_i} . In turn, a large value of b_{x_i} requires a small value of $\frac{M_{x_{i2}}}{M_i}$ if the FDI structure of FM is to become general equilibrium.

A similar inverse relation exists between the values of $\frac{M_{x_{i2}}}{M_i}$ and b_{x_i} for FM to become general equilibrium under the condition where $b_{x_i} < b_{i3}$ when $k_{x_i} > \frac{\delta s_{x_i} - b_{x_i}}{\theta(1 - b_{x_i})}$.

If the value of $\frac{M_{x_{12}}}{M_i}$ approximates 1, the domestic firm in structure *FM* disappears and only an international firm crossing the two countries based on a complete division of labour remains in general equilibrium. In this case, the fixed learning cost in producing intermediate good *x* must be sufficiently small to satisfy the inequality. On the contrary, if the value of $\frac{M_{x_{12}}}{M_i}$ is very small, indicating a very small proportion of the country's population is engaged in outward FDI and a large portion of the country's population is engaged in domestic production based on domestic division of labour, then the fixed learning cost in producing the intermediate good *x* should be very large in order to satisfy the inequality.

The relationship between the fixed learning cost in producing intermediate goods (b_x) and volume of FDI leads to the following propositions:

Proposition 6: The difficulty and, therefore, the amount of relevant investment required for producing intermediate goods, such as managerial and production process know-how, will vary negatively with the amount of resources which are required for carrying out FDI using such intermediate goods from a country. The more difficult the production of intermediate goods is, the smaller the share of the nation's resources that can be devoted to FDI. Conversely, if intermediate goods are easier to produce and their production requires a smaller amount of resources, the larger share of the country's resources can be devoted to FDI.

4.3.1.2. Domestic transaction efficiency for goods

Table 10 reports that a precondition for the emergence of *FM* as the general equilibrium

structure under the above two conditions is $\frac{M_{x_{12}}}{M_i} < k_{y_j}^2$. This means that the size of

FDI flows is constrained by the transaction conditions for final goods in the host country. Improvements in these conditions reduce the transaction costs of shipping the final goods to the source country and, thus, expand the scope for FDI inflows.

While k_{y_j} positively affects the volume of international direct investment, this is not the case for k_{x_i} , the transaction efficiency for intermediate goods in the home country. We

can observe this by solving
$$b_{i3} \equiv \frac{\theta \left(\frac{M_{x_{i2}}}{M_i} \right)^{\frac{1-\alpha}{\alpha}} k_{y_j} s_{y_j}^{\frac{1}{\alpha}} - \delta s_{y_j}^{\frac{1}{\alpha}}}{\theta \left(\frac{M_{x_{i2}}}{M_i} \right)^{\frac{1-\alpha}{\alpha}} k_{y_j} s_{y_j}^{\frac{1}{\alpha}} - s_{y_j}^{\frac{1}{\alpha}}}$$
 for

$$\frac{M_{x_{i2}}}{M_i} \equiv \left(\frac{s_{y_j}}{k_{y_j}} \right)^{\frac{1}{1-\alpha}} \left[\frac{\delta - b_{i3}}{\theta k_{x_i} (1 - b_{i3})} \right]^{\frac{\alpha}{1-\alpha}}$$
. An increase in the value of k_{x_i} decreases the value

of $\frac{M_{x_{i2}}}{M_i}$, ceteris paribus. The effect of k_{x_i} on the volume of FDI becomes even stronger

as the fixed learning costs (b_{x_i}) increase. In other words, if the production of intermediate goods involves very high fixed learning costs, the conditions for the transaction of the intermediate goods at home are very crucial for the choice between home production and outward investment which uses the intermediate goods to produce final goods.

The results of the analysis of the relationships between trading efficiencies for different goods at home and abroad and the volume of international direct investment lead to the following proposition:

Proposition 7: The scale of FDI is affected negatively by the home country's trading efficiency for intermediate goods and positively by the trading efficiency for final goods in the local country. Improved trading efficiency for intermediate goods at home encourages firms to operate at home. At the same time, higher trading efficiency for final goods in the host country reduces transaction costs for final output and attracts FDI inflows.

4.3.1.3. Domestic transaction efficiency for labour

The effects of transaction efficiency for professional labour (s_{x_i}) and ordinary labour (s_{y_j})

can be observed in the inequality of $b_{x_i} < b_{j4} \equiv \frac{\delta \left[\frac{M_i}{M_{x_{i2}}} s_{x_i} - (k_{y_j} s_{y_j})^{\frac{1}{\alpha}} \right]}{\frac{M_i}{M_{x_{i2}}} - (k_{y_j} s_{y_j})^{\frac{1}{\alpha}}}$. As $\frac{M_i}{M_{x_{i2}}} \geq 1$,

for given values of b_{j4} , k_{y_j} and δ , larger values of s_{x_i} and s_{y_j} require smaller $\frac{M_i}{M_{x_{i2}}}$.

The effects of s_{x_i} on the volume of FDI is especially strong when the difference between the values of δ and b_{x_i} is very small. The relationship between s_{y_j} and $\frac{M_i}{M_{x_{12}}}$ may not

be as transparent. However, if we solve $b_{j4} \equiv \frac{\delta \left[\frac{M_i}{M_{x_{12}}} s_{x_i} - (k_{y_j} s_{y_j})^{\frac{1}{\alpha}} \right]}{\frac{M_i}{M_{x_{12}}} - (k_{y_j} s_{y_j})^{\frac{1}{\alpha}}}$ for

$\frac{M_{x_{12}}}{M_i} \equiv \frac{\delta s_{x_i} - b_{j4}}{(k_{y_j} s_{y_j})^{\frac{1}{\alpha}} (\delta - b_{j4})}$, then the positive association between s_{y_j} and $\frac{M_i}{M_{x_{12}}}$ is very

clear.

Proposition 8: The scale of FDI outflow varies positively with both the trading efficiency for professional labour in the source country and the trading efficiency for ordinary labour in the host country. Improvements in these trading efficiencies facilitate the expansion of international direct investment.

4.3.1.4. International transfer efficiency for labour and international transaction efficiency for goods

From $b_{x_i} < b_{j4} \equiv \frac{\delta \left[\frac{M_i}{M_{x_{12}}} s_{x_i} - (k_{y_j} s_{y_j})^{\frac{1}{\alpha}} \right]}{\frac{M_i}{M_{x_{12}}} - (k_{y_j} s_{y_j})^{\frac{1}{\alpha}}}$ we can see that there is positive relationship

between δ and $\frac{M_{x_{12}}}{M_i}$. For a given value of b_{x_i} , a larger value of $\frac{M_{x_{12}}}{M_i}$ requires a larger

value for δ in order for *FM* to emerge in general equilibrium. In turn, a large value of δ requires $\frac{M_{x_{12}}}{M_i}$ being large enough to keep the value of b_{x_i} within the effective range in

which the structure involving outward FDI, i.e. *FM*, is the general equilibrium structure.

A similar positive relationship between the values of $\frac{M_{x_{12}}}{M_i}$ and δ also exists for *FM* to

become general equilibrium under the condition where $b_{x_i} < b_{13}$ when $k_{x_i} > \frac{\delta s_{x_i} - b_{x_i}}{\theta(1-b_{x_i})}$.

The effects of international trading efficiency for final goods on international direct

investment can be observed from $\frac{M_{x12}}{M_i} \equiv \left(\frac{s_{y_j}}{k_{y_j}}\right)^{\frac{1}{1-a}} \left[\frac{\delta - b_{i3}}{\theta k_x (1 - b_{i3})}\right]^{\frac{a}{1-a}}$, a changed form of

$$b_{i3} \equiv \frac{\theta \left(\frac{M_{x12}}{M_i}\right)^{\frac{1-a}{a}} k_{y_j} s_{y_j}^{\frac{1}{a}} - \delta s_{y_j}^{\frac{1}{a}}}{\theta \left(\frac{M_{x12}}{M_i}\right)^{\frac{1-a}{a}} k_{y_j} s_{y_j}^{\frac{1}{a}} - s_{y_j}^{\frac{1}{a}}}$$

Clearly there is a negative relationship between

values θ and $\frac{M_{x12}}{M_i}$.

These lead to the following proposition:

Proposition 9: The international transfer efficiencies for cross-border movements of technical and managerial professionals positively affect the size of international direct investment, and the international trading efficiencies for trading in final goods negatively affect the size of international direct investment. While improvements in the international mobility of professionals promote the extent of FDI, improvements in the international trading efficiencies for trade in goods inhibit FDI.

The above propositions are summarised in Table 11.

Table 11 The determination of the volume of FDI

Variable		Effects on the volume of FDI
Source	b_x	-
	k_x	-
	s_x	+
Host	k_y	+
	s_y	+
International	θ	-
	δ	+

4.3.2. Discussion: domestic and international trading efficiency and FDI

Our analysis shows that the volume of international direct investment is determined by a group of factors, rather than by a single or a few factors as suggested by some existing approaches such as the internalisation theory (Buckley and Casson, 1976). These factors can be grouped according to their functionality into transaction efficiency for goods (k_x , k_y , θ), transaction efficiency for labour (s_x , s_y , δ), and specialisation in production (b_x). They capture important characteristics of the home economy (b_x , k_x , s_x), of the foreign economy (k_y , s_y), and of international markets (i.e., θ , δ). These domains are interconnected through structural and policy-induced linkages. For example, international trading efficiency for goods (θ) can be worsened by structural impediments in the exporting country, by trade restrictions imposed by the importing country, and by international transport costs and other barriers such as a high ratio of weight to value of the goods. Similarly, the international movement of managerial and technical professionals may be hindered by restraints set by the home country or by the host country, or by cultural difference between the two countries.

Our findings are consistent with some established hypotheses. Existing literature pays considerable attention to trading efficiencies for intermediate goods. Various types of managerial, production and marketing techniques and know-how, which form core firm-specific advantages, are at the centre of traditional analysis. Due to natural and artificial market imperfections, firms will expand internationally to internalise the production and consumption of such goods. The internalisation theory of FDI is rooted in the transaction cost approach initiated by Coase (1937) and further developed by Williamson (1975, 1985). Importantly, the internalisation theory of FDI does not emphasise market failure due to lock-in effects arising from asset specificity (Williamson, 1975). Rather it stresses failure in markets for information as the rationale for FDI. MNEs exist because the transaction cost of doing business through an "internalised" network of wholly owned subsidiaries is in many cases lower than that of arm's length relationships (Buckley and Casson, 1976). Our findings support the role of trading efficiencies for intermediate goods in international direct investment envisaged by the internalisation theory: In our model the volume of FDI is negatively affected by

k_{x_i} , the transaction efficiency in the source country for intermediate goods. In addition, our model recognises the importance of other factors in determining FDI which are ignored by the internalisation theory. As a result, our theory can explain why firms have to invest abroad to bypass the external market rather than doing this at home.

Another factor which has attracted much attention in the existing literature of FDI is international trade condition, captured in our model by θ . Theoretical and empirical studies show that high barriers to international trade, such as transport costs or tariffs, provide incentives for firms to bypass such barriers and to locate production in the market where the good is sold (Brainard, 1993; Markusen, 1998). The impact of trade condition on FDI revealed in our model is not only consistent with this view, but it also supports the presumption of substitution between trade and factor movements (Mundell, 1957). Capital inflows cause the equilibrium production point in the host country to shift in such a direction that the capital-intensive industry (that country's comparatively disadvantaged industry) expands. Exactly the opposite phenomenon is observed in the source country.

Nevertheless, there is a crucial difference between Mundell's and our views of the consequence of FDI. Mundell claims that FDI (capital movements) may ultimately eliminate the basis for trade. Our model shows the persistence of trade in the context of increased international division of labour. Transnational organisation of production may enhance specialisation in the intermediate and final good, respectively, with the result that exports of final goods from the host country to the source country occur on a scale corresponding to the volume of the FDI. In this respect our finding complements Kiyoshi Kojima's theorem of trade-oriented complementary FDI. If FDI occurs in industry with internationally comparative disadvantage at home but internationally comparative advantage in the host country, FDI will help the expansion of each country's comparatively advantaged industries and enhance the basis for trade between the two countries (Kojima, 1978). In short, FDI could promote cross-border specialisation in production both within and between corporations that expands the basis for trade.

Our model also identifies the role of some other factors which have attracted less attention in the existing literature. One of these is the transaction condition for labour.

This factor is closely related to transaction condition for the intermediate good. Although this factor has great theoretical importance in the sense that the rationale for the very existence of the institution of the firm lies in that the firm replaces the market for intermediate goods with the market for labour (Cheung, 1983), it is generally ignored in the existing mainstream theory of FDI. One possible reason might be that researchers have institutionalised the labour that produces intermediate goods and therefore use the multinational enterprise to replace the labour in analysis. This mixing up between labour and the firm would certainly cause confusion in logic and result in a hole in the theory of FDI: is the market for labour producing intermediate goods irrelevant to FDI and the multinationals? This is not the case. Our model clearly shows that the transaction condition for labour producing intermediate goods in the home country (s_{x_i}) is positively related to the volume of FDI. The effect of the transaction condition on the volume of FDI is especially strong when the difference between the values of b_{x_i} and δ is small. This is because b_{x_i} is a cost factor but δ is a negative cost factor. When their values are close, their respective contributions to the cost of the firm offset each other, leaving s_{x_i} as a criterion. For example, when knowledge is very difficult to produce (high b_{x_i}) and the international movement of specialist producers faces little physical, political and cultural obstacles (high δ), then the cost saving from factor movements, against an average benchmark, would roughly offset the costly expenditure on knowledge. Whether or not the firm can "produce" a sufficient number of qualified specialists with a reasonable learning cost at home and send them to its overseas subsidiary at correspondingly low transfer costs, is a crucial determinant of the ability of the firm to appropriate a return on its investment.

Our model also shows that the international mobility of labour (professional) positively affect the size of international direct investment, just as international transaction conditions for goods do. Few people would deny that the reduction of cross border barriers to the movement of people, along with goods and services, has helped facilitate the international division of labour and multinational enterprises' activity. A review of the history of FDI clearly shows that the growth of FDI has been accompanied by reductions in transport costs (railways, ocean shipping, aviation, motor vehicles, etc.) and

communication costs (telephone, fax, internet, etc.). Also driven by dramatic advances in relevant technologies, national governments and international institutions have made efforts to remove or reduce institutional barriers to cross-border movement of labour, other factors of production and goods, leading to rapid regionalisation and globalisation. Liberalisation of trade and investment rules along with the process of globalisation reduces the costs of trade in goods and cross-border transfers of factors and people, encouraging multinationals to undertake larger scaled FDI and trade.

The effect on FDI of the host country's transaction efficiency for goods and labour has attracted more attention from government policy makers than from economic theorists. For decades many developing countries have made efforts to improve their investment environment. A frequently adopted method is the public provision of infrastructure investment in transportation and communication, such as highways, railways, docks, airlines and telecommunication, which facilitate the negotiation and closing of contracts. Sometimes governments may invest directly in transaction facilities, such as trading centres and warehouses, which would benefit the marketing of subsidiaries' products. In addition, the host government might improve the enforcement of contracts by legislative methods.

However, as the mainstream theory of FDI focuses on the supply side, factors that include transaction efficiency for goods and labour in the host country are generally beyond researchers' fields of vision. One of a few exceptions is Dunning who incorporates the resource endowment of the host country in his eclectic theory of FDI, which is a theoretical base for his paradigm of the *investment development path* (IDP). Dunning attributes the lack of inward FDI at a country's early stage of IDP to various factors, including limited domestic markets, inappropriate economic system or government policies and inadequate infrastructure. These factors will certainly restrict the transaction efficiency in the country (Dunning, 1981; Dunning and Narula, 1996). In later stages of IDP, the improvement of trading efficiencies, together with the improvement in other "location advantages" such as the efficiency in producing created-assets, contribute to the expansion of inward FDI at first and outward FDI later. Dunning's observation confirms our finding about the positive role of the transaction efficiency for goods and labour in the host country for the determination of the size of international direct investment

4.4. *Concluding Remarks*

This chapter develops a general equilibrium model with endogenous international economic structure and international division of labour to identify the forces that determine the size of international direct investment flows. It yields the following important findings:

First, the size of international direct investment is influenced by characteristics of the source and destination countries. These include the transaction efficiency for goods and labour, transfer efficiency for cross-border movements of factors and goods, as well as learning costs in producing intermediate goods, notably technology.

Second, the direction of these influences is consistent with a priori expectations. The transaction efficiency for goods and for ordinary labour in the host country, the transaction efficiency for managerial and technical professionals in the source country, and the cross-boarder transfer efficiency for managerial and technical professionals all promote FDI. The transaction efficiency in the source country for intermediate goods which are used as input for overseas production, the international transaction efficiency for traded goods, and difficulty in the production of intermediate goods discourage FDI.

The analysis suggests that FDI causes the contraction at home and the expansion in host country of the industry in which FDI takes place, and results in a new pattern of international division of labour between the two countries. Instead of destroying the basis of trade as asserted by Mundell (1957), FDI and the associated new pattern of the division of labour lay a new basis for trade between the two countries. The volume of trade is likely to vary directly with the volume of FDI.

This chapter has methodological and theoretical contributions. By adopting the approach of inframarginal analysis, it has developed a general equilibrium model that yields unequivocal results for the determination of the size of FDI activity. This methodology enables our analysis to overcome some of the weaknesses of the dominant descriptive methodology in the existing literature on the general theory of FDI. The analysis shifts away from the supply-side orientation of the mainstream theory of FDI, and adopts a supply-demand or an "international" view of FDI. This approach has broadened our

vision and incorporated variables which are considered essential to the organisation of economic activity by industrial organisation theory and trade theory. While it has confirmed some propositions of existing theory of FDI, such as the role of transaction condition for intermediate goods in determining FDI, it has swept away some unclear views in the existing literature due to difference in approach to FDI but each with a very narrow focus. It therefore provides a comprehensive framework for empirical analysis and business study. The relationships between the determinants and the volume of FDI revealed in this model would also help our better understanding of international trade and economic organisation. It is worth noting that a no less important contribution of this chapter is it is one of the rare efforts to this topic in a formal theoretical framework.

The findings of this chapter have rich policy implications. The expansion of FDI and multinational activity depends on the specialisation in production of intermediate goods, home and host country specific factors, as well as international factors. For the source country, the development of outward FDI not only depends on its endowments and competitiveness, conditions in host country and international environment, but also on core features of industrial organisation at home. For the host country, the expansion of inward FDI depends not only on its investment environment and international conditions, but also on source country's characteristics. The goal of liberalisation of trade and investment requires constructive policy measures in both investing and recipient countries aimed at improving trade efficiencies for goods and labour. They should take into consideration the production specialities in intermediate goods and advances in technology. In short, national governments' policy regarding FDI should embrace policies for trade and industrial organisation. For multinational enterprises, it would be beneficial in the long run if their international direct investment is carried out in the direction of enhancing international division of labour which broadens the basis for trade. In the era of globalisation and knowledge-based economy, pooled efforts to reduce difficulties in R&D would facilitate the expansion of FDI, and this in turn would help accelerate globalisation.

4.5. Appendix: Determination of the General Equilibrium and Its Inframarginal Statics

The calculation for solving for the general equilibrium is as follows:

- First step: partition the parameter space into subspaces within each of which emerges a particular configuration that yields the highest utility for the relevant country without taking into consideration the relevant configuration in the partner country. The results of this step are listed in Tables A.1 and A.2.

Table A.1 Highest utility configuration and its inframarginal statics for Country i

Value of b_x and M_i	$k_{x_i} < \frac{\delta s_{x_i} - b_{x_i}}{\theta(1-b_{x_i})}$				$k_{x_i} > \frac{\delta s_{x_i} - b_{x_i}}{\theta(1-b_{x_i})}$			
	$b_{x_i} < b_{i2}$		$b_{x_i} > b_{i2}$		$b_{x_i} < b_{i1}$		$b_{x_i} > b_{i1}$	
	$M_{x_{i2}} < M_i$	$M_{x_{i2}} > M_i$	$< b_{i4}$	$> b_{i4}$	$M_{x_{i2}} < M_i$	$M_{x_{i2}} > M_i$	$< b_{i3}$	$> b_{i3}$
Highest utility configuration	FM	MS	FM	FL	FM	MS	FM	SI

$$\text{Where } b_{i1} \equiv \frac{\theta k_{x_i} k_{y_j}^{\frac{1}{a}} - \delta s_{y_j}^{\frac{1}{a}}}{\theta k_{x_i} k_{y_j}^{\frac{1}{a}} - s_{y_j}^{\frac{1}{a}}} \text{ is given by } U_{MS_i} = U_{SI_i};$$

$$b_{i2} \equiv \frac{\delta \left(k_{y_j}^{\frac{1}{a}} s_{x_i} - s_{y_j}^{\frac{1}{a}} \right)}{k_{y_j}^{\frac{1}{a}} - s_{y_j}^{\frac{1}{a}}} \text{ is given by } U_{MS_i} = U_{FL_i};$$

$$b_{i3} \equiv \frac{\theta \left(\frac{M_{x_{i2}}}{M_i} \right)^{\frac{1-a}{a}} k_{x_i} k_{y_j}^{\frac{1}{a}} - \delta s_{y_j}^{\frac{1}{a}}}{\theta \left(\frac{M_{x_{i2}}}{M_i} \right)^{\frac{1-a}{a}} k_{x_i} k_{y_j}^{\frac{1}{a}} - s_{y_j}^{\frac{1}{a}}} \text{ is given by } U_{SI_i} = U_{FM_i};$$

$$b_{i4} \equiv \frac{\delta \left[\left(\frac{M_{x_{i2}}}{M_i} \right)^{\frac{1-a}{a}} k_{y_j}^{\frac{1}{a}} s_{x_i} - s_{y_j}^{\frac{1}{a}} \right]}{\left(\frac{M_{x_{i2}}}{M_i} \right)^{\frac{1-a}{a}} k_{y_j}^{\frac{1}{a}} - s_{y_j}^{\frac{1}{a}}} \text{ is given by } U_{FL_i} = U_{FM_i};$$

b_{i5} : $M_i = M_{x_{i2}}$ is given by $MS_i = FM_i$.

Table A.2 Highest utility configuration and its inframarginal statics for Country j

Value of b_{x_i} and M_i	$k_{x_i} < \frac{\delta s_{x_i} - b_{x_i}}{\theta(1-b_{x_i})}$				$k_{x_i} > \frac{\delta s_{x_i} - b_{x_i}}{\theta(1-b_{x_i})}$			
	$b_{x_i} < b_{j2}$		$b_{x_i} > b_{j2}$		$b_{x_i} < b_{j1}$		$b_{x_i} > b_{j1}$	
	$M_{x_{i2}} > M_i$	$M_{x_{i2}} < M_i$	$< b_{j4}$	$> b_{j4}$	$M_{x_{i2}} > M_i$	$M_{x_{i2}} < M_i$	$< b_{j3}$	$> b_{j3}$
Equilibrium configuration	FM	MS	FM	FL	FM	MS	FM	SI

Where $b_{j1} \equiv \frac{\delta(k_{y_j} s_{y_j})^{\frac{1}{\alpha}} - \theta k_{x_i}}{(k_{y_j} s_{y_j})^{\frac{1}{\alpha}} - \theta k_{x_i}}$ is given by $U_{MS_j} = U_{SI_j}$;

$b_{j2} \equiv \frac{\delta \left[(k_{y_j} s_{y_j})^{\frac{1}{\alpha}} - s_{x_i} \right]}{(k_{y_j} s_{y_j})^{\frac{1}{\alpha}} - 1}$ is given by $U_{MS_j} = U_{FL_j}$;

$b_{j3} \equiv \frac{\theta \frac{M_i}{M_{x_{i2}}} k_{x_i} - \delta (k_{y_j} s_{y_j})^{\frac{1}{\alpha}}}{\theta \frac{M_i}{M_{x_{i2}}} k_{x_i} - (k_{y_j} s_{y_j})^{\frac{1}{\alpha}}}$ is given by $U_{SI_j} = U_{FM_j}$;

$b_{j4} \equiv \frac{\delta \left[\frac{M_i}{M_{x_{i2}}} s_{x_i} - (k_{y_j} s_{y_j})^{\frac{1}{\alpha}} \right]}{\frac{M_i}{M_{x_{i2}}} - (k_{y_j} s_{y_j})^{\frac{1}{\alpha}}}$ is given by $U_{FL_j} = U_{FM_j}$;

b_{j5} : $M_i = M_{x_{i2}}$ is given by $MS_j = FM_j$.

- Second step, identify the general equilibrium structures for the whole economy by solving for the critical values of parameters which meet the combined terms for the relevant pair of structures of the two countries. The result is summarised in Table B.

Table B

General equilibrium and its inframarginal statics

		$k_{x_i} < \frac{\delta s_{x_i} - b_{x_i}}{\theta(1 - b_{x_i})}$																			
Value of b_{x_i}		$< b_{i2}$ if $k_{y_j} < 1$		$< b_{i2} = b_{j2}$ if $k_{y_j} = 1$		$< b_{j2}$ if $k_{y_j} > 1$		$> b_{i2}$ if $k_{y_j} > 1$		$> b_{i2} = b_{j2}$ if $k_{y_j} = 1$		$> b_{j2}$ if $k_{y_j} < 1$									
Value of $b_{x_i}, M_i,$ $M_{x_{i2}}$		$M_{x_{i2}} < M_i$ $M_{x_{i2}} > M_i$		$M_{x_{i2}} > M_i$ $M_{x_{i2}} < M_i$						$< b_{i4}$ if $\frac{M_i}{M_{x_{i2}}} < k_{y_j}^2$		$< b_{i4} = b_{j4}$ if $\frac{M_i}{M_{x_{i2}}} = k_{y_j}^2$		$< b_{j4}$ if $\frac{M_i}{M_{x_{i2}}} > k_{y_j}^2$		$> b_{i4}$ if $\frac{M_i}{M_{x_{i2}}} > k_{y_j}^2$		$< b_{i4} = b_{j4}$ if $\frac{M_i}{M_{x_{i2}}} = k_{y_j}^2$		$> b_{j4}$ if $\frac{M_i}{M_{x_{i2}}} < k_{y_j}^2$	
Equilibrium structure										FM		FL									

	$k_{x_i} > \frac{\delta s_{x_i} - b_{x_i}}{\theta(1 - b_{x_i})}$									
Value of b_{x_i}	$< b_{j1}$ if $k_{y_j} < 1$		$< b_{j1} = b_{j1}$ if $k_{y_j} = 1$	$< b_{j1}$ if $k_{y_j} > 1$	$> b_{j1}$ if $k_{y_j} > 1$	$> b_{j1} = b_{j1}$ if $k_{y_j} = 1$	$> b_{j1}$ if $k_{y_j} < 1$			
Value of b_{x_i} $M_i, M_{x_{i2}}$	$M_{x_{i2}} < M_i$	$M_{x_{i2}} > M_i$			$< b_{j3}$ if $\frac{M_i}{M_{x_{i2}}} > k_{y_j}^2$	$< b_{j3} = b_{j3}$ if $\frac{M_i}{M_{x_{i2}}} = k_{y_j}^2$	$< b_{j3}$ if $\frac{M_i}{M_{x_{i2}}} < k_{y_j}^2$	$> b_{j3}$ if $\frac{M_i}{M_{x_{i2}}} < k_{y_j}^2$	$> b_{j3} = b_{j3}$ if $\frac{M_i}{M_{x_{i2}}} = k_{y_j}^2$	$> b_{j3}$ if $\frac{M_i}{M_{x_{i2}}} > k_{y_j}^2$
Equilibrium structure					FM					SI

5. Growth and Geographical Distribution of Outward FDI: Case of China

5.1. Introduction

The goal of this chapter is to explore the nature of China's outward FDI. There are two motives for this investigation. First, the emergence and development of China's outward FDI have exhibited salient features that defy existing mainstream theories of FDI. It is generally acknowledged in the literature that FDI from a developing country is most likely to be directed initially to its neighbouring developing countries and to expand gradually in volume and distance. This pattern is attributed to the assumption that FDI is based on firm-specific advantages to overcome disadvantages faced by subsidiaries in the host country, and firms from developing countries are relatively weak in international competitiveness. Therefore, FDI from developing countries should choose in its early stage countries with economic, cultural and geographic proximity as destination in order to bypass or to reduce the disadvantages. Only after having gained international experience through overseas operations and consolidated firm-specific advantages can firms invest on a relatively large scale in more developed countries that are distant geographically (see for example, Dunning and Narula, 1996; Riemens, 1989; Tolentino, 1993). In contrary to these stylised facts, China's outward FDI developed rapidly and is heavily concentrated in a few developed countries, namely, the United States, Canada and Australia.

Second, we would also like to test propositions advanced in previous chapters about the determination of FDI and its size against empirical evidence from China's outward FDI. These propositions suggest that the volume of FDI is affected prominently by transaction efficiencies in goods and factor markets.

The empirical investigation does not contradict the view that the growth and geographic distribution of China's outward FDI are essentially determined by the transaction

efficiencies for labour and goods at home relative to the host country, and by international transaction and transfer efficiencies between China and host countries. These results provide answers to some of the questions on which existing theory of FDI is silent.

This chapter is set out as follows: Section 5.2 describes the emergence and development of China's outward FDI and pertinent theoretical issues. Section 5.3 analyses the rationale for the growth of China's outward FDI, and Section 5.4 focuses on its geographical distribution. The last section offers some concluding comments.

5.2. *The Growth of China's Outward FDI and Theoretical Issues*

It is well known that China has absorbed a huge amount of FDI since the start of the economic reforms more than two decades ago. Since 1992, it has been the largest recipient country for FDI flows, exceeded only by the United States (UNCTAD, 1994-1999). It is not so well known, however, that China's direct investment abroad has also been growing rapidly into diverse countries and industries at the same time. For most of the years since 1985, China has been among the top five FDI source economies within the developing country group, and it ranks as the fourth largest source country in terms of outward FDI in recent years (UNCTAD, 1997, 1999).

5.2.1. *The development of China's outward FDI*

China's outward FDI commenced in the early phase of economic reform. It began on a small scale, with an annual outflow of less than US\$40 millions in the first few years. However, as the economic reforms proceeded, Chinese enterprises invested abroad at an increasing rate. Between 1985 and 1991, the average annual outflow of China's direct investment was more than US\$728 million. This figure increased further to US\$2,804 million during the next seven-year interval, nearly quadrupling the FDI outflow of the 1985-1991 period (Figure 8).

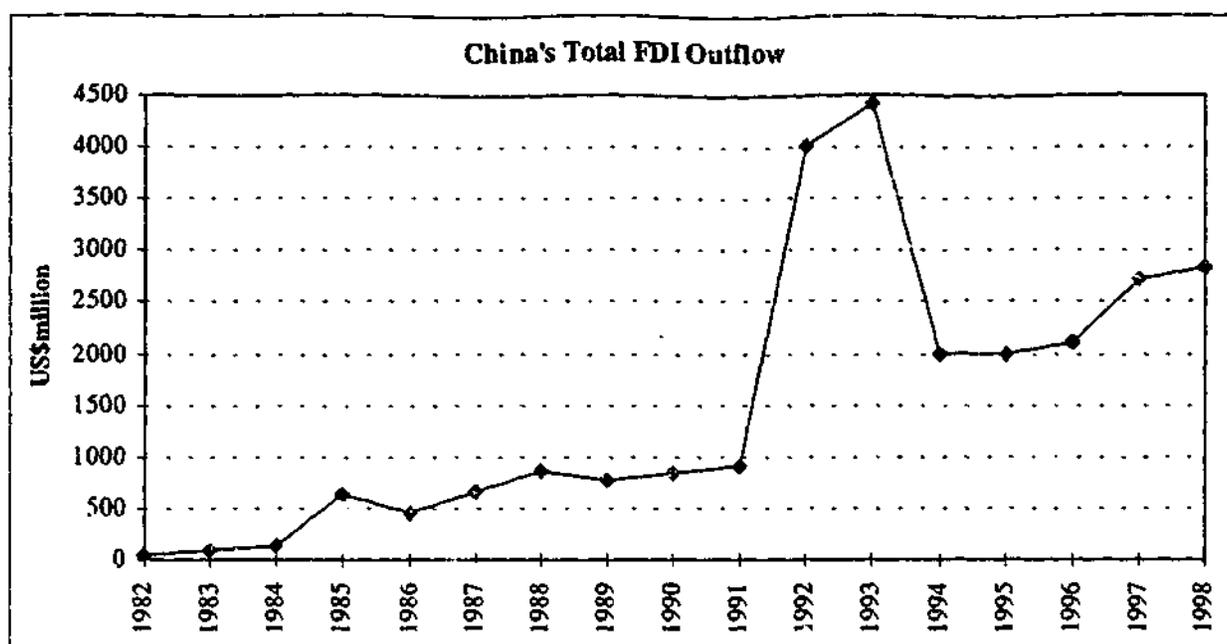


Figure 8

Data source: 1. SAFE (1999). *1982-1999 Balance of Payments Statement for China*.
 2. UNCTAD. *World Investment Report*, issues 1994-1999.

We can distinguish roughly three stages in the development of China's outward FDI:

First stage (1979-1984): *Emergence*. In November 1979, the Beijing Friendship Commercial Service Company set up a joint venture in Tokyo with a Japanese firm, signifying the start of foreign direct investment by residents of China. Investors during this period were basically trade enterprises, which might be grouped into two types: specialised foreign trade corporations with import and export licences, and technological cooperation firms under the direct administration of provinces and cities. Encouraged by the open door policy, these firms tried to enter into overseas business arrangements by taking advantage of their existing international business links as well as their higher autonomy in operation that had been granted by central and local governments. Since the economic reforms were just at their early stage and negative views of multinational enterprises were influential, China's overseas FDI during this period was small in volume and number of projects.

Second stage (1985-1990): *Early boom*. In 1985, the State Ministry of Foreign Economy and Trade passed a resolution: "Any economic entity can apply for setting up overseas joint ventures if it has the relevant financial resources, technology capability, and joint

partners". In quick succession, a group of large enterprises and conglomerates began to undertake FDI. Soon after that the State Council formally approved of the China National Chemical Import and Export Corporation (SINOCHEM) to make experiments with overseas business. During this period, not only did trade enterprises engage in international business, but manufacturing enterprises such as Shougang (the Capital Steel and Iron Corporation) also began to join the ranks of overseas FDI. However, this boom was severely affected as the Chinese government retreated in 1989 to conservative policies and suspended the approval of trade-type overseas enterprises.

Third stage (1991-): *Steady development*. In the early 1990s the Chinese Government clearly defined the aim of the economic reform as the establishment of a market economic system. It formulated a strategy of *utilising two kinds of resources and developing two markets*¹⁵. Many local governments and enterprises acknowledged the strategic importance of overseas business for accelerating economic development. As a result, China's overseas FDI expanded rapidly.

The rapid expansion of FDI outflows makes China one of the main source countries among developing economies. Since 1985, China is among the top five of those economies, and it ranks as third largest source country of outward FDI stock in recent years (Table 12). Six of the top 50 multinational enterprises based in developing economies, ranked by foreign assets in 1997, were from China (UNCTAD 1999, pp.86-87). Considering the fact that there was basically no outward FDI before the economic reforms, the rapid development of China's outward FDI is remarkable.

¹⁵ Two kinds of resources refer to the domestic resources and overseas resources; and two markets refer to the domestic market and international market.

Table 12

China's outward FDI position

Outward FDI flows												
Year	1982-87 annual average	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Flows (US\$ M)	333	850	780	830	913	4000	4400	2000	2000	2114	2724	2816
% of LDC	25.21	14.22	5.00	4.90	8.30	19.31	12.60	4.70	4.38	4.30	4.46	5.34
Ranking in LDC*	1	2	3	5	4	1	1	5	5	5	5	4

Outward FDI stock									
Year	1985	1990	1992	1993	1994	1995	1996	1997	1998
Stock (US\$M)	131	2489	7401	11802	13802	15802	17916	20416	22079
% of LDC	0.44	3.34	11.86	10.05	8.25	6.76	6.36	5.97	5.65
Ranking in LDC*	11	5	2	2	2	4	3	3	3

Note: * Ranking not including oil exporting countries, Bahamas, Bermuda, Cayman Is., Panama, and Hong Kong.

Data sources: 1. SAFE (1999). *1982-1999 Balance of Payments Statement for China*.

2. UNCTAD. *World Investment Report*, issues 1994-1999.

5.2.2. Destination of China's outward FDI

China's outward FDI covers as many as 152 countries (economies)¹⁶. However, its distribution is quite uneven among regions as well as countries. Its geographical distribution is strongly skewed in favour of a few developed countries and a few developing countries.

In term of flows, North America and Asia are the two major recipients of FDI from China. They accounted for 29 and 23 per cent, respectively, of China's outward FDI for the

¹⁶ There are two general types of data on FDI. One is the financial data from balance of payments accounting. The other is data on the operations of FDI affiliates and their parents. Lipsey (2001) discusses the differences in source and feature of these two types of data. In China, the financial data are provided by SAFE, and the operations data by MOFTEC. UNCTAD uses SAFE data source. Though UNCTAD and SAFE data can give us a whole picture of the growth of China's outward FDI flows at the aggregate level over the years from the late 1970s, they do not provide data on the country distribution of China's outward FDI. The Ministry of Foreign Trade and Economic Cooperation of China (MOFTEC), the Chinese government institution responsible for the administration of outward FDI, has recorded every single investment project approved by or registered with the government. The data include the number of investment projects, the total size of the investment, as well as the destination country. It is the only detailed data source available so far from the Chinese authorities, and we will trace the geographical distribution of China's outward FDI from this source.

period 1979-1998. They are followed by Oceania-Pacific region and Africa, each accounting for 17 and 13 per cent respectively. European countries as a whole received only 7 per cent, the lowest share among all the regions.

In terms of the number of investment projects, Asia is the biggest host region, which received about 41 per cent of China's outward FDI between 1979 and 1998. In the following positions are Europe, North America and Africa, each accounting for 18, 14, and 13 per cent, respectively, for the same period (Table 13).

Table 13 Destination distribution of China's government approved outward FDI (%)*

		1979-90	1991	1992	1993	1994	1995	1996	1997	1998	1979-98
1. Among different regions											
Asia	FDI outflows	19	5	31	34	37	47	37	16	34	23
	FDI Projects	42	28	34	39	47	52	54	43	44	41
Africa	FDI outflows	5	0	4	15	40	17	19	51	34	13
	FDI Projects	12	3	6	10	11	22	22	32	16	13
Europe	FDI outflows	6	7	26	11	8	2	1	7	5	7
	FDI Projects	13	39	33	17	11	5	5	16	17	18
L. America	FDI outflows	5	1	7	10	1	5	41	15	6	10
	FDI Projects	6	7	7	7	6	8	3	3	11	7
N. America	FDI outflows	33	86	9	17	10	20	2	1	12	29
	FDI Projects	18	16	13	16	16	10	10	3	8	14
O & Pacific	FDI outflows	32	1	24	12	4	9	0	11	9	17
	FDI Projects	9	7	7	11	8	3	5	5	5	7
2. Among different types of countries											
DC	FDI outflows	67	88	37	33	19	32	10	8	17	48
	FDI Projects	38	30	27	29	29	30	21	20	15	30
LDC	FDI outflows	30	6	42	59	76	68	89	87	79	47
	FDI Projects	58	36	45	56	64	68	75	68	72	58
C&E Europe	FDI outflows	3	6	21	9	4	0	0	6	3	5
	FDI Projects	4	33	28	15	6	2	3	12	14	12

Note: * Due to rounding off the sum for a particular year may not equal 100.

Data source: *Almanac of China's Foreign Economic Relations and Trade*. 1993/94; 1994/95; 1995/96; 1996/97; 1997/98, 1998/99.

It is noteworthy that the distribution of China's outward FDI among the three groups of countries, developed, developing, and Central and East European, is very uneven. During the entire 1979-1998 period, Central and East European countries only absorbed 5 per cent, leaving the remaining 95 per cent of investment to be approximately evenly distributed to developed and developing countries. China carried out 309 investment

projects involving a total investment flow of US\$63.6 million in Central and East European countries, but more than half of the investment (both in volume and number of projects) was carried out in 1991 and 1992 (MOFTEC).

While for the whole 1979-98 period the developed country group and developing country group received 48 and 47 per cent of China's outward FDI flows, respectively, several distributional features are worth noting. First, the number of projects received by developing countries is nearly twice that received by developed countries. This implies that the average size of investment projects in developed countries is about twice that in developing countries. Second, China's FDI flows are concentrated heavily in developed countries before 1991. More specifically, between 1979 and 1991, more than 72 per cent of China's FDI outflows went to developed countries, while developing countries only received 24 per cent. This feature stands in sharp contrast to the expected pattern of FDI from developing countries which focuses on other developing countries as the main destination, especially during its early stage. Third, China's investment in developing countries kept rising after 1992 and larger share of investment went to them during this period (Table 13).

The distribution of China's outward FDI among individual countries is much more uneven than would appear on the basis of regional comparison. FDI outflows are highly concentrated geographically in a few developed countries. Until 1998, about 42 per cent of government approved FDI went to the United States, Canada and Australia, accounting for 15, 14 and 13 per cent, respectively. These three countries, plus Hong Kong, Peru, Russia, Thailand, Macau and South Africa, accounted for more than 66 per cent of China's outward FDI, leaving the remaining 143 countries (regions) accounting for less than 34 per cent (Figure 9).

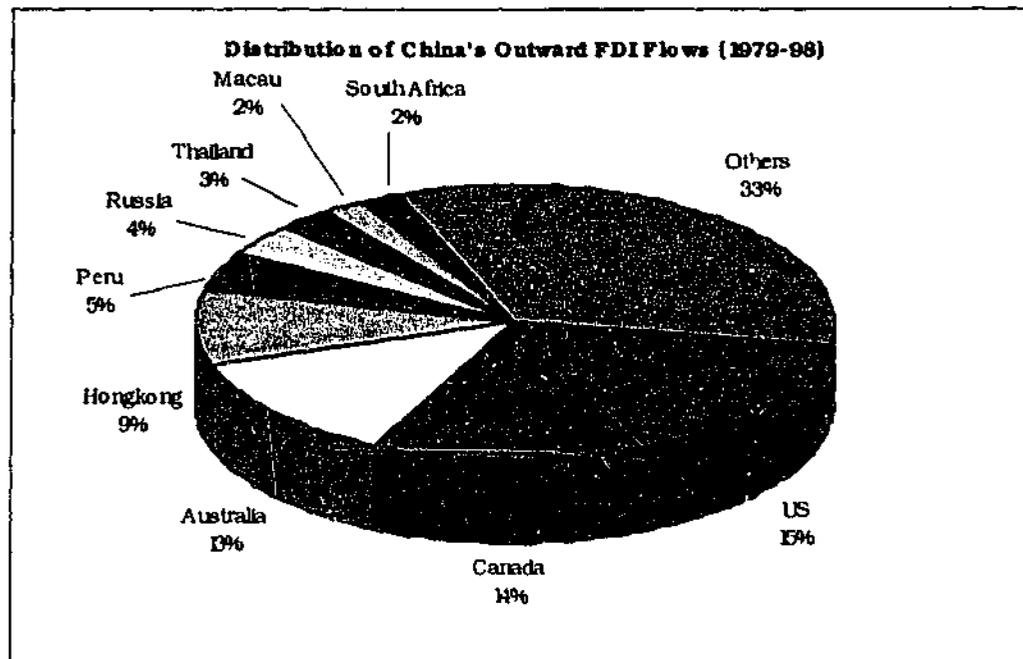


Figure 9

Data source: MOFTEC: *Almanac of China's Foreign Economic Relations and Trade*. 1993/94; 1994/95; 1995/96; 1996/97; 1997/98, 1998/99.

5.2.3. Theoretical issues raised by China's outward investment

The emergence and rapid development of China's outward FDI call for an explanation of the underlying rationale. In the analytical frameworks which are normally applied to the analysis of direct investment from a particular source country, the following issues are of particular concern: What are the ownership advantages for the Chinese investors? What are the determinants of the timing of China's outward investment? And what are the critical factors which determine the geographical distribution of China's outward FDI?

5.2.3.1. *The ownership advantages*

According to mainstream theory, the possession of some kind of proprietary advantages is a critical factor underlying a firm's overseas FDI. This holds no matter whether the investment is claimed to be motivated by the firm's desire to exploit these advantages overseas to avoid transaction costs (the internalisation model) or as part of the firm's equilibrium strategy in a game of imperfect international competition (the market power

model). These proprietary advantages are derived from the ownership of intangible resources, generally, technology, management skill, and organisational capabilities¹⁷, which can be easily transferred from country to country within a firm, but very difficult between firms. However, that pattern is hardly reflected in China's outward FDI, especially when we consider the fact that China's overseas FDI takes developed countries as its major destinations.

First, the average size of Chinese firms is relatively small. In 1996, General Motors of the United States realised sales of US\$5.26 billion, which was equal to the sum of the sales of the 342 largest Chinese firms, or 32 times that of Daqing Oil Company, the largest firm in China in terms of sales. The total sales of the world largest three firms, General Motors, Ford and Shell, exceeded the total sales of all 23,927 large and medium sized firms (L&MFs) in China. In 1996, the American industrial enterprise Exxon realised a profit of US\$7.51 billion, which was about 57 per cent of the total profit made by 23,927 L&MFs in China. In the same year, Baosteel, the largest industrial firm in China in terms of assets, held US\$9 billion of total assets, which was only about 3 per cent of total assets held by General Electric from the United States (CSIESR *et al*, 1999, pp.111-112). Some indicators of the relative size of Chinese and world firms are summarised in Table 14. In addition, most of the Chinese firms are operating in a single industry, and the variety of their products is correspondingly limited.

¹⁷ There is no unanimous view on what encompasses intangible assets or resources. Grant (1991, p.119) categorised intangible resources into four subclasses: human resources, technological resources, reputation, and organisational assets. Hall (1993) classifies intangible resources into two categories: intangible assets and competencies. Intangible assets include "having" capabilities, which typically are regulatory (e.g. patents) or positional (e.g. reputation). Competencies (intangible skills) are related to "doing" capabilities, which include functional capability (e.g. know-how) and cultural or organisational capability (e.g. routines). Intangible skills are typically people dependent, while intangible assets are considered as people independent.

Table 14 Comparison between China's large- and medium-sized firms and the world largest firms

	Sales	Profit	Assets
World no.1: China's no. 1	32:1	-	34:1
World no.1: sum of 23927 China's large- and medium-sized firms	42:100	57:100	42:100
World no. 1 equals to China's	Sum of 342 largest	-	Sum of 342 largest
World largest three: sum of 23927 China's large- and medium-sized firms	110:100	212:100	112:100

Source: CSIESR, *et al* (1999). *Report on the Development of China's International Competitiveness 1999*. (in Chinese). Beijing: People's University Press. p.111.

Secondly, compared with their counterparts from developed and newly industrialised countries, Chinese firms are weak in research and development (R&D) activities. Though the total employment in R&D activities in China is very large, less than 30 per cent of R&D workers are employed by firms. In 1998, only 32.2 per cent of the China's L&MFs had their own specialised R&D institutions. Even among those firms which have R&D institutions, 37 per cent did not have relevant inputs (NBS, 1998). This contrasts sharply with the situation in developed and newly industrialised countries where more than half of the national R&D employees work in firms. In the United States, R&D employees in firms accounted for as high as 79.4 per cent of the national total in 1998 (Table 15).

Table 15 Number of employees in R&D activities in firms

Country	(a) Total number of employees in R&D (thousand)	(b) Number of employees in R&D in firms (thousand)	b/a (%)
US	962.7	764.5	79.4
Japan	948.1	573.7	60.5
Germany	470.2	285.0	60.6
France	318.4	162.0	50.9
UK	279.0	148.0	53.1
South Korea	152.2	96.9	63.7
Russia	990.7	671.1	67.7
China	1667.7	477.0	28.6

Source: IMD (1998). *The World Competitiveness Yearbook 1998*.

Thirdly, Chinese firms as a whole are inferior in management in comparison with their counterparts from developed and most newly industrialised countries. According to the

International Management Development, the management competitiveness of firms in China was ranked 30 out of the 46 sample countries in 1998 (IMD, 1998). The major host countries for China's outward FDI - the United States, Canada, Australia, and Hong Kong - were ranked 1, 11, 17 and 4, respectively, much higher than China (Table 16).

Table 16 Management competitiveness of selected countries/regions (1998)

	Management	# Productivity	# Labour costs	# Corporate performance	# Management efficiency	# Corporate culture
China	30	42	1	31	29	20
US	1	6	39	1	3	1
Canada	11	16	34	10	12	11
Australia	17	10	27	18	23	15
Russia	46	46	31	46	46	45
Thailand	41	38	8	40	35	39
South Africa	38	37	14	29	41	32
New Zealand	9	25	25	11	14	7
Malaysia	22	30	10	24	17	19
Singapore	2	17	21	5	5	3
Japan	24	20	43	2	33	22
Taiwan	7	23	19	19	7	8
Hong Kong	4	18	24	9	1	10
South Korea	34	27	16	43	42	25
India	32	28	2	41	25	44

Source: IMD (1998). *The World Competitiveness Yearbook 1998*.

Chinese firms are especially weak in the aspects of productivity, corporate performance and management efficiency (Table 16). China is ranked lowest in overall productivity among all sample countries except for Russia. For Corporate Performance, Chinese firms are poor in the respects of Advertising Expenditure and Price/quality Ratio. In 1995, per capita advertising expenditure in the United States and Japan were US\$619.44 and US\$460.78 respectively, while in China was only US\$1.81 (CSIESR, *et al*, 1999, p.154). Chinese firms also lack competent senior managers and good marketing culture (Table 17).

Table 17 International comparison balance sheet for Chinese firms' management

Assets		Liabilities	
Index	Ranking	Index	Ranking
Yearly wages in service professions	1	Overall productivity (PPP)	45
Overall productivity (PPP) growth	2	Labour productivity (PPP)	45
Remuneration of management	2	Agricultural productivity (PPP)	44
Compensation levels	5	Productivity in industry (PPP)	44
Worker motivation	7	Productivity in services (PPP)	44
Entrepreneurship	9	Advertising expenditure	43
Managers' social responsibility	12	Price/quality ratio	42
Corporate boards	14	Competent senior managers	40
		Marketing culture	36

Source: IMD (1998). *The World Competitiveness Yearbook 1998*.

One of the main reasons for the relatively poor management competitiveness of Chinese firms is that China is still in the process of introducing the macro- and micro-economic institutions and practices appropriate for a market economy. Consequently, it will take some further time for Chinese firms to fully embrace and internalise these institutions and practices in their operations.

5.2.3.2. The timing of China's outward FDI

The time path of FDI engagement by a country has attracted relative little attention in the literature. Dunning's investment development path (IDP) is an exception (Dunning and Narula, 1997). The IDP shows that the emergence and development of outward FDI is a sequential process which is related to the economic development of the source country and its inward direct investment position. Before the emergence of its outward FDI, a country needs to experience a stage in which even inward direct investment does not exist. Even if it has started outward FDI, the country will still have to experience another stage in which inward FDI starts to rise but outward FDI remains low or negligible. Only when the country has entered the third stage, can the rate of growth of its outward FDI increase while inward direct investment gradually decrease.

Dunning's IDP is based on his trinity of OLI theorem (1981): the net outward investment (NOI) of a country is attributable to its relative endowments of ownership, location and

internalisation advantages. Over time, the endowment of these advantages changes, causing adjustment in the NOI position. During the initial low development phase, no cross-border direct investment flows occur since domestic firms have no ownership advantage to undertake outward FDI, and the country's location advantages are not sufficient to attract inward foreign direct investment. As economic development commences, location advantages emerge that attract foreign direct investment, but few local firms have sufficient ownership advantages to undertake outbound investment. Large-scale overseas direct investment can only occur when a country have gained sufficient advantages of created assets over time.

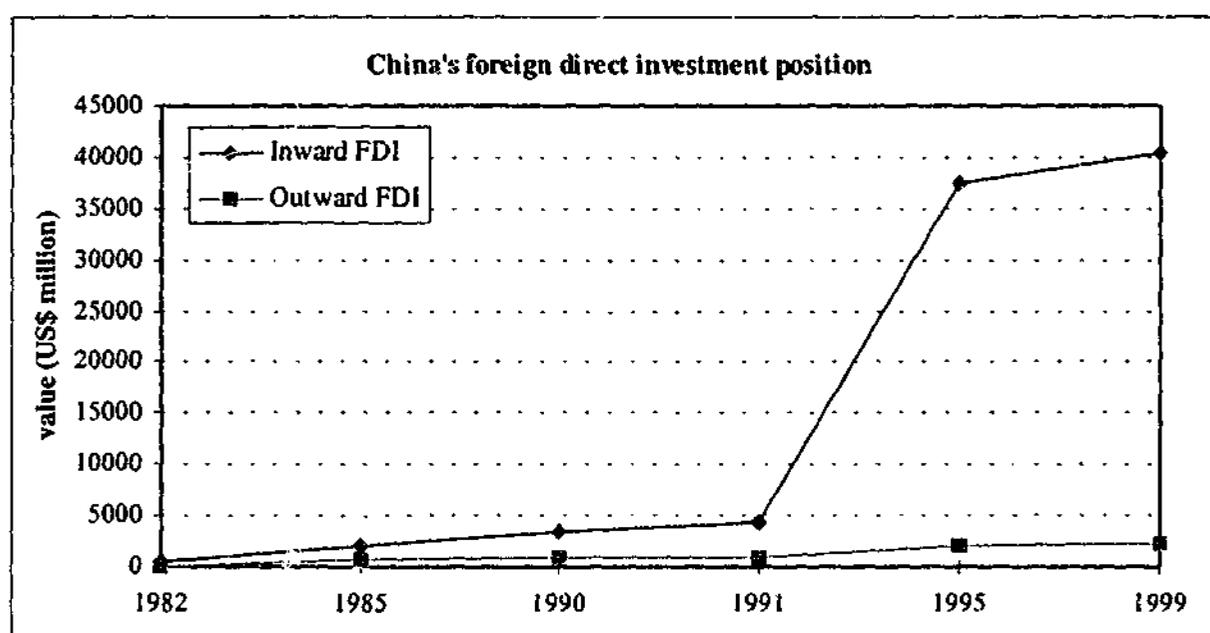


Figure 10

Data source: UNCTAD. *World Investment Report*, 1994-1999.

Figure 10 shows the evolution of China's foreign direct investment position. There are some conspicuous characteristics. First, the emergence and development of outward direct investment flows coincide with inward direct investment flows. The period 1982-1999 witnessed growth of inward and outward FDI. Secondly, compared with the huge increase in direct investment during the 1990s, China's outward FDI remained relatively small, but its absolute value is by no means negligible. From 1990 to 1999, the total FDI outflows amounted to US\$24.2 billion. This FDI experience suggests that China's outward FDI has skipped the first and part of the second stage of the typical IDP envisaged by Dunning, and that it has now entered the third stage. Since Chinese firms,

as the analysis in the preceding section indicates, do not possess sufficient ownership advantages to invest abroad on a large scale, especially to the developed countries, the timing of the emergence and development of China's outward FDI is difficult to be explained by the IDP paradigm

5.2.3.3. *The geographical distribution of China's outward FDI*

It is interesting to note that China's outward FDI is heavily concentrated in the United States, Canada and Australia. Developing countries are not major destination. This fact seems to deny the decisive role suggested by mainstream theory of proximity in economic development and geography between source and host countries for destination of FDI.

Given the importance of ownership advantage in mainstream theory of FDI, the choice for the location of FDI is largely a function of the possession of the ownership advantages. Hymer (1976) notes that domestic firms enjoy the general advantage of better information about their country: its economy, language, law, politics, and so forth, which will incur additional costs for foreign firms. Accordingly, the investing firm must have sufficient firm-specific advantages (ownership advantages) to offset the comparative disadvantage of being foreign if it is to compete successfully in the host country. On the other hand, if a firm chooses to invest in countries with less cultural, economic or physical distance from the home country, it will need less ownership advantages to tackle barriers to international operation, as "short" distance implies less barriers. Therefore, firms progressively tend to "enter markets at an increasing distance from the home country, not only in terms of physical distance but also in terms of differences in economic development, language, culture, political system. Thus, firms are predicted to start their internationalisation by moving into markets they can most easily cope with, entering more distant countries only at a later stage" (Benito and Gripsrud, 1995). Since firms from developing countries are normally small, weak in technological innovation, and less experienced in internationally, their foreign investment is typically directed towards other developing countries. This implies that the pattern of FDI from developing countries displays heavy regional concentration during the early stage (UNCTC, 1983).

Generally speaking, newly developing countries are characterised by subsistence primary

production and low levels of income per head. By comparison, in developed countries the lion's share of GDP comes from the services sector while agriculture only accounts for a very small share of GDP. By this criterion, China is a typical developing country. For example, in 1980, the value added in agriculture accounted for 30 per cent of GDP while services only accounted for 21 per cent. In the United States, on the contrary, the respective shares were 3 per cent and 64 per cent, respectively. Nearly two decades later, in 1998, agriculture still accounted for 18 per cent of GDP and services for 33 per cent in China. In the same year in the United States services accounted for 72 per cent of its GDP and the share of agriculture had dropped to 2 per cent. It is worth noting that the average share in GDP of the services sector in low-income countries was 38 per cent in 1998, some 5 per cent higher than that of China. In the meantime, in 1998, per capita GNP in China was US\$750, less than 3 per cent of the developed countries average (World Bank, 2000).

The differences in the level of economic development and economic structure between China and developed countries have militated against large-scale entry of Chinese firms' direct investment into developed countries. Not only as Chinese firms do not possess clear technological and managerial advantages over their counterparts in developed countries, as indicated above, but also as China's firms cannot obtain substantial labour cost savings in their outward FDI. Labour costs are much lower in China than in most other countries, including developing countries. In the 1995-99 period, the yearly labour cost per worker in manufacturing in China was US\$729, only about 2.5 per cent of that the United States, 2.6 per cent Canada, and 2.8 per cent Australia. If labour cost saving is the major concern in foreign direct investment, Chinese firms would not undertake FDI because they would be much better off operating at home!

The difficulties of mainstream theory to provide a plausible explanation of the pattern of China's outward FDI call for a different approach. The model developed in the preceding chapters suggests an alternative approach. This approach seems to capture salient features of China's FDI experience. In the following sections we will interpret the nature of China's outward FDI in the framework of the model.

Since China has a very short history of foreign direct investment, statistics have not kept pace. Detailed comprehensive data on outward FDI, especially on industrial composition

and overseas subsidiaries' operation, are not available. This lack of statistical evidence rules out the possibility of rigorous testing with formal econometric analysis. So the method of approach is essentially descriptive.

5.3. *Transaction and Transfer Efficiency and Growth of China's Outward FDI*

5.3.1. **Pre-reform: no market mechanism, no FDI**

Proposition 10: The closed planned economic system in China before the reform ruled out market mechanism, which in turn ruled out the possibility of outward FDI.

For nearly three decades before the reform, China's economy was a planned economy which essentially ruled out market mechanism. After the conversion of private domestic and foreign enterprises into state-owned enterprises by 1953, central planning and "public ownership" dominated the national economy. Mandatory central planning covered not only important macroeconomic targets such as aggregate investment and regional development but also basic operational aspects such as financing, production, sourcing and sales. Even though collective enterprises and communes were theoretically and ideologically not state-owned, their activities were also tightly controlled by the central planning bodies through the integrated political networks of top to bottom administration and the Communist Party systems. A central task was establishing public ownership with emphasis on state-ownership, the highest form of public ownership. The more important an activity was, the more likely it was subject to state ownership. As a result, market in the sense of market economy was basically excluded from the economy. The government set output quotas for each production enterprise and similar tasks for commercial enterprises. The sources and quantities of supply of input for production were arranged by government planning, so were the procurement and supply in commercial enterprises.

Such a system ruled out the possibility of transactions of both factors and goods on the basis of market rules. For firms in this system, this fact implied that the transaction efficiency for the external transit of factors and goods which would be associated with automatic expansion was prohibitively low or basically zero. In other words, even if a

firm would like to expand by itself, it could neither buy the required factors nor sell the relevant products in the "market". On the other hand, as firms operated within a peculiar system of dual financial flows with the government and turned over their revenues (profit) to the state, they did not have the financial source and the incentive to expand their business either.

Under such conditions, the possible occurrence of outward FDI would entirely depend upon the government planning and arrangement. However, China concurrently adopted the principle of self-reliance in its foreign economic relations. Higher-level international economic activities such as FDI were basically proscribed, and foreign trade was restricted to the extent that imports were permitted only to overcome shortages in domestic production, while exports were a means to raise foreign currency required in payment for imports. As a result, China's share in the total value of world trade decreased from 1.4 per cent in the 1950s to 1.1 per cent in the 1960s and further to 0.8 per cent in the 1970s (Teng, 1982). The formal ban on inward FDI was lifted in 1972 in the wake of the visit to China of U.S. President Richard Nixon. This opened the door for the resumption of diplomatic relations with some major industrialised countries. However, the severity of a number of restrictions on foreign investment remained unchanged.

The autarkic economic policies implied that the transaction efficiency for the international movement of factors on the basis of market rules was as prohibitively low as the domestic transaction efficiency for factors. Firms which would like to engage in international business faced not only prohibitively low transaction efficiency for factors domestically but also extremely high obstructions in moving the associated factors from China to foreign countries. As a result of the country's de-linking from the world economy and the firms' de-linking from outsiders, there was basically no FDI activity for the three decades before the reform.

5.3.2. Transition: improvement in transaction efficiency and growth of FDI

5.3.2.1. *Introducing market mechanism*

Proposition 11: China's outward FDI emerged when domestic transaction and transfer efficiencies began to improve in response to the introduction of market mechanism.

In December 1978, the Third Plenum of the Eleventh Central Committee of the Chinese Communist Party announced far-reaching economic reforms. Core elements were the introduction of market mechanism into the economy and the decision to open up and to engage actively in the global economic system. These are normally referred to as "internal revitalisation and external opening up" or "reform and opening up", for short.

Main measures for internal revitalisation include the expansion of the dimensions of market and the expansion of autonomy of enterprises. By 1985, the market economy had expanded, and factor markets started to emerge. Markets for capital, labour, technology, information and housing were gradually established during the 1985-1991 period. The market began to play a more important role in the economy for the efficient allocation of resources (Wen, 2002).

The success of the experimental rural reform of the "family contractual production responsibility system" in Anhui and Sichuan provinces in 1978 had provided empirical evidence of the enormous costs of state ownership. This experience spurred the reform of ownership in other sections of the economy. The separation of ownership rights from management rights through various measures was initially adopted in collective enterprises and by the late 1980s in most medium-sized state-owned enterprises. As a result, enterprises had larger autonomy and more freedom in planning and managing production, purchasing inputs, marketing, pricing, distributing salaries and bonuses, and hiring and firing workers. Some state-owned enterprises were granted the autonomy of direct exporting¹⁸.

The economic reforms also re-linked Chinese firms with the world market. Before the economic reforms, China's domestic industrial firms were cut off from international

¹⁸ The state-owned enterprises have experienced four stages of reform so far. The first stage (1978 - September 1984) is the experimental stage of expanding the autonomy of enterprises: main measures were government transferring to state-owned enterprises some powers in latter's planning, marketing and profit sharing. The second stage (October 1984 - end 1986) signifies the beginning of the formal reform of state-owned enterprise and focused on the separation between government and enterprises, and between ownership and operation of firms. Main measures adopted were various types of contracted operation. Third stage (1987 - end 1993) centred on the transformation of enterprises' operating mechanisms. Through particular legislation state-owned enterprises were legally granted 14 autonomy rights in operation. The fourth stage (from 1994) centres on establishing enterprises in the sense of the firm in market economy.

markets. Twelve state-owned foreign trade companies, each with responsibilities for a specific category(ies) of commodities, were the only conductors between domestic firms and the international markets. However, the monopoly status of these trade companies made them the "bad conductors" in functioning between domestic firms and overseas markets, especially in respect of market information supply and response. At the same time, local governments had no autonomy in foreign economic activities.

Since 1979, several measures have been adopted in reforming the foreign economic system. These include, (1) decentralising the right to conduct foreign economic activities: permitting local governments, some industrial sectors, many large- and medium-sized enterprises and business conglomerates to engage in foreign trade; (2) reducing the command planning: foreign trade is gradually regulated through adjustments to exchanges rates, tariffs, credits, licenses and quotas; and (3) eliminating exports subsidies, rectifying the disparities of foreign exchanges retention between regions, and standardising enterprise management behaviour. These reforms led to three separate foreign economic regimes in China. The first regime allowed foreign invested enterprises to engage in international economic activity directly. The second regime was for local foreign trade companies. These companies had the license to engage in international trade and business. The third regime applied to larger local enterprises which had been granted independent import and export rights. These firms were normally the parents or important subsidiaries within industrial conglomerates. They also had autonomy to decide setting up production joint ventures of US\$30 million or less with foreign investors and a certain degree of autonomy to engage in other international business such as project construction.

With these reform measures, market mechanism began to function in the Chinese economy, and the transaction conditions in China have been improving. Yang, Wang and Wills (1992, pp.1-37) show such improvements in China's agricultural sector during the 1979-1987 period¹⁹. In less than 10 years, the transfer efficiency for fixed assets

¹⁹ Transaction efficiency indices

	Fixed assets	Goods	Finance	Labour
1979	0.02	0.204	0.11	0.139
1987	0.123	0.373	0.266	0.33

increased more than 5 times, for finance and labour approximately 1.5 times, and for goods nearly doubled. The emergence of factor and product markets gave firms the opportunity of obtaining factors and selling products in the market. The transaction conditions for factors and goods might be far from satisfactory, and transaction conditions might differ from factor to factor and from good to good, and different firms enjoyed different treatments in external transaction, but all firms began to experience improved transaction conditions for goods and factors. In the context of international economic activity, the opening up of the economy provided firms with improved international movement of factors and goods. Chinese firms which had the "license" of FDI began to invest abroad. It is worth noting, however, that due to the partial approach of reform, not all firms were able to enjoy the same privileges. So China's outward FDI emerged almost at the same time as the economic reform began, but the growth of FDI in the early years was relatively slow. The total FDI outflows from 1979 to 1984 were only US\$271 million, less than 1 per cent of the total FDI outflows between 1979 and 1999 (UNCTAD).

5.3.2.2. Progress of economic reform and growth of outward FDI

Proposition 12: The expansion of China's outward FDI is affected by the process of reform in key fields, notably in government behaviour, factor and goods markets, and foreign trade.

The method of transition of China's economic system can be characterised as a dual track approach, setting out from a condition without market mechanism towards the restoration of market mechanism by gradually shortening the "non-market track" meanwhile gradually lengthening the "market track". During the transition, the two tracks exist in every aspect of China's economy, and the relative "length" of the two tracks (measured in marketisation) at a particular time differs among different aspects of the economy (Table 18). While the marketisation of government behaviour and technology market was quicker in the early stage of the economic reform, the marketisation of products was very slow at first but accelerated in later stages. In the meantime, the marketisation of financial sources lags much behind that of other factor markets. For example, up to 1997,

Source: Yang, Wang and Wills (1992, pp.1-37).

the marketisation of products reached 85 per cent, but financial market only reached 10 per cent. The marketisation of the firm was very slow at the early stage of the reform and now just in the halfway.

Table 18 **The trends of marketisation in China's economy (%)**

Year	1979	1985	1990	1995	1997
Firm	0	10 ^a	15	46.4	48
Government behaviour	4	50.8 ^a	62.2	73	72
Product market	2.25	15 ^a	54.5	84.5	85
Labour market	5.1	24.3	34.8	64.7	65
Financial market	1	3.6 ^b	6.3	9.1	10
Technology market	0	46.3	54.1	70.8	71
Agriculture	7.67	49.7	51.6	65	66
Industry	0	23.5	37.3 ^c	49.9	50
Foreign trade	1.5	9	22.3 ^c	41.4	54.4

Note:

(1) a. figure for 1984; b. figure for 1986; c. figure for 1991.

(2) The figures are obtained from an econometric analysis involving 11 groups of 76 indicators. Theoretically, the range of marketisation is 0~100%.

Source: Chen, Zongsheng, *et al* (1998). Research on the Marketisation Process of China's Economic System. *China Social Sciences Quarterly*, (in Chinese), Summer.

Compared with reforms in other fields, reform regarding labour transactions proceeded quite slowly until the early 1990s (Table 18). There are several reasons. One is that the reform had severely lagged in the adoption of personnel management practices (Brown and Jackson, 1991, p.121). The pre-reform belief in "eating out of the same big pot" and having an egalitarian society had for a long time shaped the function of Chinese firm management. Personnel decisions were often made away from the workplace by a small circle of leaders who were appointed either by themselves or by the party, virtually as "caretakers". Key reforms occurred in 1986 and after when enterprise directors and their managers were given broad responsibilities. In practice the early reform, while predicting better motivated employees and managers, produced some unanticipated results which hindered rather than fostered the reforms process. These included unequal job opportunities, unfair income distribution, increasing conflict between fixed-term and contract-term employees, widespread corruption, high expectations of personal development vs. willingness and ability to control uncertainties and risks, weak

protection of employees' interests, growing frustration among managers (Han and Morishima, 1992, p.249). Other factors also have contributed to the slow progress of labour market reforms. The under-provision of resident housing restrained people from obtaining suitable accommodation for their families if they quit their existing jobs. Existing employers often were not willing to provide the new employers and relevant government departments with the personnel files which were necessary for hiring and resident registration.

In spite of these deficiencies, the development of the labour market has progressed rapidly since the mid-1990s, and marketisation of labour reached 65 per cent by 1997. Many local governments, especially those within SEZs and open cities, have introduced incentive policies to attract capable technical and managerial persons from other regions. Enterprises within these regions and non-state owned enterprises have more autonomy in recruiting technical and managerial professionals. As a result, the transaction efficiency for technical and managerial professionals is higher than for ordinary workers.

Overall, some relationships between marketisation in different aspects and the expansion of FDI can be observed. First, the expansion of FDI outflows corresponded to the marketisation of government behaviour. For example, the marketisation of government behaviour expanded greatly from 5 per cent in 1981 to 51 per cent in 1984. Correspondingly, China's outward FDI jumped from US\$134 million in 1984 to US\$629 million in 1985. Similarly, the marketisation of government behaviour made distinct progress in the early 1990s, and FDI outflows expanded tremendously during the same period (Chen, Zongsheng, *et al* 1998; UNCTAD). Given the fact that the government strictly controlled the entire economy before the reform, the positive impact of the marketisation of government behaviour on the expansion of FDI is understandable. The reduction of government's direct control over economic activity implied corresponding reductions in political barriers to transactions, leading to improvements in transaction efficiencies for factors which would be associated with firms' outward direct investment.

Secondly, improvements in transaction efficiency for labour facilitated the growth of China's outward direct investment. Table 18 shows that the marketisation of labour made conspicuous progress in 1985, reaching 24.3 per cent from 5.1 per cent in 1979. This year also witnessed a rapid expansion of outward FDI. In 1990, marketisation of labour

further expanded to 35 per cent, outward FDI expanded to some degree. As indicated above, the marketisation of professional labour in China was better than that of ordinary labour. Therefore, figures for the marketisation of professional labour would be higher than figures for overall labour marketisation. This fact confirms the proposition of our models that FDI from a country is positively affected by home country transaction efficiency for professional labour.

Thirdly, China's outward FDI was negatively affected by transaction efficiency for intermediate goods. In our models, input for overseas production includes financial resources and technology. Though the development of technology market in China progressed relatively well and the marketisation of technology reached 46.3 per cent, market imperfection is far from satisfaction, especially regarding property right protection. Legislation lags behind the fostering of the market, and the enforcement of existing laws faces many difficulties. As a result, China only ranked 33rd regarding intellectual property protection among the 53 countries sampled by the World Economic Reform in 1998 (WEF). In the meantime, the development of financial market in China progressed very slowly, only reached 10 per cent in 1997. This has severely confined firms' financial activities and resulted in very low efficiency. As a response to this situation, many firms tried hard to keep their export revenue outside of China. These facts have contributed, in a negative way, to the expansion of China's outward FDI.

At last, the expansion of China's outward FDI flows corresponded negatively to international and domestic transaction efficiency for goods. As noted earlier, there are roughly three separate trade regimes in China, for foreign invested enterprises, local foreign trade companies, and larger local enterprises which have been granted independent import and export rights. Any firm outside these regimes would face extremely high international transaction barriers in foreign trade, as it has to conduct its trade through the mediation of the "inside" firms. It would be in an inferior position in gathering information about international trade and changes in technology and choosing a better position in global commodity chains. They have difficulties avoiding being unfairly treated in their export and import either by foreign firms or by Chinese foreign trade companies. In his article Choo-Sin Tseng has quoted one of his experiences which shows such a situation:

The author (i.e. Tseng) had a personal experience of this when he represented a US Fortune 500 firm in negotiating the purchase of a number of mixing tanks for its chemical plant in Shanghai. At the time of negotiation, the US firm was asked to negotiate the commercial terms and price with the import and export corporation, and the specifications and delivery date with an iron-work factory. After the start-up of the chemical plant (considered as a domestic firm in Shanghai), the author approached to the iron-work factory for additional mixing tanks and discovered that the price was only 20 per cent of that of the previous purchase. As can be expected, the iron-work factory was equally upset that the import and export corporation had made such a huge profit (Tseng, 1994, pp.122-123).

Such barriers gave firms strong incentives to invest abroad: once they did so, they could have the right to undertake foreign trade by themselves. This would not only protect them from unfair treatment, but also gave them the opportunity to exploit the insider-outsider relationship. However, as economic reforms proceed, marketisation of foreign trade makes progress, leading to the expansion of the range of these regimes. In 1995, the marketisation of foreign trade was 41.4 per cent, about twice that in 1991 (Table 18). This implies that firms are facing less trade barriers in foreign trade and therefore the role of outward FDI in bypassing trade barriers is reducing.

While international transaction barriers reduced in the 1990s, domestic transaction conditions improved greatly. In 1992, marketisation of goods reached about 85 per cent and the dual-tracks in prices merged to market prices. In 1996, only less than 10 per cent of commodity categories were under government control. Over 90 per cent of retail prices and 80 per cent of agricultural and producer goods prices (as a proportion of output value) were determined by the market (Wen, 2002). These improvements imply that firms began to have more opportunities to transact, based on market rules, the goods which would be associated with domestic expansion. Given the large size of the Chinese domestic market, the incentives for overseas direct investment are relatively weakened.

Corresponding to the enormous improvements in domestic and international transaction efficiencies for goods in the mid-1990s, outward FDI from China reduced from US\$4400 million in 1993 to US\$2000 million in 1994 and kept a relatively stable growth trend in

the following years. This confirms the proposition of our models that outward direct investment from a country is negatively affected by domestic and international transaction efficiency for goods.

Proposition 13: The growth rate of China's outward FDI varies from time to time in response to the introduction of major reform measures which affect transaction and transfer efficiencies.

The improvements in transaction and transfer efficiency in China are essentially the result of the economic reform. These improvements would not only be affected by reforms measures directly aimed at improving transaction and transfer conditions, but also indirectly by reform measures in related fields. As a result, any reform measures for the establishment and perfecting of the market system in China is likely to help enhance transaction and transfer conditions, therefore affect the expansion of China's outward direct investment.

The path of the development of China's outward FDI coincides relatively highly with the evolutionary process of the firm related reform in China. Whenever there is a major reform, there is a big increase in outward FDI. This suggests that Chinese enterprises have made the widest possible use of the autonomy granted by the government and improved market conditions to engage in outward FDI.

Before 1984, the urban and industrial reform measures basically focused on industrial management system and the expansion of the enterprise power (or *Jianzheng Fangquan* in Chinese -- to simplify administration and to decentralise the power). The major reform during this period is the profit-retention system adopted by the government in 1979. It allowed profit-making enterprises to retain part of their profits to set up three internal funds, i.e., for production development, welfare of employees, and bonuses. The aim of this measure was to transform enterprises from traditional cost centres to profit centres. In the following year, this system was modified to become a two-tier package combining a fixed base of profit retention plus a flexible extra-base proportion of profit retention, which further enhanced the incentive of enterprises to make profits.

Reforms during this period were partial and only covered some experiments in state owned enterprises. As a result, ordinary enterprises did not have enough authority to

engage in international business, nor were there relevant market mechanisms for such activity. Only a very limited number of enterprises invested abroad, and the investments were small in both volume and number of projects. The investors were some ministry-rank companies plus a few enterprises directly under provinces (G. Li, 2000, p.15).

The urban-industrial reforms expanded significantly in 1984. The reform programmes were stressed and outlined in "*The Decision of the (CCP's) Central Committee on the Reform of the Economic System*", adopted in October 1984. The programmes emphasised an expansion of enterprise autonomy and incentives and the reduction, but not elimination, of the government within-plan allocation.

A tax-for-profit system was instituted in two successive steps in 1983 and 1984. Under this system enterprises were required to pay tax instead of profit remittance and were able to fully retain their after-tax profits. Enterprises would be asked to see to their own profits and losses after paying tax. However, as firms were not on a level playing field due to some pre-determined factors like technological capabilities, fixed assets under controls, government administered input and output prices, locations, etc, an "adjustment tax" was introduced to even out inter-firm differences of state owned enterprise profit sharing under the tax for profit system. As a consequence of this reform, outward FDI jumped to US\$134 million in 1984 and further to US\$629 million (Figure 1), at annual growth rate of 44 per cent and 369 per cent on the previous year base respectively.

In 1987, the contractual management system was applied to Chinese enterprises, aimed at coping with the problems of soft-budget behaviour against the background of falling realised enterprise profits and state budget. This system set out to personify enterprises amid their taking up of rights and duties and therefore replaced the traditional party committee-dominated enterprise leadership system. Under this system managers were designated as the legal representatives of enterprises and were responsible for the fulfilment of the task (e.g., profit, remittance, and taxes) set in the multiyear management responsibility contracts. With regard to the internal operation and management, the reforms allowed enterprise managers to use their authority to choose the level of production, to sell output and acquire material inputs on the market, and to set or negotiate prices. With regard to external business activities, the reforms gave enterprise

managers the right to develop lateral economic associations across different trades and regions as well as to permit the exchange of capital and technology and to cooperate in production matters. In addition, enterprise managers had the right to control activities related to employment, including, for example, the right to recruit labourers openly and to determine the level of skill or qualifications required.

In the meantime the government abandoned the pursuit of a single rate of state-enterprise division of profits which would be applicable across the board. It required enterprises to ensure a steady increase in tax and profit remittance (or decrease in subsidies and/or tax exemptions for loss making enterprises) over the pre-contract remittance which was taken as the base. In addition to the requirement on increasing current profits, firms had to ensure the fulfilment of another two tasks: technical renovation investment and linking the wage bill with total realised profits, the latter being set as a device both to enhance enterprises' incentive and to avoid bonus expansion at the expense of state assets accumulation (Lo, 1997, p. 108)

In the meantime the foreign trade system underwent drastic reform. The national import and export corporations delegated functions to their local branches. Certain industrial firms were encouraged to form holding companies and were given authority to import and export, and certain big industrial firms were also granted such rights.

Economic reform slowed down during the period 1989 to 1990 due to several interrelated factors, including different views on economic reforms between the conservatives and the reformers in the Party leadership, problems associated with economic growth and modernisation, and especially, the Tian'anmen Square incident. Behind the notorious political troubles, there was a serious economic crisis. Since 1985, China's economy had experienced high rates of inflation, with the retail price index ranging from 8.8 per cent in 1985 to 7.3 in 1987, and further skyrocketing to 18.5 per cent in 1988. The direct outcome of these events was the change of leadership in economic management, the beginning of hard-line dominance of economic policy (Liou, 1998, pp.36-37), and the economic adjustment. Outward FDI flow fell to US\$780 million in 1989, less than 92 per cent of the previous year.

Economic reform was regenerated in mid-1991 and accelerated in 1992 after Deng

Xiaoping's trip to South China. During that trip, Deng attacked conservative opinions and called on the country to accelerate its growth and pursue more vigorously its policy of reform and opening up. In October 1992, the Fourteenth National Congress of the Party endorsed Deng's view and called for the establishment of a *socialist market economy*. That goal was finally adopted in China's constitution during the first session of the Eighth National People's Congress in March 1993.

The reform plans and measures introduced in the 1990s attempted to broaden and deepen the reform process. These plans and measures covered not only the reform activities emphasised in the earlier stages of reform but also major issues related to China's macroeconomic structures, including, for example: (1) reforming the exchange rate system (allowing RMB to be devalued without formal government action); (2) adjusting the fiscal system (introducing a new tax assignment system that separates central and local taxation authorities); (3) reforming the bank system (intended to establish an effective central banking system and to commercialise the state owned banks); (4) opening the stock markets (in Shanghai and Shenzhen); (5) emphasising state-owned enterprise reform to improve the efficiency of SOEs); (6) adopting systems of accounting, laws on property rights, and patent protection); (7) reforming the social security system; (8) reforming the circulation system; and (9) accelerating housing reforms (Liou, 1998, p.32).

Such all-round measures have changed the whole economic system in China in the direction of a market economy and affected enterprises' investment behaviour. On the one hand, firms have more authority and better economic environment in their operations and development, and therefore have more freedom to engage in overseas FDI. On the other hand, as marketisation in nearly all aspects of the economy proceeds, more and more enterprises are able to carry out overseas investment with less difficulty (easier to obtain government approval of and more capability to engage in outward FDI), being able to invest abroad is becoming less proprietary in taking advantage of the segment (or barriers) between the domestic and international markets and between those with and those without overseas investment. For example, when it is very difficult to be granted a "license" to invest abroad, those enterprises which have overseas subsidiaries can relatively easily undertake roundabout investment in the home market in the name of their

overseas subsidiaries. They can thus enjoy the preferential treatment specifically for *foreign* investors as well as establish cross-border commodity chains with one end in China and the other in overseas markets, through which supply foreign goods badly needed in China and supply overseas markets the products of the parents with very low wage labour. The reduction of both international and internal barriers due to marketisation as well as the entering of a large number of competitors inevitably reduce the profit margin of such activities. As a result of the inter-action of the two forces, the growth of China's outward FDI in the 1990s was very rapid at first (US\$4000 million in 1992 and US\$4400 million in 1993) and relatively smooth afterwards, with clearly identifiable increases in these years when major reform measures were adopted.

5.4. *The Geographical Distribution of China's Outward FDI*

Proposition 14: China's outward FDI is directed towards countries with higher transaction efficiency for both labour and goods as well as higher transfer efficiency for technical and managerial professionals as the main destination.

Proposition 15: As international transfer and transaction conditions improve in response to the progress of opening up and increasing international business experience, Chinese firms will expand their outward FDI in countries with relatively low domestic transaction efficiencies for goods and labour.

According to our findings in Chapter 4, transaction efficiency in the host country for both labour and goods affects the inflow of FDI positively. In addition, while international transaction efficiency for goods affects FDI negatively, international transfer efficiency for factors between the two countries affects FDI positively. Accordingly, the geographical distribution of a country's outward FDI will tend to concentrate in countries which have good transaction conditions, and it will be positively led by low cross-border transfer barriers. The geographical distribution of China's outward FDI clearly conforms to these basic characteristics.

The three largest recipients of China's outward FDI are the United States, Canada and Australia. Over the 1979-98 period, they accounted for about 16, 14 and 13 per cent, respectively, of China's government registered outward FDI. These dominant host countries have many common features. They are all developed economies with a stable

political environment and well established market system, which provide ideal conditions for market activities, including transactions of both goods and labour. English is the official language, and the Anglo-Saxon culture is the dominant. This cultural and linguistic homogeneity removes the barriers to communication that obstruct more diverse settings. A common cultural background is very beneficial for business operations, especially in the aspects of internal human resources management and external contract negotiation. Lastly, as developed countries they provide good education for their nationals and, hence, an adequate supply of skilled labour to foreign investors. All these features contribute greatly to the transaction efficiency for goods and labour, allowing these countries to have high values of k_y and s_y .

In China's firms' point of view, the transaction condition for goods and labour in these countries are even more suitable for their FDI when the following factors are taken into consideration. First, English is by far the most widely taught foreign language in China. Most of China's university students take English as one of their compulsory courses. There are also a lot of other institutions which provide English learning, including nation-wide television and broadcasting programmes as well as local television and broadcast programmes. Therefore a Chinese firm would feel much easier to recruit expatriates who can use English as the working language if it undertakes FDI in one of these three countries. Second, these three countries have the largest ethnic Chinese communities outside Asia. By way of illustration, in the United States, more than a million ethnic Chinese are living in California alone. Expatriate Chinese are exerting overwhelming economic power through so-called "China networks" based on a sense of belonging and common experience (Choo, 2000, p.139). China's investors can use the overseas China networks as effective platforms to access quickly the local markets and business communities:

The United States, Australia, and Canada are relatively homogeneous compared to Europe's cultural and linguistic diversity. The Chinese diaspora is more strongly represented in these countries, providing a progressive airlock for reducing cultural distance (Slater, 1998, p.271).

The above factors enable China's firms to enjoy high transaction efficiency for goods and

labour and high international transfer efficiency for cross-border factor movement. The international transaction conditions for goods between China and these countries provide some incentive to China's firms to undertake foreign investment aimed at bypassing trade barrier. Developed countries often impose technical and other non-tariff barriers to restrict imports from developing countries. One of the main reasons that Haier set up a refrigerator factory in South Carolina in the late 1990s was to bypass trade barriers. Before that this company had served the US market via trade for 8 years. Through the investment this company has maintained its US market and now holds more than 20 per cent market share for small refrigerators of 180 litres or less in the United States (Gang Li, 2000, p.190).

It is worth noting that the share of these three countries in China's outward FDI was even larger in the early days. Between 1979 and 1990, more than 63 per cent of China's outward FDI went to Australia, Canada and the United States. In 1991 Canada alone attracted 83.7 per cent of China's FDI (Table 19). This reflects the more decisive role of host country's factors in determining China's outward FDI location in the early days of China's outward FDI. In the early days of the economic reform, Chinese firms were not only unfamiliar with international business, but also lacked experience of operation in market economic system. Therefore, Chinese foreign investors had to rely on host country transaction conditions. Therefore they had to choose those countries with lowest possible transaction barriers as their ideal investment destinations.

As China's firms became more experienced in market economy and international business, their ability to deal with market transaction risks improved, which made it feasible to invest in countries where transaction conditions are less favourable compared with developed countries. The improvement in transaction conditions in China further gives investing firms an edge to deal with less favourable conditions in host countries. As a result, China's firms greatly expanded their investment in Southeast Asian countries during the early 1990s. Between 1979 and 1990, China's investment in five ASEAN countries (Indonesia, Malaysia, the Philippines, Singapore, and Thailand) accounted for just 5.4 per cent of its total outward FDI, corresponding to less than one-tenth of China's total investment in the three developed countries. But during the 1991-98 period, China's average annual investment in the five ASEAN countries increased to 7.5 per cent, more

than a quarter of China's FDI in Australia, Canada and the United States in the same period (Table 19).

Table 19 Trends of China's outward FDI in select destinations (FDI flows, %)

	1979-90	1991	1992	1993	1994	1995	1996	1997	1998	1991-98
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
H&M [ⓐ]	11.2	-	14.9	7.3	0.2	25.3	26.7	4.2	8.9	10.9
ASEAN-5 [ⓑ]	5.4	2.1	9.5	18.7	21.0	15.8	2.8	2.6	11.3	7.5
Russia	2.6	5.9	20.5	6.7	0.8	0.05	0.03	0.6	1.0	4.6
Australia	30.1	0.9	1.3	7.5	2.3	0.8	0.2	0.5	(0.1)	1.1
Canada	5.2	83.7	2.8	2.9	1.4	0.3	0.3	0.5	1.9	20.4
US	28.1	1.8	6.0	14.5	9.0	19.9	1.4	-	9.9	7.6

*Note: ⓐ Hong Kong and Macau; ⓑ Indonesia, Malaysia, the Philippines, Singapore, and Thailand.
Data source: MOFTEC: *Almanac of China's Foreign Economic Relations and Trade*, 1993-99.

Southeast Asian countries are close to China in geography and culture. China's direct investment in this region can enjoy convenient communications and transportation with them. The relative similarity ("closeness") in economic development level between China and these countries to some extent offsets the negative effect of international transaction efficiency for goods on the expansion of FDI. In addition, this region has about 21 million overseas Chinese, the largest overseas Chinese community (Choo, 2000), which exhibits enormous economic power and business networks. The common cultural heritage among the Mainland Chinese and overseas Chinese enable China's investors to get down to business quickly. All these facts contribute much to the growth of China's outward FDI in these countries.

Similarly, along with the improvement in transaction efficiency at home and the enhancement of international business abilities, the 1990s witnessed the expansion of China's outward FDI in other developing countries (Figure 11). Nevertheless, China's outward FDI is still distributed unevenly among individual developing countries. For example, in ASEAN, except for Thailand, Malaysia, Indonesia, Singapore and the Philippines, Other ASEAN countries only received a very small share of China's investment. In Africa, North Africa only received a very small share of China's FDI in that region, the majority of China's investment went to the central and southern African countries. Among them, South Africa, Zambia, Zimbabwe and Mali are the major

destinations. The other major recipients in Africa are Tanzania, Nigeria, Egypt, Cote D'Ivoire, Sudan and Gabon. In Latin America, Peru is the biggest recipient of China's outward FDI. On the whole, West Asia, Central Asia and East Europe (except for Russia) are the regions which attracted a little interest from Chinese investors. For example, twelve West Asian countries (Cyprus, Iran, Israel, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirate, Yemen) together only received US\$24.95 million of Chinese investment in the 1979-1998 period. Similarly, six Central Asian countries, Georgia, Kazakhstan, Kyrgyzstan, Tadzhikistan, Turkmenistan, and Uzbekistan, together only received US\$25.08 million of Chinese investment until 1998. Until 1998, China invested US\$123.55 million to Central Asia and East Europe; of which more than 80 per cent went to Russia. All those countries which have received small a share of China's outward FDI are either experiencing difficulties in transition or do not have good transaction conditions required by FDI.

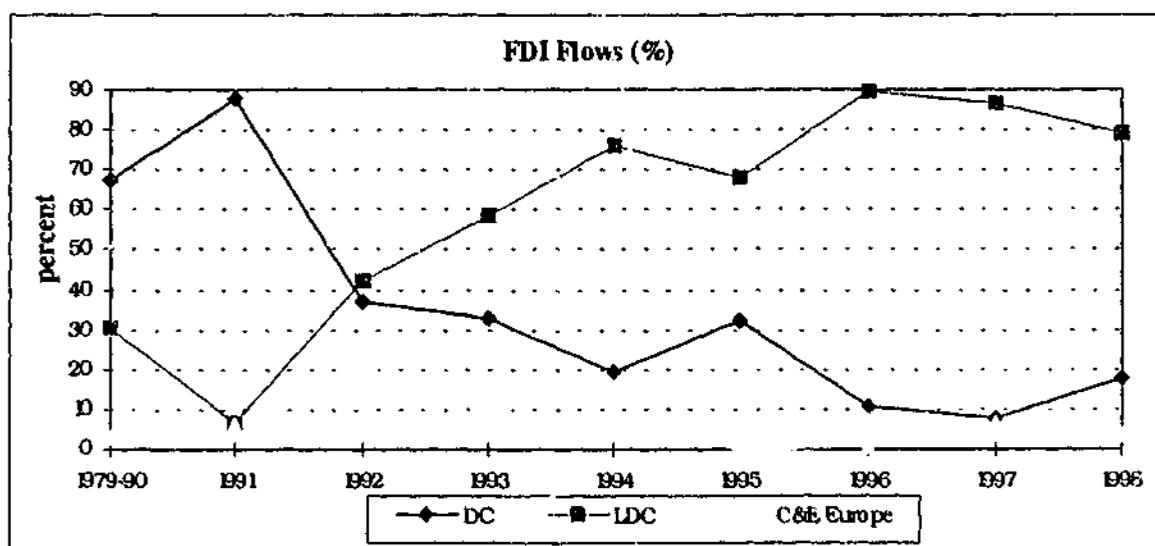


Figure 11 Distribution of China's outward FDI among three groups of countries

5.5. Concluding Remarks

Characteristics of China's outward FDI during the last two decades are not readily compatible with the prediction of existing mainstream theories of FDI. However, they are well explained by our model which shows that FDI is influenced to a significant

extent by transaction and transfer conditions within and between the source and host countries.

The investment behaviour of firms and investment environment today are quite different from that of a century ago. Not only cross investment in same industry between developed countries has replaced the traditional investment pattern from more-developed to less-developed countries. Developing countries have also joined actively the ranks of investors and taken developed countries as important destinations. Notwithstanding these changes, the essential drivers of foreign investment behaviour are still related to economic organisation, a topic which has attracted much academic attention since Coase (1937). Noted that when market expands to cross partially national borders in the process of globalisation, hierarchy and the firm would have new forms and the use of methods of economic organisation may also have inventory ways. Specifically, when investigating rationales for FDI one should consider that international economic organisation is not only affected by home market conditions but also by host country conditions as well as international conditions. It is unreasonable to only include host country conditions in the analysis, and it is also unreasonable to ignore the difference in transaction conditions between countries.

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