Ethnic Chinese Networking in Cross-border Investment: The Impact of Economic and Institutional Development

Sarah Y. Tong*
Hong Kong Institute of Economics and Business Strategies
The University of Hong Kong

April 2003

Abstract:

Ethnic Chinese entrepreneurs are known for their active domestic and cross-border business networking practices, particularly in Southeast Asia. This paper empirically investigates the role of ethnic Chinese networks in promoting foreign direct investment (FDI). Using a standard gravity model to analyze bilateral FDI reported by 54 economies, we find that ethnic Chinese networks are important in facilitating cross-border direct investment between countries. The strength of ethnic Chinese networks between country pairs, approximated by the product of the numbers of ethnic Chinese in both countries, is positively correlated with the cumulative amount of their reciprocal FDI. More importantly, this significant relationship is not limited to countries in Southeast Asia, but is applicable to other country pairs included in the study as well, regardless of whether the investment originated from industrial countries or developing economies. Finally, the analysis finds no evidence that ethnic networks are only effective in countries where economic and legal institutions are under-developed. The measure for ethnic Chinese networks is found significant in promoting FDI to countries with a relatively higher bureaucratic quality, and the magnitude of the coefficient is in fact much larger than that found for FDI destined to countries with a lower bureaucratic quality.

* The author wishes to thank James Rauch for his many encouraging and helpful suggestions. She also thanks Vitor Trindade for his assistant in compiling part of the data. Dudley Poston L. Jr. kindly provided data on ethnic Chinese population.

I. Introduction

The importance of business and social networks in facilitating trade has been the focus of many recent studies, from both the theoretical (Greif, 1993; Rauch & Casella, 1998) and empirical aspects (Gould, 1994; Balderbos & Sleuwaegen, 1998; Rauch & Trindade 2002). Theoretical analyses point out that networking activities are key in overcoming informational barriers in international transactions, such as inadequate information about international trade opportunities and the quality of potential business counterparts abroad, and also provide community enforcement sanctions to deter violations of contracts in a weak international legal environment. Empirical analyses show that networks significantly increase bilateral trade, especially trade in differentiated goods (Rauch and Trindade, 2002), suggesting that networking activities are key in forming a match between buyers and sellers where complex information is needed.

The role of networks in promoting cross border investment has not yet been studied extensively. As an important form of international economic activity, foreign direct investment requires large starting costs and intensive information. It entails searching for potential locations, conducting feasibility studies, obtaining government approval, building factories, installing machinery and equipment, and hiring workers. Compared to trade, FDI calls for cooperation and commitment at a much deeper level between the parties concerned, and therefore encounters a higher informational barrier. It is therefore reasonable to expect that ethnic networks play a more important role in assisting bilateral FDI than in encouraging trade.

There are various types of business and social networks. Coethnic networks have tended to attract empirical research, since it is much easier to identify their members, and

several studies on such groups have been made in recent years (e.g. Kotkin, 1992; Weidenbaum & Hughes, 1996; Light & Isralowitz, 1997). Overseas Chinese[1] have the most well-known ethnic networks active in trade and in direct investment (Redding, 1995). The vigorous networking activity among ethnic Chinese in Southeast Asia and their commercial success have both been highly visible, and these networks are believed by many to have played a crucial role in some of the region's fast growth in recent decades.

Like many other ethnic groups living outside their countries of origin, overseas Chinese create various formal or informal associations. These associations have traditionally been based on kinship, dialect and place of origin in China, and were established partly to provide assistance to those in need in the community, especially new immigrants. As an ethnic Chinese community becomes more commercially developed, these associations begin serve as centers where information exchange takes place between coethnic business people working both locally and in other parts of the world. It is possible to consider overseas Chinese as forming a set of inter-connected networks at various local and national levels, especially in Southeast Asia, but not a unified international system. In recent years, however, there have been signs that the international links have been formalized in organization, perhaps strengthened in capacity, and extended to other parts of the world outside Southeast Asia (Liu 1998, EAAU 1995).

This paper contributes to the literature by empirically investigating the impact of ethnic Chinese networks on promoting bilateral FDI. We will concentrate mainly on three issues. First, do ethnic Chinese networks significantly increase the cumulative amount of FDI between countries? The answer to this question is important to governments in

[1] The term Overseas Chinese in this paper refers to ethnic Chinese residing outside mainland China and Taiwan.

formulating policies. For example, policies encouraging cooperation between ethnic minorities and their overseas counterparts may generate significant benefits to a country's long-term growth. Second, is the importance of ethnic Chinese networks specific to Southeast Asian economies? This is also a question with important implications. If ethnic Chinese networks are found to be important for bilateral FDI outside Southeast Asia, it suggests that networks of other ethnic groups could also play a significant role in facilitating cross-border investment activities. Third, is the effectiveness of ethnic Chinese networks on FDI conditional on a low level of institutional development in the host countries? If so, then little attention need be paid to the issue, as only a small percentage of FDI is destined to countries where economic and legal institutions are under-developed.

In the next section, we specify our empirical model and discuss the variables used in the estimation. Section IV describes the data and specifies the measures. We present our results and discuss the implications in Section V. Section VI provides some concluding remarks.

II. Empirical Model

A. Gravity model specification

In this study, we examine the effects of ethnic Chinese networking on bilateral FDI using the gravity specification, which is widely used in trade literature. The basic gravity model states that the total amount of trade between two countries is directly related to the product of their economic masses (measured by either GDP or GNP) and inversely related to the distance between them. Per capita income is also often included in gravity models (Eaton and Tamura, 1994; Rauch and Trindade 2002). Gravity models have attracted

widespread attention because of their empirical success in predicting bilateral trade volumes. Recent theoretical works (e.g. Anderson, 1979; Bergstrand, 1985, 1989; Helpman, 1987; and Deardorff, 1995) show that gravity specification is consistent with various trade models.

In addition to the basic elements, various factors that either aid or deter trade are also included in the standard gravity models. It is assumed that these factors will cause bilateral trade to deviate somewhat from the basic proportional relationship. For example, dummy variables are included to indicate special relations between the two trading countries, such as a former colonial relationship, a common native language, geographical proximity, and common membership of a trading bloc (Frankel 1997; Rauch and Trindade 2002).

Recent studies have employed gravity models to predict the amount of FDI (Eaton and Tamura, 1994; Jeon and Stone, 1998; Morsink 1998; Wei 1998). Morsink, for example, developed an empirical specification to analyze FDI, similar to gravity models used to predict bilateral trade, based on the theory of international production and theories on localization strategies. The model incorporated factors thought to affect firms' investment decisions, categorizing them as push factors, pull factors, stimulus factors and friction factors. Many of the variables are similar to those often used in the trade models, such as total market size of the host country, per capita income, labor cost, and cultural differences.

The use of the gravity model to estimate foreign direct investment implies the view that trade and foreign investment, to a large extent, complement each other. Standard trade models would predict that trade and international production factor mobility are substitutes

(e.g. Mundell 1957). Empirical studies, however, have shown that more often than not, trade and international factor mobility complement each other (Lipsey and Weiss, 1981; Collins, O'Rourke & Williamson, 1997; Jeon & Stone, 1998; Head & Ries, 2001; Hejazi & Safarian, 2001). To consider empirically the question of complementarity between trade and direct investment, we include in the model a measure of a host country's overall trade intensity.

Theoretical models established by authors such as Helpman and Markusen (Helpman 1984, 1985; Markusen 1995) emphasize the role of multinational corporations and their firm specific assets. They also generate testable implications for the location of investment. For example, industrial countries, where skilled labor is relatively abundant, should be the dominant source countries for multinationals. Large countries, especially those with a large unskilled labor force, may be the dominant host countries for multinationals. In addition, these models suggest that the effect of trade barriers on direct investment may depend on the type of investment. On the one hand, high trade barriers encourage horizontal direct investment[2] between large industrial countries where countries are similar in size and in relative endowments. On the other hand, they discourage vertical direct investment between industrial countries and developing countries where relative endowments are unbalanced. In our empirical models, the GNP and per capita GNP of the source and the host countries could be seen as measures of a country's size and relative endowment with skilled labor. Moreover, measures on the level of host countries' trade barriers are also included in the model.

[2] Horizontal direct investment means the foreign production of products and services roughly similar to those the firm produces for its home market, while vertical investment involves the fragmentation of the production process geographically by stages of production.

Compared to their counterparts in industrial countries, multinational corporations in developing countries generally possess less firm specific advantages. Normally, for example, they have fewer resources available for R&D activities. FDI from developing countries, therefore, may respond to the variables differently. Our empirical analysis will address the question by estimating equations separately for FDI originating from industrial and developing countries respectively.

B. Ethnic Chinese Networks

The main purpose of this paper is to investigate the significance of ethnic Chinese networks in facilitating bilateral foreign direct investment. Earlier work has suggested two major mechanisms whereby coethnic networks promote international business transactions such as trade and investment. One mechanism, established by Greif (1989, 1993), is that coethnic networks provide community enforcement of sanctions to deter violations of contracts in a weak international legal environment. An alternative mechanism, emphasized in more recent work by Gould (1994) and Rauch and Casella (1998), is that coethnic networks promote FDI by providing foreign investors with important information that may otherwise be difficult or costly obtain, in respect of the domestic market, local government regulations, and potential business partners.

Both these mechanisms seem to be consistent with descriptions of the operation of ethnic Chinese networks (see, for example, Weidenbaum and Huges, 1996). It is, however, difficult to distinguish the two mechanisms empirically in our study. It seems reasonable to assume that ethnic networks are more important in community enforcement of sanctions where the FDI is destined to countries with weak rather than strong institutions. As for the role played by ethnic networks in providing information, it is difficult to judge. On the one

hand, less information is available publicly in countries with weak institutions, enhancing the value of that provided through ethnic networks. On the other hand, ethnic networks might be more efficient with strong institutions when there is more transparency in the bureaucratic system. To get some ideas of the two mechanisms' relative importance, we divide the FDI data into two groups estimate the gravity model separately. The first group includes FDI destined to countries with weak institutions and the second includes FDI destined to countries with strong institutions.

C. Introduction of the Variables

Following the usual gravity model specifications, we include the total GNPs of the both the source country and the host country, as well as the distance between the two. We could think of the source country's GNP as an indication of the country's potential supply of FDI. The host country's total GNP indicates the country's potential demand for FDI. We expect the above two to have a positive influence on total FDI, while the distance between the two is expected to carry a negative sign. We also include a country's GNP growth rate to capture the impact of a country's market growth on its inward FDI.

Unlike other studies, we include the total populations of the source and the host countries instead of per capita GNPs. First of all, combining GNP and population can produce equivalent measures for the effect of per capita incomes. The more important reason is the following. As will be explained later, the numbers of ethnic Chinese will be included in the model. It is quite possible that the number of ethnic Chinese in a country is correlated with its population. Including total population in the analysis will exclude the possible effect of population on FDI.

Beside the basic factors, additional variables are included to reflect their possible role in either impeding or assisting FDI between countries. One such factor is whether two countries are adjacent with each other. Studies suggest that there are advantages in trading with neighboring countries and we examine whether sharing a common border may also have an additional positive impact on FDI. Studies also indicate that regional trading blocs affect the bilateral FDI of the member states. Two dummy variables, EEC and EFTA, are added to indicate membership in the European Community and the European Free Trade Association, both of which were active at the time when FDI was reported. The model also includes a variable indicating whether two countries have former colonial ties, which may provide investors with advantages in terms of a relatively familiar social and political environment. It may also capture the effect of some widely used second language or official language in many former colonies. Finally, studies suggest that country pairs remotely located from the rest of the world tend to have closer trade relations (Deardorff 1998; Wei, 1996, and Rauch and Trindade 2002).

We include the host country's trade intensity and barriers to trade in our empirical model. Trade intensity is included to explore the relation between trade and FDI and is represented by a country's ratio of total trade to GDP. By including a measure on barriers to trade, we can assess whether tariff jumping is an important motivation for FDI. In addition, as high tariffs have been held to increase horizontal FDI and decrease vertical FDI, we can also use this measure to examine the relative importance of the two types of FDI.

To examine the impact of ethnic Chinese networks on bilateral FDI, we add the product of the numbers of ethnic Chinese in the source and the host countries into the

empirical model. It is a proxy of the strength of ethnic Chinese networks between two countries and could be interpreted as the total number of potential connections between the ethnic Chinese populations in the two countries.[3] One concern is that our measure could have possibly captured a common language effect. Clearly, it is much easier for people speaking the same language to communicate and to make business deals. In addition, a shared mother tongue often implies similar cultural and social values. It is particularly important to recognize the effect of a common language when studying the role of ethnic Chinese. Many ethnic Chinese, especially those in Southeast Asia, share one or more dialects, including Hokkien, Teochiu, Cantonese, and Hakka. Without considering the common language factor, it is debatable whether a positive effect of our measure on ethnic Chinese networks is in fact attributable to the networking. In the empirical model, we include a variable measuring the extent to which two countries share a common native language.

D. Basic empirical model

Based on these principles, we can now write out our basic gravity model as follows:

$$\begin{aligned} FDI_{ij} = {} & a GNP_i^{b_1} GNP_j^{b_2} POP_i^{g_1} POP_j^{g_2} DIST_{ij}^{d} * REM_i^{e_i} REM_j^{e_2} \\ & * TAR_j^{t_2} TRADE_j^{r_2} CHIN_{ij}^{y} \exp(xADJ_{ij} + hEEC_{ij} + qEFTA_{ij} \\ & + lLANGUAGE_{ij} + jCOLOTIE_{ij} + w_2 GROGDP + m_{ij}) \end{aligned} \qquad (1)$$

where

Subscripts $_1$ and $_2$ denote the coefficients for the source country and host country;

[3] Alternatively, we could use the product of the ethnic Chinese share of the total population of the two countries. That measure could be seen as the probability that, if we select an individual at random from each country, both will be ethnic Chinese. The two measures are related but the coefficients will entail different inferences.

FDI_{ij} denotes the nominal value of total FDI stock from country i to country j 1990[4];

GNP_i, GNP_j denote the nominal GNPs of country i and country j in 1990;

POP_i, POP_j denote the total populations in country i and country j in 1990;

$DIST_{ij}$ equals the great circle distance[5] between the principal cities (economic centers) of country i and country j;

REM_i, REM_j are the weighted sum of country i's and country j's distances from all other countries in the sample. The weights are the nominal GNPs of the other countries in the sample;

ADJ_{ij} equals 1 if country i and country j share a land border and 0 otherwise;

EEC_{ij} equals 1 if countries i and j are both members of the European Community and 0 otherwise.

$EFTA_{ij}$ equals 1 if countries i and j are both members of the European Free Trade Association and 0 otherwise.

$LANGUAGE_{ij}$ is a measures of the extent to which countries i and j share birth languages;

$COLOTIE_{ij}$ equals 1 when i and j share a former colonial tie and 0 otherwise;

TAR_j is the host country's average tariff rate for the years 1985 to 1990;

$TRADE_j$ is the host country's average trade to GDP ratio for the years 1985 to 1990;

$GRPGDP_j$ is the host country's annual average GDP growth rate between 1985 and 1990;

[4] As will be explained in the next section, FDI stocks for some host countries are not available for 1990. The available figure for a year that is closest to 1990 is used instead. A variable indicates that the year that the data is reported is therefore also included in the estimation.

[5] The formula used to calculate great circle distances between principal cities is explained briefly in the Appendix.

$CHIN_{ij}$ is the product of the numbers of ethnic Chinese in country i and country j in 1990; [6]

m_{ij} is a Gaussian white noise error term associated with FDI_{ij}.

The dependent variable, FDI_{ij}, is non-negative and thus bounded below by zero. Following Eaton and Tamura (1994) we estimate a modified gravity model, also called the threshold gravity model, as it assumes that the actual FDI will be strictly positive only when the right-hand side of the equation achieves a minimum threshold value A. The gravity model to be estimated is thus

$$\begin{aligned} FDI_{ij} = \max[&-A + aGNP_i^{b_1} GNP_j^{b_2} POP_i^{g_1} POP_j^{g_2} DIST_{ij}^{d} REM_i^{e_i} REM_j^{e_2} \\ &* TAR_j^{t_2} TRADE_j^{r_2} CHIN_{ij}^{y} \exp(xADJ_{ij} + hEEC_{ij} + qEFTA_{ij} \\ &+ lLANGUAGE_{ij} + jCOLOTIE_{ij} + w_2 GROGDP + m_{ij}), 0] \end{aligned} \quad (2)$$

Rearranging and taking natural logarithms of both sides yields

$$\begin{aligned} \ln(A + FDI_{ij}) = \max[&\ln a + b_1 \ln GNP_i + b_2 GNP_j + g_1 \ln POP_i + g_2 \ln POP_j \\ &+ d \ln DIST_{ij} + e_1 \ln REM_i + e_2 \ln REM_j + t_2 \ln TAR_j \\ &+ r_2 \ln TRADE_j + y \ln CHIN_{ij} + xADJ_{ij} + hEEC_{ij} + qEFTA_{ij} \\ &+ lLANGUAGE_{ij} + jCOLOTIE_{ij} + w_2 GROGDP + m_{ij}), \ln A] \end{aligned} \quad (3)$$

Equation (3) is estimated using the maximum likelihood method, where the likelihood function is constructed using a threshold Tobit model. The detailed estimation procedures can be found in Eaton and Tamura (1994).

E. FDI involving Southeast Asian economies

To convincingly account for the impact of ethnic Chinese networks in promoting FDI, we should recognize the unique and important role of ethnic Chinese in Southeast Asia. There are an estimated nearly 37 million ethnic Chinese living outside mainland

[6] When we estimate separately the coefficients for the number of ethnic Chinese in both the source and host

China and Taiwan. Nearly 90 percent of them reside in Southeast Asia. The presence of ethnic Chinese in many Southeast Asian economies is not only substantial but also economically significant. In addition, unlike other regions in the world, the ethnic Chinese networks in Southeast Asia have a long history and are well-established. Thus, we might expect the influence of ethnic Chinese on FDI to be stronger within the Southeast Asian region than in other parts of the world. To identify differences in the importance of ethnic Chinese networks, we estimate three coefficients on ethnic Chinese networking, one for country pairs where both are in Southeast Asia, one for country pairs where either the source or the host country is in Southeast Asia, and one for the country pairs whether neither is in Southeast Asia.

Another concern is the possible impact on the estimation results on ethnic Chinese networks if investment in China is included. Overseas Chinese have played an essential role in investing in China. For example, until recently, the majority of FDI in China originated from neighboring Southeast Asian economies where ethnic Chinese account for a significant fraction of their economies. In addition, within China, FDI is concentrated in Guangdong and Fujian, the two southeastern provinces that are "home" for most ethnic Chinese outside mainland China and Taiwan. One could argue that investment by overseas Chinese in China may not be motivated by economic interests, and that the results could be misleading if these investments are included in the analysis. In our empirical analysis, our model is re-estimated excluding FDI to China, and similar results are obtained.[7]

---

countries, a statistical test indicates that we cannot reject the hypothesis that the two estimates are the same.

[7] Estimation results excluding FDI to China are obtained but not reported, due to space considerations. A related issue concerns investments in mainland China, Taiwan and Hong Kong. Because of historic political circumstances, investment between Taiwan and mainland China is prohibited officially and thus mostly channeled through Hong Kong. In addition, there is also the phenomenon of 'round-tripping investment', where investments in mainland China ostensibly from Hong Kong in fact originate within mainland China,

III. Data and Measurement

The sample includes 70 countries (Table 1).[8] These include 16 countries in North and South America, 11 in East and Southeast Asia, 14 in Africa, 5 in West Asia, 4 in Oceania, 15 in Western Europe, and 5 in Eastern Europe. Of the fifteen Western European countries, 10 were member countries of the EEC and 5 members of EFTA. For each of the country pairs, the great circle distances between their economic centers were calculated using the formula explained briefly in Appendix B. Data for GNP in current dollars were obtained from the IMF International Financial Statistics for 1990.

Information used to construct the variable on adjacency was obtained from the web page for Empirical Investigation in International Trade (EIIT, http://www.eiit.org). European Community membership and European Free Trade Association membership are from Frankel (1997). The variable for colonial ties was constructed on the basis of articles in the *Encyclopedia Britannica* (1997). Data on the countries' unweighted average tariff rates between 1985 and 1990 came from the World Development Indicators 2000 (World Bank, 2000). The countries' trade to GDP ratio and their GDP values in constant dollars for the years 1985 and 1990 also came from the World Development Indicators. The latter was used to calculate its GDP growth rate.

Most of the data on ethnic Chinese populations came from Poston (1994). Supplementary information was obtained from the *Overseas Chinese Economy Yearbook 1990* and Tao (1994). Three language variables were constructed to account for the effect of a common native language between countries. The simplest of the three measures is a

---

but were channeled through Hong Kong in order to benefit from preferential tax arrangements. To remove possible distortions, investment within these three economies is excluded from the analysis.

dummy variable. It takes the value of 1 if at least 10% of the populations share a common native language and 0 otherwise. It was constructed on the basis of country articles in the *Encyclopedia Britannica*, combined with *Ethnologue* (Grimes 1992).[9] Two continuous language variables were constructed using the formula $\sum_l s_{il}s_{jl}$ for country pair i and j. s_{il} is the share of native speakers of language l in county i and s_{jl} is the equivalent share in country j. The share was obtained by dividing the number of native speakers of each language obtained from *Ethnologue* by the midyear population estimates for the corresponding years in the *United Nations Demographic Yearbook*. In creating one continuous language variable, nine major languages were included (l=9), the same method as used in Rauch and Trindada (2002). In creating the other continuous language variable, 21 languages were used, including all languages that have at least 1% native speakers in at least two countries. This was done to account for the additional effect of some common dialects spoken by Chinese in Southeast Asia.[10]

Indices on institutional development for 1990 came from International Country Risk Guide (ICRG), a monthly publication of Political Risk Services. Of the five indices[11] provided in the original data, the scores on bureaucratic quality were thought to be the most relevant and were used to indicate a host country's institutional development.

Unlike Wei (1998) and Morsink (1998), who both used FDI from OECD data, we assembled bilateral FDI data from the United Nations' *World Investment Directory*. The

---

[8] The number of countries included in the sample was limited by data availability of FDI figures and data on ethnic Chinese populations. The dependent variable, as will be explained later, was the stock of FDI from country *i* to country *j* in (or around) 1990,

[9] *Encyclopedia Britannica* lists major languages spoken in each country. *Ethnologue* (Grimes 1992) gives the numbers of native speakers for each of the various languages spoken in a country.

[10] Results using alternative languages are similar to those using the simple dummy language variable and thus are not reported in the paper.

advantage is that the *Directories* include not only investments from OECD countries and other industrial nations, but investments originating from developing countries as well. Unfortunately, the *Directories* contain only one volume[12] for each of the regions and were published in different years for each region. Even within the same volume, information for different countries differs in the years when FDI is reported. As a result, the data obtained for different country pairs are figures for different years[13]. To minimize the possible problems rising from this temporal inconsistency, we used the FDI stocks rather than the flows in the estimation. This approach might also be helpful in limiting the effect of factors that cause short-term fluctuations in yearly FDI flows. In addition, we included a variable in our estimation to indicate the year that the amount of FDI is reported.

The data on bilateral FDI was gathered from the reports of 54 host countries on inward investment in *World Investment Directory*, and these reports identify 69 source countries[14]. If bilateral FDI was reported for all the country pairs, 0 or positive, there should be more than 3,600 observations, but only 1,329 valid observations were actually obtained and used in the empirical estimation.[15] Table 2 is a summary of the data on FDI. The total FDI stock reported amounted to US$1.06 billion. The majority of FDI originated from industrial countries (96%), and was destined to industrial countries (83%)[16]. More

[11] The five indices are: scores on government repudiation of contracts, risk of expropriation, corruption, law and order tradition, and bureaucratic quality.
[12] An updated investment directory on East and Southeast Asia was published recently.
[13] For FDI stock data compiled, the available years vary across countries, ranging from 1987 to 1995. For most of the countries in the study, the data covered FDI stock at the end of either 1989, 1990 or 1991.
[14] The inward FDI report of El Salvador was used to compile the data, but the country is not identified as a FDI source by any countries.
[15] There are two possibilities for the missing observations. First, there is zero investment between the two countries. Second, the total amount of bilateral investment is relatively small and therefore is not listed in the table. In both cases, the observation is treated as missing.
[16] The total amount of FDI used in the analysis accounts for about 60% of FDI stock in 1990 reported by UNCTAD (http://www.unctad.org/). The discrepancy is probably due to multiple sources. For example, their exist differences in defining FDI stocks across countries. Second, our sample includes inward FDI stock of only 54 countries.

than 80 percent of total FDI takes place between industrial countries. In addition, the average bilateral FDI stocks either outward from or inward to industrial countries are much larger than those for developing countries. Table 2 shows that the average amount of outward FDI stock from industrial countries investment is around US$1.3 billion, more than 16 times that for developing countries. The average quantity of inward FDI stock to industrial countries amounts to about US$2.0 billion, nearly 10 times as high as that for developing countries on average.

IV. Results of Estimation

A. Estimation results for the full sample

In this section, we present estimates using the full sample. Estimation results in Table 3 are obtained from both the threshold Tobit method as well as the OLS method.[17] While the results of the two methods are generally consistent, the following discussions will focus on those from maximum likelihood estimation of the Tobit model.

The first two columns give estimates excluding $CHIN_{ij}$, the measure for ethnic Chinese networks represented by the product of the numbers of ethnic Chinese of the country pairs, as a benchmark. The OLS results suggest that the model explains close to 40 percent of the total variance in FDI. The Tobit model produced significant estimates for the basic variables with expected signs. To explain the estimates in a more conventional way, we write the equation in terms of GNPs and per capita GNPs as follows.

$$\ln(60 + FDI_{ij}) = \max[-2091 + 0.84 \ln GNP_i + 1.22 GNP_j + 0.64 \ln PGNP_i - 1.01 \ln PGNP_j - 0.65 \ln DIST_{ij} + \mathbf{A}X_{ij}, \ln 60]$$

[17] When OLS is used to obtain estimates, we define the dependent variable as ln(FDI+1) to retain observations with zero amount of FDI.

where X_{ij} represents the other variables in the model.

Bilateral FDI responds positively to the GNPs of both source and the host countries and the per capita GNP of the source country, and negatively to per capita GNP of the host country and the distance between the two.

The higher a source country's GNP and per capita GNP, the more its firms will enjoy specific advantages and benefits from investing abroad. For the host countries, the higher the host countries' GNPs and the lower the per capita GNPs, the larger the potential market and the lower the average labor cost. These suggest that cross-border investment is motivated by both large markets and lower labor costs. The results also suggest that distance is a significant deterrence to FDI between two countries and its magnitude (-0.65), is compatible to that obtained for trade in differentiated goods.[18]

Before adding measures on ethnic Chinese networks into the model, we briefly examine the estimates for the other variables of interests. The members of the European Community invest significantly more with each other than with other countries, but this is not the case for the members of the European Free Trade Association. Furthermore, former colonial ties and a common native language are also important in promoting bilateral FDI between countries.

The level of a country's tariffs does not have a significant impact on its inward FDI, and tariff jumping was therefore not found to be an important motivation for FDI in our full sample. On the other hand, the ratio of a country's total trade to its GDP is positively associated with its FDI. We cannot conclude that as evidence of complementarity between trade and FDI. It is highly plausible that a country pursuing an

open policy would attract foreign investment as well as having a high ratio of trade to GDP. In addition, there is no evidence that FDI is driven by the host country's recent GDP growth. On the contrary, the coefficient on host country GDP growth is negative and significant. This result might be due to various factors. For example, GDP growth rates for some less-developed countries have been quite high in recent years, as they started from very low bases. Since they have opened their economy to foreign investors only for a short period, the level of accumulated FDI is still rather low (this is the case, for example, in Vietnam, Kenya, and Pakistan). On the other hand, industrial countries which have accumulated the longest and largest FDI may have suffered a serious slowdown in economic growth in recent years. In addition, the effect of fast growth, indicating a large potential market, might have partially been captured by a country's total GNP.

Finally, we notice that a country remote from the rest of the world seems to be more attractive for FDI. It might be that the cost of serving a remote market through trade is relatively high and thus direct investment is a better alternative. On the other hand, remoteness from the major global markets does not seem to be important in driving outward FDI. In addition, there is no sign that neighboring countries invest more with each other. The coefficient is positively but statistically insignificant. Presentations of estimation results in the following paragraphs and in the following sections will focus on the impact of ethnic Chinese networks. Discussions on the estimates of the other variables will be provided only where different estimates are obtained and comparisons are needed.

The third and the fourth columns present estimation results, including a measure on ethnic Chinese networking, $CHIN_{ij}$. It is shown that the inclusion improves the model

[18] In equations where the dependent variable is bilateral annual trade (Rauch and Trindade 2002), the coefficient on distance for differentiated goods range between –0.68 and –0.83.

overall fitness significantly. The coefficient on $CHIN_{ij}$ is positive (0.19 for the Tobit equation) and significant, consistent with the hypothesis that ethnic Chinese networks, as represented by the total number of potential international connections between two countries, significantly increase bilateral FDI.

Because of the structure of the threshold Tobit specification, the coefficients cannot be readily interpreted as percentage change of FDI in response to a percentage change in the number of Chinese in the two countries. As the estimated threshold, A, is positive and significant, the presence or the increase of ethnic Chinese could mean to increase bilateral FDI for zero to positive. In that case, the marginal impact is infinite. When there exists positive FDI, the coefficient is the lower bound for the percentage change of FDI as a result of a 1% increase in the product of the numbers of ethnic Chinese in the two countries. In other words, when positive FDI exists between two countries, a 1% increase in the ethnic Chinese population in both countries will correspond to an increase in total bilateral FDI by at least 0.38%[19].

As noted earlier, the majority of overseas Chinese live in Southeast Asia, and they play a unique and important role in the region's economy. In addition, ethnic Chinese businesses in the region are known for their established and active networking activities across national borders. To identify the possible different effects of ethnic Chinese networks involving Southeast Asian economies, we divide country pairs into three groups. In the first group, both the source and the host country are in Southeast Asia. In the second group, either the source or the host country is in Southeast Asia. In the third group, neither

[19] Since $(1+0.0019)^2$ is roughly 1.0038. FDI from country *i* to country *j* will increase by about by 0.38% as a result of a 1% increase of the number of Chinese in both the source and the host country. Similarly, FDI from country *j* to country *i* will also increase by about 0.38%.

is in Southeast Asia. Separate estimates on $CHIN_{ij}$ are obtained for the three groups and the new estimates are presented in columns 5 and 6 of Table 3. The results show that the new estimates improve the model significantly and, indeed, the effect of ethnic Chinese networks differs across groups. The highest coefficient for $CHIN_{ij}$ is 0.26 for country pairs outside Southeast Asia. This might suggest that there is decreasing marginal effect of ethnic Chinese networking on bilateral FDI[20]. On the other hand, we find that the coefficient for country pairs where both countries are in Southeast Asia (0.22) is higher than where only one of the pair is in Southeast Asia (0.16). This might suggest that, indeed, extensive and active networks among ethnic Chinese businesses in Southeast Asia have played key roles in driving cross-border investment in the region.

The above survey suggests that ethnic Chinese networks, approximated by the product of the numbers of ethnic Chinese in the two countries, are important in promoting bilateral FDI between all country pairs included in this study. In addition, evidence suggests that the marginal effect of ethnic Chinese networks is higher for country pairs outside Southeast Asian countries. A 1% increase in the total number of ethnic Chinese in each of the two countries corresponds to an increase of about 0.52% in total bilateral FDI. For country pairs involving Southeast Asian countries, the corresponding change in bilateral FDI is 0.44% where both countries are in Southeast Asia and 0.30% where only one of the pair is in Southeast Asia.

[20] $\ln CHIN_{ij}$ is 20.84 when both country i and country j are in Southeast Asia, 17.02 when either i or j is in Southeast Asia, and 9.38 when neither i nor j is in Southeast Asia.

B. Industrial vs. developing countries & ethnic Chinese networks

Our discussion earlier suggests that FDI originating from developing economies may demonstrate different features than that from industrial countries. In this section we divide the full sample into two sub-groups according to the source countries of bilateral FDI[21] and estimate the empirical equation separately. In the left panel of Table 4, the dependent variable is bilateral FDI originating from industrial countries; in the right panel, the dependent variable is FDI originating from developing economies. In general, the results from the two panels are qualitatively the same,[22] while OLS estimation indicates that the gravity model specification accounts for a larger portion of total variance for FDI originating from industrial countries than from developing countries. The adjusted R-square is more than 40% for the left panel, and about 22% for the right panel.

On the other hand, the results suggest that the percentage change in bilateral FDI in response to a percentage change in the basic factors differs in magnitude between the left and the right panels. This becomes clear if we rewrite the equations in the following format based on the second column two panels in Table 4.

For FDI originating from industrial countries, we have the following.

$$\ln(152 + FDI_{ij}) = \max[-2997 + 1.06 \ln GNP_i + 1.31 GNP_j + 1.45 \ln PGNP_i - 0.65 \ln PGNP_j - 0.70 \ln DIST_{ij} + \mathbf{A}X_{ij}, \ln 152]$$

Similarly, for FDI from developing economies, the equation is as follows.

$$\ln(33 + FDI_{ij}) = \max[-1801 + 0.38 \ln GNP_i + 1.03 GNP_j + 0.47 \ln PGNP_i - 1.37 \ln PGNP_j - 0.48 \ln DIST_{ij} + \mathbf{A}X_{ij}, \ln 33]$$

[21] Industrial countries include Australia, Canada, Japan, New Zealand, the United States, and all members of the European Community and European Free Trade Association.

[22] The estimates for the two panels have the same signs when they are written in terms of GNPs and per capita GNPs of the source and the host countries.

The results show that FDI from industrial countries is more sensitive to source country characteristics, while FDI from developing countries is more sensitive to host country characteristics. One possible explanation is that, as multinationals from developing countries possess relatively less firm specific assets, cost advantage in a foreign location is a much stronger motivation for relocation of production. In addition, distance is a more significant deterrent to FDI from industrial countries. A shared native language is important for investors in industrial countries, but is almost irrelevant for investors in developing countries.

Columns 3 through 6 give model estimates while measures on ethnic Chinese networking are included. In both panels, the inclusion improves the model significantly. In general, seen from columns 3 and 4, the impact of ethnic Chinese networks is positive and significant. The magnitude of the estimates $CHIN_{ij}$ is larger for FDI originating from industrial countries (0.28) than that for FDI from developing countries (0.15). The results indicate that ethnic Chinese networking is significant in promoting bilateral FDI from both industrial countries and developing countries. The importance, on the margin, seems to be stronger for investment originating from industrial countries.

In columns 5 and 6 of both panels, separate estimates on $CHIN_{ij}$ are obtained for three groups of country pairs according to the involvement of Southeast Asian economies. For investors in industrial countries (left panel), ethnic Chinese networks, again on the margin, are less important for investment to Southeast Asia (0.22) than to other countries (0.36), such as those in Europe and America. This is consistent with the decreasing marginal effect of ethnic networks between countries. For investors in developing countries (right panel), ethnic Chinese networks are most important between Southeast

Asian economies. The coefficient on $CHIN_{ij}$ is 0.22 and significant. Investment from Southeast Asia in other regions also responds positively to changes in $CHIN_{ij}$, but the magnitude is much smaller (0.10). Finally, ethnic Chinese networks do not seem to significantly affect investors in developing countries outside Southeast Asia when they invest in regions outside Southeast Asia. The coefficient is positive but statistically insignificant. This is in contrast to the decreasing marginal effect of ethnic Chinese networks. That is to say, for investors in developing countries, ethnic networks are effective only when intensive networking activities are present.

Our basic gravity model specification has provided consistent results for the two sub-samples while the overall fitness of the model is better when FDI from industrial countries is used in the estimation. More importantly, ethnic Chinese networking is found to be important in promoting direct investment except when FDI is between two countries outside Southeast Asia and, at the same time, the FDI source is a developing country. An example would be investment from Mexico to Brazil or to France.

C. Bureaucratic quality & ethnic Chinese networks

Our discussions suggest that there are two mechanisms through which ethnic Chinese networks promote bilateral FDI: community enforcement of sanctions and assistance in overcoming informational barriers. Assuming the first mechanism is important mainly for investment destined to countries with weak institutions, we may be able to evaluate the two effects by dividing the bilateral FDI into two groups, depending on the level of bureaucratic quality in the host countries. In the left panel of Table 5, the dependent variable is direct investment to countries where bureaucratic quality is relatively

high[23]. In the right panel, the dependent variable is FDI destined to countries where the bureaucratic quality is relatively low. If we believe that economic development is positively correlated with a country's institutional development, we could also think of the first as FDI to countries with a relatively higher level of economic development.

In general, the models explain more than 40 percent of total variance in total bilateral FDI between countries. To compare the estimates on the basic variables, we present the equations in terms of the countries' GNP and per capita GNPs (column 2).

For FDI to countries with high bureaucratic quality we have the following.

$$\ln(93+FDI_{ij}) = \max[1197+1.00\ln GNP_i +1.17GNP_j + 0.97\ln PGNP_i -1.72\ln PGNP_j -0.48\ln DIST_{ij} +\mathbf{A}X_{ij}, \ln 93]$$

For FDI to countries with low bureaucratic quality, we have the following.

$$\ln(26+FDI_{ij}) = \max[-2944+0.70\ln GNP_i +1.19GNP_j + 0.33\ln PGNP_i -0.41\ln PGNP_j -1.08\ln DIST_{ij} +\mathbf{A}X_{ij}, \ln 26]$$

In both equations, the coefficients for the basic variables, as well as for most of the additional variables, have same signs but differ in magnitude. There are nevertheless some significant differences. In the left panel, where FDI destined to countries with high bureaucratic quality is used, the coefficients on the measures of formal colonial ties and of common birth language are both positive and significant. In the right panel, where FDI destined to countries with low bureaucratic quality is used, neither of the two coefficients is significant. Perhaps the most important contrast between the two panels is the coefficient for the host country's average tariff rate. The estimate is negative in the left panel but positive in the right panel, both statistically significant. It suggests that tariff jumping

[23] The score for a country's bureaucratic quality ranges from 0 to 6. The mean value is about 3.6. FDI to two countries are excluded from the analysis, as the score of bureaucratic quality for the two countries is 3.5.

might be the motivation for some direct investments, especially investments in countries with low levels of economic and institutional development.

The results in columns 3 and 4 of both panels are obtained when the measure on ethnic Chinese networks is included. The inclusion improves the overall model significantly. The coefficient on $CHIN_{ij}$ is 0.31 in the left panel and 0.07 in the right panel, both significant. The results show that ethnic Chinese networks are important in facilitating bilateral FDI between countries, regardless of the institutional development status of the host countries. In addition to community enforcement of sanctions, which is important for FDI to countries with weak institutions, ethnic Chinese also promote FDI through providing crucial information. The latter might be a more important mechanism.

Finally, we estimate the effect of ethnic Chinese networks for different country pairs depending on whether the source and/or host countries are in Southeast Asia (columns 5 and 6). The improvement on the model is significant (marginally for the right panel). In the left panel, all three estimates for $CHIN_{ij}$ are positive and highly significant. The magnitude is the highest for country pairs where neither is in Southeast Asia and the lowest when only one of the pair is in the region. In the right panel, all three estimates are positive, but the estimate where either the source or the host is in Southeast Asia is statistically insignificant. The results are consistent with earlier findings that ethnic Chinese networks seem to be most effective in promoting bilateral FDI between countries outside Southeast Asia. Ethnic networks are also very important for FDI between Southeast Asian economies.

V. Concluding Remarks

Using a standard gravity model, this paper examines the impact of ethnic Chinese networks in promoting bilateral FDI between countries. We conclude that ethnic Chinese networks play a crucial role in facilitating direct investment not only between Southeast Asian economies but also between economies elsewhere in the world.

By using data on FDI from the United Nations, we are able to investigate the importance of ethnic networking on direct investment originating from developing countries separately from those from industrial countries. Although the gravity model is not as effective in predicting FDI from developing countries than from industrial countries, ethnic Chinese networks are found significant in promoting bilateral FDI in both cases.

By estimating separate models on FDI destined to countries with weak and strong institutions respectively, the study also finds evidence that both mechanisms are important for ethnic Chinese networks. For investment to countries with weak institutions, ethnic networks provide community enforcement of sanctions to deter cheating activities and to promote investment. This is particularly effective for investment between Southeast Asia economies where extensive ethnic Chinese networks have long been active. For countries with good institutions, on the other hand, the more important mechanism of ethnic networks is to help investors overcome informational barriers in their investment decisions. While it is difficult to evaluate the relevant importance of the two mechanisms, the estimates on $CHIN_{ij}$ are much larger for FDI to countries with a high level of institutional development, suggesting that information might be a more important benefit in facilitating FDI.

Our empirical results have also generated some interesting findings on the determinants of FDI. In general, we find that investment from developing countries is driven by a large market size and low labor costs in the host countries, just as in the case of industrial countries. A large economy and increasing labor costs in source countries encourages more direct investment abroad. In addition, membership of the EC, former colonial ties and a shared native language are also important influences on FDI, especially for investors in industrial countries. We also find that investment and trade seem to complement each other, as FDI is positively related to the host countries' trade intensity. On the other hand, there is also evidence that tariff jumping is an important motivation for investment. FDI to countries with weak institutions responds positively to host countries' average tariff rate.

What can we learn from this study? We find that ethnic Chinese networks play a significant role in promoting bilateral FDI between countries in a rather broader sense, implying that the effectiveness should not be limited to ethnic Chinese. Two questions remain for future studies. First, can we find evidence of the effect of networking activities of other ethnic groups in promoting trade and investment? Second, will the effectiveness of ethnic networking decrease with the development of new technologies that make information exchange faster, easier, and less costly?

Appendix A: Data source and definition for foreign direct investment

Data on each country's bilateral foreign direct investment stocks were obtained from Table 9, 'Geographical location of FDI stocks', in the World Investment Directory. Six volumes of the Directory have been published since 1992. Volume Two includes all developed countries. Each of the other volumes includes developing countries in a region, such as Asia and the Pacific, the Americas, Central and East Europe, and Africa and West Asia.

There are two main definitions of FDI. One is contained in the Balance of Payments Manual (Washington DC, International Monetary Fund, 1977) and the other in the Detailed Benchmark Definition of Foreign Direct Investment (Paris, Organization for Economic Cooperation and Development, 1983). Both are used in the Directory. According to the Balance of Payments Manual, FDI refers to investment made to acquire lasting interest in enterprises operating outside the economy of the investor. Further, in cases of FDI the investor's purpose is to gain an effective voice in the management of the enterprises. Some degree of equity ownership is almost always considered to be associated with an effective voice in the management of an enterprise; however, IMF does not specify an exact percentage of equity ownership that qualifies an investor as a foreign direct investor.

Appendix B: Formula for Calculating Great Circle Distances

While the "great circle" formula does not provide the true distance between two separate locations, it does yield an answer that is accurate enough for many purposes. The notation given here is slightly modified from that given in *The American Practical Navigator*, a standard reference book for marine navigation. The following is the formula and an example for calculating great circle distances.

Formula

Cos D = (SinL1 * SinL2) + (CosL1 * CosL2 * CosDLo)

Where L1=the latitude of place A

L2=the latitude of place B

Dlo = the difference in longitude between places A and B

D = the arc distance (in degrees) between place A and B

Distance=D*111.3 (kilometers)

Example:

Place A: Boston, USA	42	22	n	71	3	w
Place B: Nairobi, Kenya	1	17	s	36	49	e

Therefore:

L1=+42.3667

L2=-1.2833

Dlo=(-71.0500) - (+ 36.8167)) = -107.8667

Then Cos D=0.241715

D=103.987783

Distance=103.987783*113.3=11574.08km

Appendix C: Definition of variables used in the empirical analysis:

FDI: dependent variable, nominal value of total bilateral FDI stock;

LGNP1: log of source country GNP in 1990;

LGNP2: log of host country GNP in 1990;

LPOP1: log of source country populaiton in 1990;

LPOP2: log of host country populaiton in 1990;

LDISTANT: log of great circle idstance between the economic centers of the source and the host countries;

EEC2: equals 1 if both the source and the host countries are members of the European Community and 0 otherwise;

EFTA2: equals 1 if both the source and the host countries are members of the European Free Trade Association and 0 otherwise.;

LRMT1: log of the weighted sum of source country's distances from all other countries in the sample. The weights are the nominal GNPs of the other countries in the sample;

LRMT2: log of the weighted sum of host country's distances from all other countries in the sample. The weights are the nominal GNPs of the other countries in the sample;

ADJACENT: equals 1 if the source and the host countries share a land border and 0 otherwise;

LANGDUM: equals one if the more than 10% of the populaiton in the source and the hsot countries share a common birth language;

LINKS: equals 1 when the source and the host countries share a former colonial tie and 0 otherwise;

LTAR: log of the host country's average tariff rate for the years 1985 to 1990;

LTRADE: log of the host country's average trade to GDP ratio for the years 1985 to 1990;

GDPGRO2: the host country's annual average GDP growth rate between 1985 and 1990;

LYR: log of the year when the FDI data is reported;

LCHIN: log of the product of the numbers of ethnic Chinese in the source and the host countries in 1990;

LCHS2=LCHIN*SEASIA2, where SEASIA2 equals one if both the source and the host are in Southeast Asia and 0 otherwise;

LCHS1=LCHIN*SEASIA1, where SEASIA1 equals one if eitehr the source or the host are in Southeast Asia and 0 othterwise;

LCHS0=LCHIN*SEASIA0, where SEASIA0 equals one if neither the source or the host countries are in Southeast Asia and 0 otherwise.

References:

Anderson, James E., 1979, 'A theoretical Foundation for the Gravity Equation', *The American Economic Review* 69 (1): 106-116.

Belderbos, Rene, and Leo Sleuwaegen, 1998, 'Tariff Jumping DFI and Export Substitution: Japanese Electronics Firms in Europe', *International Journal of Industrial Organization* 16 (5): 601-638.

Bergstrand, Jeffrey H., 1985, 'The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence', *The Review of Economics and Statistics* 67 (3): 474-81.

Bergstrand, Jeffrey H., 1989, 'The Generalized Gravity Equation, Monopolistic Competition and the Factor-Proportions Theory in International Trade', *The Review of Economics and Statistics* 71 (1): 143-53.

Casella, Alessandra and James E. Rauch, 2002, 'Anonymous Market and Group Ties in International Trade', *Journal of International Economics* 58 (1): 19-47.

Collins, William J., Kevin H. O'Rourke and Jeffrey G. Williamson, 1997, 'Were Trade and Factor Mobility Substitutes in History?', NBER Working Paper 6059.

Deardorff, Alan V., 1995, 'Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World', NBER Working Papers 5377.

EAAU (East Asia Analytical Unit), 1995, *Overseas Chinese Business Networks in Asia*, Department of Foreign Affairs and Trade, Commonwealth of Australia.

Eaton, Jonathan, and Akiko Tamura. 1994. 'Bilateralism and Regionalism in Japanese and U.S. Trade and Direct Foreign Investment Patterns', *Journal of the Japanese and International Economies* 8: 478-510.

Encyclopedia Britannica. 1997. Internet Edition.

Frankel, Jeffery A. 1997. *Regional Trading Blocs in the World Economic System* (Washington, DC: Institute for International Economics).

Gould, David M., 1994, 'Immigrant Links to the Home Country: Empirical Implication for U.S. Bilateral Trade Flows', *The Review of Economics and Statistics* 76 (2): 302-316.

Greif, Avner, 1993, 'Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition', *American Economic Review* 83 (3): 525-548.

Grimes, Barbara F., ed. 1992. *Ethnologue, 12th Edition* (Dallas, TX: Summer Institute of Linguistics).

Head, Keith and John Ries, 2001, 'Overseas Investment and Firm Exports', *Review of International Economics* 9(1): 108-22.

Hejazi, Walid and A. E. Safarian, 2001, 'The Complementarity Between U.S. Foreign Direct Investment and Trade', *Atlantic Economic Journal* 29 (4): 420-37.

Helpman, Elhanan, 1984, 'A Simple Theory of Trade with Multinational Corporations', *Journal of the Political* 92: 451-71.

Jeon, Bang Nam and Susan F. Stone, 1998, 'Foreign Direct Investment in the Asia-Pacific Region: The Gravity-Model Approach', from J. Jay Choi and John A. Doukas (eds.) *Emerging Capital Markets: Financial and Investment Issues*, Quorum Books, Westport, Connecticut: 97-109.

Light, Ivan and Richard E. Isralowitz (eds.), 1997, *Immigrant Entrepreneurs and Immigrant Absorption in the United States and Israel* (Aldershot: Ashgate Publishing Ltd).

Lipsey, Robert E. and Merle Yahr Weiss, 1981, 'Foreign Production and Exports in Manufacturing Industries', *The Review of Economics and Statistics* 63 (4): 488-94.

Liu, Hong. 1998. 'Old linkages, new networks: The globalization of overseas Chinese voluntary associations and its implications', *The China Quarterly* 155: 582-609.

Markusen, James R. 1995, 'The Boundaries of Multinational Firms and the Theory of International Trade', *Journal of Economic Perspectives* 9: 169-89.

Morsink, Robert L.A. 1998. *Foreign Direct Investment and Corporate Networking.* New Horizons in International Business.

Mundell, Robert A., 1957, 'International Trade and Factor Mobility', *The American Economic Review* 47: 321-335.

Overseas Chinese Affairs Commission. 1991. *Overseas Chinese Economy Yearbook, 1990* (Taipei).

Poston, Dudley L., Jr., Michael Xinciang Mao, and Mei-Yu Yu. 1994. 'The Global Distribution of the Overseas Chinese Around 1990', *Population and Development Review* Volume 20, Issue 3 (September 1994), 631-645.

Rauch, James E., 1999, 'Networks versus markets in international trade', *Journal of International Economics* 48 (1): 7-35.

Rauch, James E. and Casella, Alessandra, 1998, 'Overcoming Informational Barriers to International Resource Allocation: Prices and Group Ties', NBER working paper 6628.

Rauch, James E. and Vitor Trindade, 2002, 'Ethnic Chinese Networks in International Trade', *The Review of Economics and Statistics* 84 (1): 116-30.

Redding, Gordon, 1995, 'Overseas Chinese Networks: Understanding the Enigma', *Long Range Planning* 28 (1): 61-69.

Tao, Jie. 1994. 'The distribution and status of the overseas Chinese and the foreign citizens of the Chinese origin' in Yearbook of the Hua Ren Economy Editorial Committee, *Yearbook of the Hua Ren Economy 94*. Chinese Academy of Social Sciences 94.

Wei, Shang-Jin, 1998, 'How taxing is corruption on international investors?', NBER Working Papers 6030.

Weidenbaum, Murray and Samuel Hughes, 1996, *The Bamboo Network* (New York: The Free Press).

Table 1: Countries and their economic centers, ethnic Chinese population and total population around 1990.

Country	Economic Center	CHIN (thousand)	POP(mil.)
Americas			
* Canada	Ottawa	680.00	26.58
* United States	Chicago	1,645.47	249.91
* Argentina	Buenos Aires	20.00	32.55
* Brazil	Sao Paulo	100.00	144.72
* Chile	Santiago	13.00	13.17
* Columbia	Bogota	4.00	32.30
* Ecuador	Quito	15.00	10.26
* Mexico	Mexico City	20.00	86.15
* Peru	Lima	500.00	21.55
* Venezuela	Caracas	15.00	19.33
* Bolivia	La Paz	4.00	6.57
* Paraguay	Asuncion	7.00	4.22
* Uruguay	Montevideo	0.35	3.09
* Dominican Republic	Santo Domingo	6.50	7.17
* El Salvador	San Salvador	0.90	5.17
* Jamaica	Kingston	20.00	2.42
East and Southeast Asia			
* Japan	Tokyo	150.34	123.53
* Indonesia	Jakarta	7,315.00	179.83
Taiwan	Taipei	20,095.00	20.11
* Hong Kong	Hong Kong	5,686.14	5.70
* Korea	Seoul	22.84	42.87
* Malaysia	Kuala Lumpur	5,471.70	17.76
* Philippines	Manila	820.00	61.48
* Singapore	Singapore	2,112.66	2.70
* Thailand	Bangkok	6,000.00	56.08
* P.R. China	Shanghai	1,080,210.00	1,155.28
* Vietnam	HCM City	2,000.00	66.23
European Community (EC)			
* France	Paris	200.00	56.74
Germany	Bonn	39.50	79.37
Italy	Rome	20.66	57.66
* United Kingdom	London	125.00	57.56
* Belgium	Brussels	13.36	10.35
Denmark	Copenhagen	6.00	5.14
* Netherlands	Amsterdam	45.50	14.95
* Ireland	Dublin	1.00	3.50
* Portugal	Lisbon	4.70	9.90
* Spain	Madrid	15.00	38.96
European Free Trade Area (EFTA)			
* Austria	Vienna	6.00	7.72
* Finland	Helsinki	0.01	4.99
Norway	Oslo	0.95	4.24
* Sweden	Stockholm	12.00	8.56
Switzerland	Geneva	5.00	6.71
Other countries			
* Australia	Sydney	300.00	17.06
* New Zealand	Wellington	35.00	3.36
South Africa	Pretoria	36.00	37.07
* Turkey	Ankara	60.00	56.10
Libya	Tripoli	0.36	4.15
* Nigeria	Lagos	2.00	96.16
* Egypt	Cairo	0.11	52.69
* Morocco	Casablanca	0.02	24.49
* Kenya	Nairobi	0.15	24.03
* Cameroon	Yaounde	0.01	11.53
* Gabon	Libreville	0.05	1.15
Liberia	Monrovia	0.12	2.41
Mauritius	Port Louis	35.00	1.06
Sierra Leone	Freetown	0.02	4.00
Togo	Lome	0.03	3.53
Tanzania	Dar es Salaam	0.51	25.64
Zaire	Kinshasa	0.20	35.56
* Zimbabwe	Harare	0.40	9.37
* Bangladesh	Dakar	0.70	108.12
* Sri Lanka	Colombo	3.50	16.99
* Pakistan	Karachi	3.60	112.04
* India	New Delhi	21.00	834.72
Fiji	Suva	8.00	0.73
* Papua New Guinea	Port Moresby	6.80	3.70
* Hungary	Budapest	0.02	10.36
* Poland	Warsaw	0.08	38.12
Bulgaria	Sofia	0.03	8.99
Czechoslovakia	Prague	0.02	15.66
* Romania	Bucharest	0.04	23.21

Note: "*" identifies the 54 countries whose inward FDI reports are used to compile data on bilateral FDI.

Table 2: Summary for FDI data

FDI source		FDI destination: Industrial countries	FDI destination: Developing countries	FDI destination: All
Industrial				
Average	US$ million	3659	287	1290
Subtotal	US$ million	856169	158788	1014957
# of obs		234	553	787
Developing				
Average	US$ million	98	66	78
Subtotal	US$ million	19737	22421	42158
# of obs		202	340	542
All				
Average	US$ million	2009	203	809
Total	US$ million	875905	181209	1057115
# of obs		436	893	1329

Table 3: Gravity model estimation using the full sample

	Model 1		Model 2		Model 3	
	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT
LGNP1	1.60 ***	1.48 ***	1.44 ***	1.33 ***	1.36 ***	1.25 ***
LGNP2	0.04	0.21 ***	-0.03	0.15 *	-0.14 #	0.04
LPOP1	-0.70 **	0.64 ***	-0.78 ***	-0.71 ***	-0.76 ***	-0.69 ***
LPOP2	1.24 ***	1.01 ***	0.78 ***	0.59 ***	0.97 ***	0.78 ***
LCH			0.21 ***	0.19 ***		
LCHS2					0.25 ***	0.22 ***
LCHS1					0.18 ***	0.16 ***
LCHS0					0.28 ***	0.26 ***
LDISTANT	-0.66 ***	-0.65 ***	-0.74 ***	-0.74 ***	-0.69 ***	-0.69 ***
EEC2	2.88 ***	2.47 ***	2.48 ***	2.09 ***	2.34 ***	1.96 ***
EFTA2	-0.16	0.14	-0.21	0.10	0.03	0.33
LRMT1	0.06	0.09	-1.04 ***	-0.92 ***	-1.21 ***	-1.07 ***
LRMT2	3.06 ***	3.05 ***	1.47 ***	1.58 ***	1.38 ***	1.52 ***
LTAR	-0.08	-0.04	0.12	0.16	0.02	0.06
LTRADE	2.09 ***	1.97 ***	1.34 ***	1.28 ***	1.60 ***	1.55 ***
GDPGRO2	-0.19 ***	-0.16 ***	-0.21 ***	-0.18 ***	-0.22 ***	-0.19 ***
LYR	271 **	271 ***	489 ***	472 ***	503 ***	486 ***
ADJACENT	0.58	0.40	0.58	0.39	0.63	0.43
LINKS	0.96 ***	0.78 ***	1.02 ***	0.85 ***	1.11 ***	0.92 ***
LANGDUM	1.78 ***	1.58 ***	1.43 ***	1.25 ***	1.10 ***	0.96 ***
C	-2091 ***	-2091 ***	-3718 ***	-3588 ***	-3821 ***	-3695 ***
AI		59.65 ***		59.98 ***		59.94 *
SIGI		3.43		3.36		3.34
R2	0.38		0.40		0.41	
R2-adj	0.37		0.39		0.40	
Log Likelihood	-3515	-14606	-3487	-14578	-3479	-14571
LR test			56.24	55.60	15.24	15.80
LR test sig level						
# obs.	1329					

Note: ***, **, *, and # denote the siginificance level of 1%, 5%, 10% and 15% respectively.

Table 4: Gravity model estimation for FDI from industrial countries and developing countries

	North1=1						North1=0					
	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT
LGNP1	2.97 ***	2.51 ***	3.01 ***	2.54 ***	2.96 ***	2.50 ***	0.89 ***	0.85 ***	0.71 ***	0.67 ***	0.79 ***	0.75 ***
LGNP2	0.48 ***	0.66 ***	0.38 ***	0.57 ***	0.12	0.37 ***	-0.47 ***	-0.34 **	-0.52 ***	-0.38 ***	-0.33 **	-0.20
LPOP1	-1.80 ***	-1.45 ***	-2.23 ***	-1.82 ***	-2.27 ***	-1.85 ***	-0.48 ***	-0.47 ***	-0.51 ***	-0.50 ***	-0.49 ***	-0.48 ***
LPOP2	0.96 ***	0.65 ***	0.33 *	0.10	0.84 ***	0.49 ***	1.50 ***	1.37 ***	1.05 ***	0.93 ***	0.65 **	0.57 **
LCH			0.32 ***	0.28 ***					0.16 ***	0.15 ***		
LCHS2											0.24 ***	0.22 ***
LCHS1					0.24 ***	0.22 ***					0.10 **	0.10 ***
LCHS0					0.42 ***	0.36 ***					0.02	0.03
LDISTANT	-0.65 ***	-0.70 ***	-0.91 ***	-0.93 ***	-1.02 ***	-1.01 ***	-0.51 **	-0.48 ***	-0.57 ***	-0.54 ***	-0.23	-0.25
EEC2	2.75 ***	2.08 ***	2.29 ***	1.67 ***	1.99 ***	1.45 ***						
EFTA2	-0.25	0.12	-0.11	0.27	0.34	0.62						
LRMT1	-0.11	0.01	-0.75 *	-0.55 #	-0.89 **	-0.66 **	1.71 **	1.60 **	-0.12	-0.17	0.04	-0.04
LRMT2	3.82 ***	3.66 ***	1.91 ***	2.01 ***	2.44 ***	2.42 ***	1.73 **	1.84 ***	0.37	0.53	0.21	0.42
LTAR	-0.10	-0.04	0.33	0.34 *	0.00	0.10	-0.09	-0.05	0.04	0.09	0.25	0.28
LTRADE	1.78 ***	1.52 ***	0.91 **	0.77 **	1.58 ***	1.29 ***	2.09 ***	2.16 ***	1.24 **	1.34 **	0.71	0.87 #
GDPGRO2	-0.19 ***	-0.13 ***	-0.21 ***	-0.16 ***	-0.22 ***	-0.17 ***	-0.21 ***	-0.19 ***	-0.21 ***	-0.19 ***	-0.17 **	-0.16 ***
LYR	403 ***	390 ***	793 ***	729 ***	783 ***	722 ***	250	232 #	381 *	361 **	307 #	296 *
ADJACENT	0.62	0.43	0.36	0.20	0.33	0.18	0.66	0.58	0.76	0.66	1.09 *	0.96 **
LINKS	1.32 ***	1.10 ***	1.42 ***	1.19 ***	1.39 ***	1.16 ***	0.98 **	0.88 *	1.07 **	0.97 **	1.42 ***	1.27 ***
LANGDUM	2.11 ***	1.80 ***	1.51 ***	1.28 ***	1.28 **	1.11 ***	0.80	0.71 #	0.61	0.52	0.50	0.43
C	-3094 ***	-2997 ***	-6023 ***	-5535 ***	-5953 ***	-5492 ***	-1937	-1801 #	-2897 *	-2745 **	-2335 #	-2250 *
AI		152.41 ***		153.70 ***		152.69 ***		32.99 ***		33.13 ***		33.04 ***
SIGI		3.12		3.01		2.98		3.56		3.51		3.48
R2	0.38		0.43		0.44		0.22		0.24		0.26	
R2-adj	0.37		0.42		0.43		0.20		0.22		0.23	
Log Likelihood	-2005	-9732	-1975	-9697	-1967	-9690	-1448	-4795	-1440	-4787	-1434	-4781
LR test			60.62	68.76	15.10	13.66			16.08	17.04	12.30	10.86
LR test sig level												
# obs.	787						542					

Note: ***, **, *, and # denote the siginificance level of 1%, 5%, 10% and 15% respectively.

North1=1 when the source country is an advanced country, and North1=0 when the source country is a developing economy.

Table 5: Gravity model estimation for FDI to countries with strong institutions and weak institutions

	Bureaucratic quality of the host country is high						Bureaucratic quality of the host country is low					
	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT	OLS	TOBIT
LGNP1	2.06 ***	1.97 ***	1.83 ***	1.74 ***	1.68 ***	1.59 ***	1.08 ***	1.03 ***	1.03 ***	0.98 ***	1.01 ***	0.96 ***
LGNP2	-0.63 ***	-0.55 ***	-0.69 ***	-0.59 ***	-0.87 ***	-0.78 ***	0.74 ***	0.78 ***	0.70 ***	0.74 ***	0.66 ***	0.70 ***
LPOP1	-0.99 ***	-0.97 ***	-1.14 ***	-1.09 ***	-1.10 ***	-1.06 ***	-0.36 ***	-0.33 ***	-0.38 ***	-0.36 ***	-0.38 ***	-0.35 ***
LPOP2	1.91 ***	1.72 ***	1.26 ***	1.10 ***	1.31 ***	1.16 ***	0.48 ***	0.41 ***	0.31 **	0.25 *	0.44 ***	0.40 **
LCH			0.32 ***	0.31 ***					0.07 ***	0.07 ***		
LCHS2					0.36 ***	0.33 ***					0.09 ***	0.09 ***
LCHS1					0.29 ***	0.28 ***					0.04	0.04 #
LCHS0					0.43 ***	0.42 ***					0.09 **	0.10 ***
LDISTANT	-0.45 *	-0.48 **	-0.53 **	-0.58 **	-0.54 **	-0.60 **	-1.13 ***	-1.08 ***	-1.16 ***	-1.10 ***	-1.07 ***	-1.03 ***
EEC2	3.01 ***	2.55 ***	2.46 ***	1.99 ***	2.25 ***	1.78 ***	2.02 ***	1.92 ***	1.93 **	1.83 ***	1.96 ***	1.85 ***
EFTA2	-1.06	-0.71	-1.08	-0.69	-0.80	-0.40	1.26	1.12	1.28	1.15	1.32	1.20
LRMT1	0.23	0.16	-1.57 **	-1.54 ***	-1.77 ***	-1.72 ***	-0.22	-0.10	-0.59 #	-0.46	-0.66 *	-0.53 #
LRMT2	1.47 *	1.46 *	-0.57	-0.45	-0.81	-0.69	5.19 ***	5.01 ***	4.58 ***	4.41 ***	4.54 ***	4.40 ***
LTAR	-1.41 ***	-1.46 ***	-0.96 **	-0.98 **	-1.10 **	-1.13 ***	0.37 **	0.39 **	0.46 ***	0.47 ***	0.38 **	0.39 **
LTRADE	1.06 #	0.89	0.02	-0.02	0.03	0.00	1.64 ***	1.62 ***	1.42 ***	1.41 ***	1.59 ***	1.60 ***
GDPGRO2	-0.38 ***	-0.33 ***	-0.42 ***	-0.38 ***	-0.41 ***	-0.37 ***	-0.08 #	-0.07 #	-0.08 *	-0.08 *	-0.09 *	-0.08 **
LYR	-180	-160	-20	3	52	76	389 ***	382 ***	471 ***	461 ***	459 ***	454 ***
ADJACENT	1.22	1.00 *	1.10	0.84 #	1.05	0.78	-0.57	-0.62 #	-0.54	-0.58 #	-0.42	-0.49
LINKS	1.82 ***	1.65 ***	1.63 ***	1.47 ***	1.77 ***	1.61 ***	0.11	0.09	0.17	0.15	0.24	0.20
LANGDUM	2.58 ***	2.34 ***	2.28 ***	2.05 ***	1.78 **	1.56 ***	-0.12	-0.13	-0.27	-0.28	-0.35	-0.36
C	1347	1197	175	6	-364	-548	-3000 ***	-2944 ***	-3608 ***	-3533 ***	-3522 ***	-3478 ***
AI		92.57 ***		93.59 ***		93.69 ***		26.14 ***		26.18 ***		26.12 ***
SIGI		4.16		4.02		4.01		2.17		2.16		2.15
R2	0.42		0.46		0.47		0.47		0.47		0.48	
R2-adj	0.41		0.44		0.45		0.45		0.46		0.46	
Log Likelihood	-1812	-6764	-1790	-6740	-1787	-6737	-1433	-7338	-1429	-7334	-1426	-7331
LR test			43.70	47.20	7.04	7.30			8.30	8.90	5.38	5.54
LR test sig level												
# obs.	640						657					

Note: ***, **, *, and # denote the siginificance level of 1%, 5%, 10% and 15% respectively.