THREE ESSAYS ON THE DETERMINANTS OF FOREIGN DIRECT INVESTMENT (FDI)

by

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Abstract

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At first, a literature review of over 150 articles on the determination of Foreign Direct Investment (FDI) proposes the main determinants of FDI. A meta-analysis tests the reliability of the previous studies on FDI.

Then, a cluster analysis on FDI data reveals the necessary to segment economies, especially by income level, in FDI analysis.

A large number of studies emphasize FDI determinants but ignore the income distribution on the results, which biases the estimates. In Chapter 3, I correct for heterogeneity due to income distribution by using the Blundell-Bond System GMM (Generalized Method of Moments), which controls for endogeneity problem as well. I categorize the countries according to their level of development: high, middle and low income. I further break down the middle income category into upper and lower segments. I consider level effects and various interactive effects.

I find that income levels play a significant role in FDI determination model. Controlling for income levels corrects the sign and the magnitude of a number of

estimates. In particular, results show that low income countries attract more FDI, ceteris paribus. This result is in stark contrast with the traditional consensus that capital flows to rich countries (Lucas 1990). Moreover, modeling income levels shows that lagged FDI has consistently positive effect on FDI, which is a dynamic model structure. Consistent with the literature, market potential and education boost FDI and results are robust to income levels. FDI increases with risk levels because during financial or economic crises it replaces other investments. Tax rates overall exert downward pressure on FDI, but mostly when the middle and low income levels are controlled for. This article also supports the Tariff Jumping FDI argument in middle and low income economies, according to which, FDI is a potential substitute for international trade. My results reject the hypothesis of the wealth effect of exchange rate, and there is weak evidence that the depreciation of local currency discourages FDI in particular in poorer countries. Results are stable for different specifications of income dummies (one intercept dummy, two intercept dummies, and slope dummies, etc).

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本文献给我亲爱的父亲梁平岳和母亲李桂枝

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Chapter1: Evaluation of Econometric Studies on the Determinants of Foreign Direct Investment (FDI): Literature Survey & Meta-Analysis of Two Determinants

The development of literature on the determinants of Foreign Direct Investment (FDI) can be divided into three stages: studies in the 1960s (Beginning), studies in the 1970s and 1980s (Development), and the literature since the 1990s (Mature). After an overview of the data, the dependent variables, the independent variables, and the methodologies in the three generations of research, a specific model with commonly used explanatory variables is recommended.

This is followed by a meta-analysis of the research to test how often the potential publication bias (towards reporting significant or common results) may influence the measurement of the effects of the market size and exchange rates on FDI. The results support the premise that there are genuine associations between market size and FDI as well as between exchange rates and FDI. Nevertheless, there is potential publication bias co-existing with genuine association in literature on market size's effect. Particularly in studies on the effect of market size on FDI into developed countries, publication bias is clearly identified by meta-analysis, but I find that there is no publication bias in the literature on the effect of exchange rate on FDI.

Foreign Direct Investment (FDI) occurs when the residents of one country acquire control over a business enterprise in another country.

Richard E. Caves et al., World Trade and Payments: An Introduction

1.1 Introduction

Foreign direct investment (FDI) is widely perceived as a powerful development engine for many receiving (host) countries. It adds to gross capital formation, improves balance of payments, and creates jobs in the receiving countries. Equally important are other consequences- the spillover of technological know-how and business skills and increase of dynamic competition and efficiency, etc. They are crucial for a quick and fundamental take–off for development in host economies. Since the 1960s a voluminous literature has examined various aspects of FDI. This chapter offers a survey and analysis of the major advances in ascertaining the determinants of FDI inflows.

1.2 The First Generation Models: Beginning in the 1960s

The FDI literature starts with study of US FDI in Europe, emphasizing the effects of international trade and host GNP on FDI and mainly[1] using the ordinary least squares (OLS) method.

The first well-known article on FDI flows was motivated by the European Economic Community (EEC) in the 1960s. Scaperlanda (1967) studies how the establishment of the EEC would shift the FDI allocation in Europe. Regressing the ratios of the US FDI in non-EEC and in EEC countries to total FDI on a linear time trend, he rejects the hypothesis that EEC's creation caused a reallocation of FDI. This linear bivariate OLS regression has provoked substantial and sustained academic interest. Wallis (1968) undertakes a similar study for different periods and found a significant difference between the 1951-58 and 1959-64 regressions. d'Arge (1969, 1971a, 1971b) and Schmitz (1970) add relative ratio of profit rate of FDI in EEC and EFTA, intercept and slope shift variables (between two time periods of 1951-58 and 1959-64) to the analysis and conclude that the formation of Customs Unions or placing tariffs on U.S. exports to a foreign country is likely to increase U.S. FDI to that area, even though the effects of the slope-shift variable and the profit item are ambiguous[2].

An article by Bandera and White (1968) is one of the first formal studies to reveal the importance of the host country's income as a major determinant of FDI. The authors regress the level of the U.S. FDI into European countries, and its annual changes, on the

[1] Mainly, in most cases, refers to the scenario in a given article based on slightly different model specifications applied to the same data set. In other cases, mainly refers to the scenario in an article with the same model specification but a different data set or an article with both different model specifications and different data sets.

[2] The results are ambiguous when both significant and insignificant results with generally equal weight are reported.

host nation's GNP with mainly significantly positive results. However, both the annual earnings of FDI and the international liquidity of the host country and their annual change, when similarly regressed, yield mainly insignificant conclusions. Since then, the market size of the host countries, commonly represented by their GDP or GNI, has become one of the most important independent variables to explain FDI flows.

Scaperlanda and Mauer (1969) and Goldberg (1972) update the analysis by Bandera and White by including not only the EEC's GNP and its annual change, but also the ratio and the change of the ratio between exports from US to EEC and EEC internal exports, but find them insignificant.

At the same time, many researchers concentrate on the performance of FDI, such as the sales, exports, and profitability of FDI enterprises, or the return on the FDI in the host countries, instead of FDI flows. Mason (1968) is one of the people to initiate this academic field.[3]

[3] United Nations (1992) publishes a comprehensive summary on this field, which covered many developments during the 1960s.

1.3 The Second Generation Models: Development in the 1970s and 1980s

During this score of years, many researchers follow the first generation models but bring in some new observations. Hawkins and Macaluso (1977) include the U.S. outward FDI into Japan and Canada. Schmitz and Bieri (1972) add the data on FDI in Canada to their research. Culem (1988) uses six industrialized countries for a small panel study on bilateral flows of FDI. Gorecki (1976), Ray (1977) and Baldwin (1979) turn their attention towards larger sets of countries with industry level data. In addition to the country level data, firm level information becomes the focus of many economists. Horst (1972) investigates firm level FDI for 1191 U.S. manufacturing corporations, and Bond (1981) analyzes the FDI firm level information in Puerto Rico. Grubaugh (1987) uses a random micro sample of U.S. firms that filed reports with the SEC in 1982.

New dependent variables are also introduced. Horst (1972) applies two-step analysis to FDI research, in which the coefficients of 20 industrial dummies are obtained from step one to regress the decisions to be multinational, that is, the coefficient in this step-one regression is the propensity to invest abroad. Gorecki (1976) replaces the traditional dependent variable, the value of FDI, by the count of the number of foreign enterprises entering Canadian manufacturing industries. Bond (1981) regresses the firm survival dummy on a set of firm level information. Moreover, Grubaugh (1987) creates the firms' multinational indicator which is equal to 1 if a ratio of assets of a firm's foreign subsidiaries to total firm assets is equal to or higher than 10%.

The second generation of studies introduced a number of new explanatory variables. Many studies at this time emphasize industry and firm-specific variables. R & D expenditure is used by Horst (1972), Gorecki (1976) and Grubaugh (1987) with mainly significant and positive results. They also include industrial dummies (for resource sectors, labor or advertising intensity, etc.) in their studies with ambiguous results. Grubaugh (1987) also analyzes product diversity, obtaining a positive correlation with FDI. The size of FDI enterprises in the host economies is applied by Horst (1972), Ray (1977), and Lunn (1980 and 1983) in their model with mainly negative or insignificant results. Baldwin (1979) discovers that industries with high concentration ratios and those employing large numbers of skilled labor attract more FDI. Similarly, Culem's model (1988) includes labor cost and labor cost differential, but reports ambiguous results. Moreover, the age of the FDI (the length of FDI history) has been found to have an ambiguous effect on FDI by Bond (1981) and Ball and Tschoegl (1982).

From the 1980s onwards, trade openness (Goldberg and Saunders, 1981), exchange rate (Cushman, 1985), interest rates (Cushman, 1985, Culem, 1988), foreign capital price (Cushman, 1985) and inflation rate in host country (Schneider and Frey, 1985) have become important determinants in FDI models.

The first manifestation of political economy variables also goes back to the 1980s; multilateral aid, and the type of government and political system turn out to be statistically significant in explaining FDI (Schneider and Frey, 1985); bilateral aid coming from Western countries and multilateral aid have a stimulating effect on FDI, but help from communist countries has a negative effect. Political instability significantly

reduces the FDI. A tax exemption dummy is found to have a significant and positive relationship with FDI firms' survival dummy[4] in Bond's research in 1981.

In most articles, these new variables coexist with the established explanatory variables, i.e. host country's GDP, exports, trade barriers, relative labor cost, lagged FDI. Among them, host GDP dominates the results with its very significant coefficient in most cases.

Even though OLS remained the main methodology in the 1970s and 1980s, some new econometric tools had been introduced during the 1980s in order to accommodate more complicated and sophisticated model specification and solve econometric challenges (heteroscedasticity, correlations, endogeneity, non-linear regression, or dichotomous dependent variables, etc.) For example, Generalized Least Squares used by Horst (1972), Goldberg and Saunders (1981), and Culem (1988); Two Stage Least Squares by Scaperlanda and Balough (1983); Probit in Bond (1981); and Logit applied by Ball and Tschoegl (1982) and Grubaugh (1987). These new econometric methods do provide more significant results.

[4] =1 if the surveyed firms are still in operation, and 0 if the firm has ceased operations.

1.4 Third Generation Models: Mature in the 1990s and Beyond (till 2008)

The period after 1990 has seen a massive expansion in the scope and increasing sophistication in the literature studying FDI, which can be discussed with respect to the econometric methods, the data, the dependent variable and the array of explanatory variables.

Methodology Used in FDI Studies

Besides the traditional panel data estimation methods, researchers have paid much more attention to the latent variable models to analyze the "discrete" or "limited" FDI data[5].

Kogut and Chang (1991), Blonigen and Feenstra (1996), Blonigen (1997), Keller and Levinson (1999), and Castellani and Zanfei (2002) have applied Negative Binomial model in their research. A similar method, Zero Inflated Negative Binomial Model, is used by Keller and Levinson (2002). In addition, List (1999), Keller and Levinson (1999), and Tomlin (2000) also choose Poisson or zero inflated Poisson models. Some other Maximum Likelihood Estimate (MLE) methods have been used in articles by

[5] The detailed econometric methods used for the latent variable model are as follows: Probit models in Chen (1992), Altomonte (2000), Smarzynska and Wei (2000, 2001), Asiedu and Esfahani (2001), and Habib and Zurawicki (2002); Tobit used by Campa (1993), Eaton and Tamura (1994, 1995, and 1996), Hines (1996), Lee and Mansfield (1996), Tomlin (2000), Wei (1997a and 2000), Asiedu and Esfahani (2001), and Jensen (2002); Logit in Sylvia and Harianto (1995), Friedman et al (1996), Cleeve (1997), Klein et al (2000), Seyf (2001), Baek and Kwok (2002), Ito and Rose (2002), and Makino et al (2002); Multinomial Logit in Belderbos and Sleuwaegen (1996), Mariotti and Piscitello (1999), Lopez-Duarte and Garcia-Canal (2002), and Louri et al (2002); Conditional Logit applied by Coughlin et al (1991), and Ford and Strange (1999); and Heteroscedastic Extreme Value (Generalized Conditional Logit) Model in Suazo (2002).

Kogut and Chang (1996, partial MLE), and Dilyard (1999, exact maximum likelihood method[6]).

Other methodologies involve Seemingly Unrelated Regression (Dewenter, 1995), Three Stage Least Squares (Bende-Nabende and Ford, 1998), Instrumental variables (Lucas, 1993, Hines and Rice, 1994, Alesina and Dollar, 1998, Altshuler and Grubert, 1998, Hines, 1998, Benassy-Quere et al, 2001), Generalized Methods of Moments (Keller and Levinson, 1999), the Principal Component analysis (Sagari, 1992, Wheeler and Mody, 1992, Lucas, 1993, Seyf, 2001), and Extreme Bound Analysis (Chakrabarti, 2001, Bandelj, 2002). These special methods satisfy the unique requirements of different econometric scenarios.

More recently, Enders and Sandler (1996), Barrell and Pain (1996), Sarno and Taylor (1999), Love and Lage-Hidalgo (2000), Buch (2001), Basu et al. (2001), and Ramirez (2002) have conducted Time Series and Stationarity Analysis in FDI. Furthermore, Enders and Sandler (1996), Jun and Singh (1996), and Lipsey (2000a) include Granger Causality tests in their studies.

In order to tackle the bias due to presence of the lagged dependent variable as a regressor in panel data, Cheng and Kwan (2000), Keller and Levinson (2002), Carstensen and Toubal (2004) and Anghel (2006) applied a new GMM estimation process created by Arellano and Bond (1991) and Blundell and Bond (1998). Uctum and Doytch (2008) also

[6] The exact maximum likelihood method includes the initial likelihood term, as opposed to the other approximate maximum likelihood methods, in which the initial likelihood term is either dropped or treated in an ad hoc manner. The exact maximum likelihood method can achieve small-sample bias reduction and efficiency gains (Beach and MacKinnon, 1978, and Diebold and Schuermann 1996). The Partial MLE is established based on three assumptions on a likelihood hazard specification thus the model can be simplified to estimate partial instead of full maximum likelihood functions.

apply Blundell and Bond system GMM method to analyze the effect of FDI. This Blundell-Bond System GMM method will provide robust estimation in the dynamic FDI models. This method will also be applied in Chapter 3 of this paper to study FDI inflows.

Data Scope of FDI Studies

In contrast to the first and second generation researches that predominantly emphasize the FDI coming from and going into the U.S., the third generation FDI literature expands the analytical scope to many different regions in the world.

While large panel studies by Wheeler and Mody (1992), Harrison and Revenga (1995), Wei (1997a, 1997b, 2000), UN (1998, 1999), Alesina and Dollar (1998), Lipsey (2000a), Kucera (2002), Habib and Zurawicki (2002), and Balasubramanyam et al. (2002) create a global perspective on the FDI, smaller regional researches specifically emphasize developing or emerging economies[7].

Some analyses have also examined FDI into more specific regions (groups of countries) such as: FDI to African countries (Morisset, 2000, Asiedu, 2002), FDI into Asian economies (Sylvia and Harianto, 1995, Lipsey, 1999a, Baek and Okawa, 2001), and Latin American economies (Tuman and Emmert, 1999). Other researchers (Goldberg and Klein, 1997, Dilyard, 1999, Sarno and Taylor, 1999, and Ito, 1999) combine some Asian and Latin American countries for study. In addition, developed Europe is always a focus for FDI analyses (Froot and Stein, 1991, Barrel and Pain, 1997, Ford and Strange,

[7] Researches emphasizing developing or emerging economies include Edwards (1990), Lucas (1993), Hanson (1995), Summary and Summary (1995), Jun and Singh (1996), Wilhelms (1998), Gastanaga et al (1998), Noorbakhsh et al (2001), Basu et al (2001), Benassy-Quere et al (2001), Asiedu (2002), and Harms and Ursprung (2002).

1999, Bevan et al, 2002, Barrell and Pain, 1998). With the dramatic geo-political change in the 1990s, researchers have naturally paid their attention to FDI in transition economies (Jensen, 2002, Anghel, 2006) and FDI into Central and Eastern Europe (Selowski and Martin, 1997, Altomonte, 2000, Ziacik, 2000, Holland et al, 2000, Bevan et al, 2002, Bandelj, 2002, Janicki and Wunnava, 2004, Carstensen and Toubal, 2004, Anghel, 2006). Moreover, FDI in Mediterranean countries has been analyzed by Mintz and Tsiopoulos (1997) and FDI inflow to Arabian countries has been investigated by Shrestha and Onyeiwu (2002).

Others have studied FDI at the country level. Following the rapid increase of Japanese FDI in the latter half of 1980s, Japanese inbound or outbound FDI has attracted many researchers[8].

FDI inflows or outflows from the United Kingdom have been investigated by Goldberg and Kolstad (1994), Milner and Pentecost (1996), Barrell and Pain (1997), Cleeve (1997), Billington (1999), and Girma (2002). FDI concerning the other developed countries is also covered, such as Canadian FDI by Froot and Stein (1991), and Goldberg and Kolstad (1994); outbound FDI from Italy by Mariotti and Piscitello (1999); Spanish outbound FDI in Lopez-Duarte and Garcia-Canal (2002); and Inward FDI in Greece by Louri et al. (2002).

In addition to the above FDI concerning developed countries, the recent rapid development across world has led to an acceleration trend of both inward and outward FDI in developing economies. FDI into Mainland China, the largest FDI recipient in the

[8] Studies on Japanese FDI include Kogut and Chang (1991), Froot and Stein (1991), Goldberg and Kolstad (1994), Eaton and Tamura (1994, 1995, and 1996), Sylvia and Harianto (1995), Dewenter (1995), Pugel et al (1996), Belderbos and Sleuwaegen (1996), Kogut and Chang (1996), Blonigen and Feenstra (1996), Blonigen (1997), Cleeve (1997), Goldberg and Klein (1997), Hines (1998), Ford and Strange (1999), Tuman and Emmert (1999), Ito (1999), Seyf (2001), Baek and Okawa (2001), and Park (2003).

developing world, has been examined by Cheng and Kwan (2000), Sun et al. (2002), Fung et al. (2002), and others. Taiwan, in addition, has attracted researchers into its inward or outward FDI (Tsai, 1991, Chen, 1992, Tu and Schive, 1995, Chow, 1996 and 2010, Bende-Nabende and Ford, 1998, Makino et al, 2002). Latin American countries are a focus for many studies not only due to their vast foreign indirect investment but also because of the huge FDI in these economies. Ramirez (2002) sheds light on FDI inflows to Mexico and Suazo (2002) studies FDI in 13 regions in Chile.

However, since the United States is the largest player in the global markets (Lipsey, 1999b), it is not surprising that in the third-generation FDI literature, FDI in and out of the United States has been studied much more often than any other countries or regions in the world. Both the entire U.S. and specific areas have been examined[9].

Additionally, some researchers have focused on FDI at the firm level. These studies include Grubert and Mutti (1991), Altshuler and Grubert (1996, 1998), Asiedu and Esfahani (2001) and Baek and Kwok (2002) on U.S. Transnational Corporations; Feliciano and Lipsey (2002) concerning foreign takeovers and establishment of new firms in U.S.; Castellani and Zanfei (2002) on 32 largest U.S. and European companies in the electronic sectors; Smarzynska and Wei (2000, 2001) and Anghel (2006) on surveyed European firms; and Klein et al. (2000) on Japanese firms and banks. Finally, Ito and Rose (2002) analyze the FDI location strategies of the global Tire giants. These firm level researches have contributed a critical part in FDI determination models: the micro-economic (firm-characteristic) arguments.

[9] Coughlin et al (1991), Friedman et al (1996), and List (1999) analyze some specific areas in U.S. and Tomlin (2000) studies some specific American industries.

Dependent Variable

FDI determination models in the third generation treat various aspects and characteristics of FDI as the dependent variables, as well as using the traditional measures, such as: annual FDI inflows in Barrell and Pain (1996), Lipsey (1999b), and Blonigen and Davies (2001); first-difference of FDI flows in Goldberg and Kolstad (1994), Enders and Sandler (1996), Love and Lage-Hidalgo (2000), and Ramirez (2002); and net annual FDI flows in Cassou (1997), Buckley and Castro (1998), Altshuler et al. (1998), Hines (1998), Lipsey (1999b, 2000b), Tuman and Emmert (1999), and Chakrabarti (2001). Cumulative FDI inflows or FDI stock have been analyzed by Grubert and Mutti (1991), Wei (1997a, 1997b, 2000), Barrell and Pain (1998), Benassy-Quere et al. (2001), Bandelj (2002), and Park (2003). Chow (1996) studies FDI in different industrial sectors.

In addition to the use of aggregate FDI, per capita FDI has been examined by Hanson (1999), and Harms and Ursprung (2002).

The foregoing studies have used actual FDI as a dependent variable; in contrast, contractual (announced) FDI is the topic in Baek and Kwok (2002).

Researchers have also analyzed the ratios of different FDIs, especially the specific FDI relative to the aggregated value of FDI. For example, the ratio of FDI in each state to the total FDI in the U.S. (Hines, 1996); the ratio of host FDI inflows to world total FDI inflows (Kucera, 2002); and the ratio of the host country's FDI to total home countries' FDI (Edwards, 1990, Goldberg and Kolstad, 1994, Hines, 1998). Habib and Zurawicki (2002) create a new target variable, comparing the host country's share in global FDI with its share in the home country's total outgoing FDI. Additionally, Lee and Mansfield

(1996) target the percentage of firm-level FDI that devoted to sales, distribution outlets, primary production, and assembly facilities.

In addition to these various comparisons within FDI, other studies focus on the relation of FDI to the size of the economy. The ratio of FDI to host GDP has been studied by Edwards (1990), Harrison and Revenga (1995), Alesina and Dollar (1998), Gastanaga et al. (1998), UN (1999), and Asiedu (2002). Froot and Stein (1991) examine FDI inflow as a percent of host GNP. Park (2003) studies Japanese FDI outflows over sales. The economic size-normalized FDI can be treated as a FDI propensity: regardless of economic size, the higher this ratio, the higher the propensity of the economy to attract FDI.

Some studies have examined the components of FDI such as transfer of funds (Cassou, 1997), loans to FDI enterprises over these enterprises' total assets (Altshuler and Grubert, 1996), new plant (Friedman et al., 1996), mergers and acquisitions (M&A, Friedman et al., 1996, Klein and Rosengren, 2000 and Feliciano and Lipsey, 2002) and real estate purchases as a component in total FDI (Klein and Rosengren, 2000 and Feliciano and Lipsey, 2002). Hines and Rice (1994), Altshuler et al. (1998), Lipsey (1999a), and Keller and Levinson (1999) analyze the investment stock, the total assets and fixed assets of FDI enterprises.

A number of articles study FDI transactions (the count of FDI projects) rather than the value of FDI (Coughlin et al, 1991, Froot and Stein, 1991, Kogut and Chang, 1991, Campa, 1993, Blonigen and Feenstra, 1996, Friedman et al, 1996, Blonigen, 1997, List, 1999, Tomlin, 2000, Seyf, 2001, and Castellani and Zanfei, 2002). For example, Suazo (2002) investigates the 640 FDI projects' regional selection dummies in Chile.

Klein and Rosengre (2000) also look at the number of FDI projects using Japanese banks as their main banks.

Several studies have focused on the probability aspect of FDI. Chen (1992) addresses the intention of Taiwan's investors to invest abroad, and Makino et al. (2002) study the location choice of Taiwan's outward FDI. Several other articles also draw some general conclusions from the probability that a firm would invest abroad (Belderbos and Sleuwaegen, 1996, Kogut and Chang, 1996, Cleeve, 1997, Ford and Strange, 1999, Altomonte, 2000, Smarzynska and Wei, 2000, 2001, Ito and Rose, 2002). More specifically, Sylvia and Harianto (1995) analyze the probability that Japanese firms will choose certain FDI strategies (goals being markets, strategic assets, or efficiency). Asiedu and Esfahani (2001), Lopez-Duarte and Garcia-Canal (2002), Baek and Kwok (2002), and Louri et al. (2002) explore the topic of choices of ownership structure of FDI enterprises in host countries.

In contrast to the other FDI researchers, Mariotti and Piscitello (1999) examine FDI divesting, and the survival, failure or restructuring of Italian firms' FDI projects.

Explanatory Variables

Since 1990, there has been increased interest in bringing new explanatory variables into FDI determination studies. The following provides a brief, selective summary of recent developments regarding the explanatory variables:

Lagged FDI and Other FDI Related Variables

Notably, lagged FDI has a consistently significant and positive effect on FDI, whether it is specified as flows or stocks, inflows or outflows, value or count of projects.

It is the main explanatory variable in Tu and Schive (1995), Barrell and Pain (1996), Kogut and Chang (1996), Barrell and Pain (1998), List (1999), Bandelj (2002), Girma (2002), and Lopez-Duarte and Garcia-Canal (2002). However, other studies have different results. Kudrle (1995) reports an ambiguous effect for lagged FDI. Gastanaga et al. (1998) find that both total and manufacturing FDI from the U.S. as a percentage of host GDP (lagging 1 period) have negative or insignificant effects on the ratio of aggregate FDI inflows to host GDP for 49 less-developed-countries (LDCs) in the next period. In addition, UN (1998) and Lipsey (1999a) find that the unexplained component of FDI has a positive effect on FDI in the next period. One possible interpretation is that the unexplained residuals are representing the effects of unspecified determinants of FDI, especially the political, social, and cultural factors which is difficult to be quantified into regressions.

Other FDI-related variables are also studied. Sagari (1992) determines that FDI in other sectors has a significant and positive effect on FDI in the banking industry. Findings concerning the important relationship between FDI and other types of global investment have been summarized by Lipsey (1999b). He notes that other types of international investment (short-term capital, or long-term capital excluding FDI, or portfolio capital[10]) have significant relationships with inward and outward FDI.

[10] Short-term capital refers to an investment period less than a year. Long-term capital is for an investment period longer than a year. For portfolio capital, the investment goal does not involve management- i.e. either no voting shares or only under 10% voting shares change hands.

Furthermore, using years of experience of FDI and the ratio of FDI to total assets, Cleeve (1997) demonstrates that these variables significantly affect the selection of the joint venture as FDI structure. Asiedu and Esfahani (2001) incorporate age of FDI enterprises in their model and derive a significant and positive effect on FDI, but the age of FDI is found to be insignificant in Makino et al.(2002).

Sylvia and Harianto (1995) report that the percentage of Japanese ownership of the FDI electronic firms encourages these Japanese FDI firms to chose low-cost supplier strategy (efficiency seeking motivation) or export-market penetration strategy (market-seeking motivation) but has an insignificant effect on the choice of strategy of "upgrading of products and technology" (strategic asset seeking motivation). Mariotti and Piscitello (1999) include FDI start-up size, FDI entry mode dummies and affiliates diversification in their model with significant effects in most cases. Asiedu and Esfahani (2001) show that the number of foreign subsidiaries and its quadratic form have ambiguous effects on FDI. Sun et al. (2002) examine the effect of the ratio of the accumulated FDI in China to Chinese domestic investment with basically negative results, whereas Blonigen and Davies (2000) calculate the ratio of the host country's FDI stock to its GDP and reveal that its impact on FDI is mainly significant and positive.

Finally, Goldberg and Kolstad (1994) have estimated the effects of volatility (standard error) of FDI and the first difference of the volatility of the FDI and derive insignificant results in most cases.

Exchange Rates

Exchange rate is one of the best-known explanatory variables for FDI determination models, but its expected effect on FDI is twofold.

Froot and Stein (1991) wrote an influential article on the effect of exchange rates and conclude that the logarithm of real value of the dollar has a significantly negative or insignificant effect on U.S. FDI inflow, which "lend(s) some credence to popular claims that a depreciated currency can give foreigners an edge in buying control of productive corporate assets." This view is affirmed by Kogut and Chang (1996) who show that the exchange rate between host and home countries (the ratio of the home country's currency to the FDI host country's currency) has a significant and negative effect on FDI. Furthermore, both Ito (1999) and Baek and Okawa (2001) report that home currency per US dollar has mainly a significant and negative effect on Japanese FDI into Asian economies. However, Baek and Okawa (2001) find that the host currency per US dollar is not a significant determinant of FDI. They also discover that the difference between the nominal and Purchasing Power Parity (PPP) rates of the home currency per US$ has a significantly negative impact. In contrast, the difference between the nominal and PPP rates of the host currency per US$ has an insignificant effect. Tomlin (2000) studies a trade-weighted exchange index of the U.S. dollar (a rise in the index indicates a real appreciation of the dollar). The conclusion is that the exchange index has a significantly positive effect on FDI into the U.S.

Many researchers have investigated the effect of the volatility of the exchange rate on FDI with different conclusions. The standard error of the exchange rate has been examined by Goldberg and Kolstad (1994), who find a positive effect on FDI, but Tomlin

(2000) and Baek and Kwok (2002) find insignificant results. Goldberg and Kolstad (1994) discover that the first difference of the standard error of exchange rate has an insignificant or negative relationship with FDI. Benassy-Quere et al. (2001) calculate coefficients of variation and correlation of the nominal exchange rate (host currencies against home currencies) and get significantly negative effects on 17 OECD countries' FDI in 42 developing economies. Baek and Kwok (2002) report that the ratio of the FDI announcement-year's average exchange rate to the average rate for the previous 3 years has an insignificant effect on FDI.

Other exchange-rate-related variables have also been extensively analyzed. Harrison and Revenga (1995) include in their research the adjusted dollar index, an indicator of the degree of distortion of the price structure of the tradable goods. They have discovered that this index has a negative effect, but the first difference of the value has an insignificant effect on FDI. They also include in their model dummy variables for multiple exchange rates in the international economy (for host imports, exports, capital transactions, etc.). The results are generally undetermined or insignificant. In addition, Benassy-Quere et al. (2001) generate a new variable, the logarithm of the real exchange rate of the host country relative to that of the home country, with a significant and positive effect on 17 OECD countries' FDI in 42 developing economies. Gastanaga et al. (1998) investigate the black market premium of exchange rates in 49 less-developed countries, with insignificant results.

New GDP or GNP Related Variables

In addition to the traditional GDP and GNP, numerous new GDP or GNP related variables have been created since 1990, which are mostly expected to be positively related to FDI.

The effect of the share of the components of GDP or GNP has been studied extensively.

Both Edwards (1992) and Harrison and Revenga (1995) demonstrate that the ratio of the host government consumption to GDP has ambiguous effects on FDI.

In the case of the industrial production to GDP ratio, Edwards (1990) discovers that the variable has a mainly positive relationship with FDI inflows. Harrison and Revenga (1995) find that the mining industry's production relative to GDP is in the main positively correlated with FDI inflows, while the reverse is true for the agricultural industry.

Bevan et al. (2002) find that the private sector’s share of GDP in the host country has a significant and positive effect on FDI in 12 Eastern European transitional countries.

Per capita GNP or GDP is also included in the third generation models. Eaton and Tamura (1994) point out the significant and positive effect of per capita GNP in the home country. This conclusion is confirmed by Blonigen and Davies (2000).

The relationship between home and host GDP or GNP has also been explored. Blonigen and Davies (2000) show that the sum of the host and home countries' level of real GDP has a significantly positive relationship with FDI. They also conclude that the

square of the difference between FDI host and home country's GDP[11] has a significant and negative effect on FDI. In addition, they analyze some interaction variables concerning either the sum of or the difference between home and host GDP, with mostly ambiguous effects. Habib and Zurawicki (2002) argue that the absolute difference between home and host GDP per capita, which "is included to capture the macro environmental differences between the host and home countries," has a significantly negative or insignificant impact on FDI.

Asiedu (2002) treats the logarithm of the expression (1/host GDP per capita) as a proxy of return on investment[12] in the host country and finds it has a significantly positive effect on the ratio of net FDI flows to host GDP for 71 developing countries in the world.

Gastanaga et al. (1998) apply the rational expectations assumption and add the future growth rate in GDP to their models, with insignificant or significantly positive effects. However, they find that the growth rates lagged one period are mainly significantly negative determinants of FDI, while with a lag of two periods effects on FDI are insignificant.

Wei (1997a) uses host population as an instrument for host GDP and reports that it has mainly significant and positive effects on FDI.

[11] This framework was proposed by Markusen and Maskus (1999a, 1999b). They proposed that FDI is positively correlated with the size of host and home countries but negatively correlated (non-linear) with the difference of home and host economies.

[12] The expression (1/host GDP per capita) may signify other things, for example, probability of future return or stability of return or the potential economic growth rate, etc.

Education

Education level of host workers, for example average years of schooling, has a positive effect on FDI in Eaton and Tamura (1994, 1995, and 1996), Asiedu and Esfahani (2001), Castellani and Zanfei (2002). Hanson (1995) affirms the view that higher adult literacy has a significant and positive effect on inward FDI. However, Morisset (2000) shows this argument is incompatible with the trend of the FDI inflows to African countries.

The conclusion on the effect of school enrollment rate on FDI is two-pronged. Tuman and Emmert (1999) report an insignificant effect of host secondary school enrollment on FDI. Reaching an opposite conclusion, Fung et al. (2002) show that the ratio of students enrolled in higher education to its total population in China has mainly significant and positive impact on contractual FDI inflows. But Kucera (2002), generating a new uneducated rate, which is the rate of non-enrollment in secondary education (as a ratio to total population in that age group) in host countries, finds a mainly insignificant effect on FDI. Kucera (2002) also examines the ratio of female to male educational attainment and the female/male literacy ratio and still gets mainly insignificant effects on FDI.

Risk Related Social-Political Variables

Risk related social-political variables have been extensively analyzed since the 1990s for their effect on FDI**.** However, for most risk related variables, results are mixed.

This paper covers some critical risk factors in the investment climate for FDI, e.g. legal system, political and social stability, corruption, bureaucracy, democracy, and transition economies[13].

The literature on the effect of the legal system on FDI provides divergent conclusions. Altomonte (2000) finds an insignificant relationship between a legal variable index and FDI, while Buch (2001) illustrates that a dummy for the origin of the legal system (which is of English, French, or German origin) has a significant and positive effect on FDI and Bevan et al. (2002) discover that indexes of legal extensiveness and effectiveness have positive effects on FDI. On one hand, Wilhelms (1998) and Alesina and Dollar (1998) conclude that the strong rule of law in the FDI host country has a significant positive effect on FDI. On the other hand, Asiedu and Esfahani (2001) argue that this effect has significantly negative effect on the choice of "wholly owned" as ownership of foreign subsidiaries by US Transnational Enterprises (TNEs). Gastanaga et al. (1998) analyze the contract enforcement index and nationalization risk index for less-developed countries from Business Environmental Risk Intelligence (BERI). Both of these range from 0 (if enforcement is poor or risk is high) to 4 (if conditions are good). The conclusion is that good contract enforcement (i.e., low risk) has a significantly positive effect on FDI.

Intellectual property protection is a critical part of a legal system from the economic perspective and has drawn the attention of researchers. Weakness of intellectual property protection depresses inbound FDI according to Lee and Mansfield (1996).

[13] In this analysis, risk related variables are listed and classified approximately with general non-economic definition or common sense. There are may be some overlapped domains of different risk related variables.

According to Asiedu and Esfahani (2001), legal limitation of equity (measured by the percentage of U.S. parent firms in the host country that have been asked to limit their equity in their foreign subsidiaries) has a significant negative effect on American FDI in 42 countries. However, the risk of expropriation has an ambiguous effect on FDI.

Variables for political stability and social order yield conflicting results. Edwards (1990) finds an index of political instability to have a mainly negative effect and frequency of unexpected government changes has a uniformly negative effect on FDI inflows, while the effect of an index of political violence is insignificant. Jun and Singh (1996) and Sun et al. (2002) confirm that political risk and operation risk (a country's general business climate) generally discouraged FDI. Along similar lines, reports from both Harms and Ursprung (2002) and Habib and Zurawicki (2002) show that the absence of political risk encouraged FDI inflows. Lopez-Duarte and Garcia-Canal (2002) show that the host country's risk has a significant effect on the mode of Spanish FDI (joint venture, full or partial acquisitions). However, other analyses (Tu and Schive, 1995, Wei, 1997b, 2000, and the United Nations, 1998) conclude that political stability's effect on FDI is undetermined.

Besides the level of risk index, transformations of the risk index, e.g. the difference and the standard deviation of risk indexes, are also scrutinized. Habib and Zurawicki (2002) find that the absolute difference between home and host political stability (measured by a political risk index created by Political Risk Services) has an insignificant effect on FDI. Altomonte (2000) proves that the standard deviation of the time series of production indices of the manufacturing sector, which can also be regarded as an instability indicator, has a significantly negative effect on FDI.

Some researchers turn their attention to the degree of violence in host countries. Tuman and Emmert (1999) find that both the "War / Unpacted Regime transition[14]" dummy (coded 1 for host countries experiencing a defeat in foreign war and Unpacted regime transition) and host economies' annual civilian and combatant deaths caused by revolutionary movements are negatively correlated with Japanese FDI. In addition, Enders and Sandler (1996) studied the first difference of the number of transnational terrorists in Spain, with significantly negative results. However, Tuman and Emmert (1999) also discover that host "Coup/Attempt" in 12 Latin American countries has a significantly positive effect on Japanese FDI into these Latin American countries. The authors explain the unexpected sign may result from that "firms do not view military action as a threat to stability." In other words, firms are supportive of military rule because military regimes protect property rights. In addition, from Wei (1997b), Japanese firms are more adapt to corruption government, which is a main trigger for political instabilities.

The question of the effect of democracy on FDI is of keen interest to FDI researchers. Alesina and Dollar (1998) address this question by showing that the effects of democracy and civil liberties indexes (from Freedom House) on the ratio of FDI to GNP are insignificant for global economies. Similarly, Kucera (2002) reports that both a political rights index (from Freedom House) and the FACB index (measures of Freedom of Association and Collective Bargaining) have mainly insignificant effects on FDI. Nonetheless, liberalization is found to be encouraging FDI by Selowski and Martin (1997), Bende-Nabende and Ford (1998), Balasubramanyam et al. (2002) and Harms and

[14] The authors include unpacted transition cases where the military is defeated and forced to exit without an agreement over property rights, political processes, and amnesty for the military.

Ursprung (2002). Furthermore, Harms and Ursprung (2002) show that the average level of political repression and civil repression in FDI host developing countries (from Freedom House) has a significantly negative effect on FDI inflows.

Not surprisingly, evidence from a number of studies shows that corruption generally discourages FDI (Wei, 1997a, 2000, Wilhelms, 1998, Smarzynska and Wei, 2000, 2001, Balasubramanyam et al., 2002, and Jensen, 2002), however, some researchers do report different results. For example, Wei (1997b) does find that a corruption index (from Business International, the higher value, the more corruption) in the host country has a mainly positive effect on Japanese FDI, while Gastanaga et al. (1998) suggest that absence of corruption has mainly insignificant effect on FDI in less-developed countries.

Similarly, Harms and Ursprung (2002) confirm that the sum of indexes of corruption, bureaucracy and law-and-order tradition in host countries has insignificant effects on FDI.

In addition, Habib and Zurawicki (2002) report the positive effect of the absolute difference between home and host CPI (Corruption Perception Index compiled by Transparency International [TI]) on FDI. They also find that the country dummy for the presence of organizations like TI in the FDI host country has a significantly positive impact.

In addition to studying corruption as an independent determinant, Wei (1997a, 1997b, 2000) has also shed light on the effect of the interaction of corruption and other variables. Wei (1997a) finds that the interactive variables of corruption with dummies for home countries in East Asia and in the U.S. have mainly insignificant effects on FDI.

However, the effect of the interactive variable of host corruption and a Japan investor dummy is mainly positive, which suggests that Japanese investors would generally invest more in the corrupt countries than the other investors would.

Host governments' bureaucracy has been found to be a negative driver of FDI. Wei (1997b) proves in a cross-section study that "Red Tape" (bureaucratic obstacles) in the FDI host country has a mainly negative effect on FDI.

Host country's debt is another variable that has been used to gauge the country-risk and is expected to be negatively related to FDI, as shown by Klein et al. (2000). However, Lucas (1993), Jun and Singh (1996), Dilyard (1999) and Shrestha and Onyeiwu (2002) find debt risk has either ambiguous or insignificant effects on FDI.

Taxes

Tax rate is also analyzed in FDI literature with negative effect on FDI in most cases.

Among the many tax related variables in FDI literature are the tax rate on dividends, the corporate or income tax rates, the deviation from the average of the corporate tax rate, the reciprocal of the average effective corporate tax rates, the share of tax revenue in the host GDP, and the square of the tax variables[15].

These variables generally have a significant and negative effect on FDI inflows. However, ambiguous effects of certain tax variables on FDI have also been reported; examples are per capita state and local taxes in the U.S. (Coughlin et al, 1991, Friedman

[15] The details of the tax related variables are the marginal effective tax rate (Mintz and Tsiopoulos, 1997), the host withholding tax rate on dividends (Altshuler and Grubert, 1996), the host corporate or income tax rates (Grubert and Mutti, 1991, Hines and Rice, 1994, Altshuler and Grubert, 1996, Cassou, 1997, Wei, 1997a, 1997b, 2000, Lipsey, 1999a, Smarzynska and Wei, 2000, 2001), the deviation from the weighted average of the state corporate tax rate (Hines, 1996), the reciprocal of the host average effective corporate tax rates (Grubert and Mutti, 1991), and the share of the tax revenue in host GDP (Wilhelms, 1998). Hines and Rice (1994) also included the square of the tax variables in their article.

et al, 1996, List, 1999), tax incentives in Taiwan (Tsai, 1991, Tu and Schive, 1995) and the type of the tax system in host countries (Klein and Rosengren, 2000). Lipsey (1999a) also finds the similar results in an analysis on host taxes on US affiliates (FDI from the U.S.).

Other studies introduce new tax-related variables. Altshuler et al. (1998) establish a new set of independent variables, the logarithm of one minus average effective tax rates for FDI enterprises: mainly positive effects are found. Furthermore, withholding tax rate on dividends has also been found by Altshuler and Grubert (1996) to have a positive effect.

In order to tackle the effect of taxation on FDI from a new standing point of tax treaty, Blonigen and Davis (2000) create a dummy for a U.S. bilateral tax treaty with a given partner country. They report that the dummy's effect on FDI is mainly insignificant (with a few positive cases), but the length of time that a treaty has existed has a positive effect on FDI in most cases. However, this result could be influenced by a lagged FDI paralleling the duration of the tax treaty. Similarly, Bandelj (2002) finds a positive effect of investment treaties on FDI. Hines Jr. (1998) argues that a dummy for tax-sparing in host economies is positively correlated with Japanese FDI. Keller and Levinson (1999) also include a new explanatory variable, tax effort in the host state (an index calculated as actual tax revenues divided by those that would be collected by a model tax code)[16], and find a positive effect on FDI in the U.S.

[16] Tax effort comes from "State Fiscal Capacity and Effort" 1988 by Advisory Commission on Intergovernmental Relations. From Keller and Levinson (1999), "This variable measures the extent to which a state utilizes its available tax bases. It is a state's actual revenues divided by its estimated capacity to raise revenues based on a model tax code, multiplied by 100. The national average is 100."

Tariff and other Trade Barriers

The research on tariff's effect on FDI leads to varied conclusions. In the work of Grubert and Mutti (1991), Jun and Singh (1996), and Hasnat (1997), a mainly positive effect is reported, which supports the "tariff-jump" FDI argument (FDI undertaken to avoid tariff). Others, however, report mainly insignificant results (Kudrle, 1995, Harrison and Revenga, 1995, Milner and Pentecost, 1996, and Castellani and Zanfei, 2002). And Chow (2010) concludes that FDI has a complementary effect on home country's export, rejecting the "tariff-jumping" hypothesis.

Studying the effect of non-tariff barriers, Kogut and Chang (1991) construct a dummy indicating official quotas and voluntary restraints on home country's exports. At first, they found the dummy to have a consistently significant and positive effect on FDI in host economies, but this effect was not maintained in their subsequent research (Kogut and Chang, 1996). Blonigen and Feenstra (1996) analyze protection dummies (for anti dumping duties or Voluntary Export Restraint Agreements for a US industry) and find mainly positive effects on Japanese FDI in the U.S. Buch (2001) finds that control on capital account transactions has a clearly negative effect on FDI.

Interest Rates

Contrary to standard theory regarding interest rates, a study of net interest expense in the FDI home country by Altshuler and Grubert (1996) finds a positive effect on FDI, and Shrestha and Onyeiwu (2002) show that a greater lending rate of host commercial banks increases FDI. Feliciano and Lipsey (2002) also discover that the real interest rate in the host country has positively affected FDI in the U.S. Home country interest rate, however,

does not have an influence. It seems that the financial resources funding FDI do not come from short-term financial market in either home country or host country. How to finance FDI? For Mergers and Acquisitions, most deals are in type of exchanges of stocks instead of cash purchase, thus no extra fund is needed for FDI investors. For green-field FDI, the funding may mainly come from accumulation of profits or stock sales instead of borrowing from short-term money market.

Labor Cost and Wages

The argument in the literature on wage's effect on FDI is two-pronged.

Chow (1996) finds that lower labor cost does motivate Taiwan's FDI in Malaysia. Barrell and Pain (1998) consider relative labor cost, defined as the labor cost in a host or home location relative to the cost in other host or home locations in Europe, respectively. They find the host relative labor cost has a negative effect on FDI, while the home relative labor cost has a positive effect, thus confirming the argument that FDI is cost driven. This conclusion is affirmed by two subsequent analyses. Kucera (2002) creates the logarithm of wages as a share of value added in host manufacturing industries, and finds mainly negative effects on FDI. Castellani and Zanfei (2002) determine that average wages of all workers in the host country as a share of average wages of all workers in the home country have a mainly negative impact on the number of FDI plants of the 32 largest electronic firms in the U.S. and Europe.

However, Baek and Okawa (2001) reach ambiguous results when they measure the effect of an index of host wage or labor costs relative to such costs in home countries. Girma (2002) finds that the average wage rates of the group of operatives and of the

group of administrative, technical and clerical workers in the UK have insignificant effects on FDI inflows.

Finally, Lucas (1993) summarizes effects of several labor cost variables on FDI in seven eastern and southeastern Asian economies. Results are contradictory: the principal-component variables for labor cost (mainly negative), lagged labor cost (mainly positive), capital rent over labor cost (mainly negative), and lagged capital rent over labor cost (insignificant results).

Openness to International Trade

Openness to international trade has drawn extensive attention in FDI literature in the 3rd generation of FDI determination models. Most analytical results reflect openness' positive effect on FDI.

Harrison and Revenga (1995) demonstrate that the index of openness (the summation of exports and imports vs. GDP) in host economy has significantly positive effect on FDI. And Blonigen and Davies (2000) have found a positive effect of home country's index of openness. Similarly, Habib and Zurawicki (2002) discover that the absolute difference between home and host's index of openness has a mainly positive effect. But Harrison and Revenga (1995) report that changes in the index of openness are statistically insignificant.

The positive effect of open-trade policies on FDI or the negative effect of trade restrictions is asserted by many researches. For example, Harrison and Revenga (1995) do show that the dummy of restrictions on trade payments in respect of host current transactions has a negative effect on FDI. Altshuler et al. (1998) record that the effect of

the trade restriction regime ranging from 0 (most open) to 3 (most restrictive) is negative. In addition, Harms and Ursprung (2002) find that a host trade openness indicator (reflecting the low trade barriers, such as low tariff rates, low black market exchange premium, and fewer restrictions on capital movements.) has a positive effect on FDI inflows. But, Lee and Mansfield (1996), putting openness indicators of the host country practices (free import, price controls, profit repatriation controls) into their model, obtain insignificant results.

Bandelj (2002) also reports that the openness of host government's FDI policy has an insignificant effect on FDI inflows to Central and Eastern Europe.

Besides the ten groups of most commonly used explanatory variables cited above, a number of other factors are analyzed in FDI literature: 1) international trade variables (export comparative advantage indicator, dependence on imported raw material, net energy imports, terms of trade, trade open year, labor emigration), 2) new public finance variables like government expenditure, 3) new financial variables (stock market, credit and debt, money supply, and capital), 4) human capital (population and density) and employment, 5) industrial characteristics (industrial shipments, industrial organization, company characters, profits), 6) social-political variables (diplomatic variables, transition, and culture), 7) distance and geographic location (common borders dummy), 8) infrastructure, 9) natural resources and environmental protection, 10) science and technology, and 11) various dummies (country and time).

All these new studies, representing the contributions of various authors, have permeated our understanding of the FDI sphere.

1.5 Conclusions on Literature Survey

After over 40 years of development, literature on the determinants of FDI has evolved into an extensive and prosperous field.

The dependent variables can be divided into three categories: the absolute or relative measure of the value of FDI (inflow, outflow, inward stock, and net FDI), the entry count of FDI projects, and various firm-level characteristics of FDI (belong to TNC (Transnational Corporation) or not, intention to invest, FDI strategies, performance, etc.)[17].

The researchers extensively applied various econometric methods such as OLS, MLE, or Time Series to analyze FDI. GMM (Blundell-Bond System) is a newly developed of research tool in this area.

The commonly used explanatory variables, as shown in the foregoing literature survey, are host countries' market size (GDP, GNP, or industrial outputs), previous FDI (lagged dependent variable), human capital (education) and wages, risk, tax, tariff, exchange rates, interest rates, trade openness, and dummies (country and time). These extensively used explanatory variables are also recommended for the FDI determination model in Chapter 3.

This recommendation generally matches the combination of the conclusions from Blonigen (2005) and Chakrabarti (2001)'s comprehensive literature surveys. However, this recommendation differs obviously from the United Nations' (1992) summary which, at that time, was mainly limited to the second generation models.

[17] Many firm-level characteristics of FDI are qualitative, for example, FDI strategies. In addition, some FDI-related characters (e.g. intention to invest and FDI strategies) may be the outcome associated with other firm characteristics and FDI determinants.

1.6 Meta-Analysis of the Studies on Two FDI Determinants

Scientists have known for centuries that a single study will not resolve a major issue. Indeed, a small sample study will not even resolve a minor issue. Thus, the foundation of science is the cumulation of knowledge from the results of many studies.

Hunter and Schmidt, Methods of Meta-Analysis

The previous literature survey gives an overview of the FDI determination models based on over 150 articles. A following question is "Are these studies reliable?" One way to assess the validity of the FDI literature, specifically concerning publication bias, is to undertake meta-analysis.

Meta-regression analysis (meta-analysis) may take the general form of regression of a variable of interest on a set of variables from a body of related studies. Meta-analysis techniques may be used to evaluate the reliability of results from a set of statistical articles, for example, to test for publication bias, a tendency of academic journals or researchers to report only "statistically significant" results or those confirming preconceived theoretical expectations.

Publication bias is a typical problem in quantitative research. Publication bias, given continuing use of journals for validating research quality, will lead to an artificially limited pool of statistically significant studies or reports confirming the popular theories which drops many valuable empirical findings. Thus, publication bias will exaggerate the significant results, emphasize mainstream theories, ignore implications of insignificant findings or alternative arguments and distort policy inferences. Because of the

vulnerability of an empirical literature to publication bias, the test of publication bias is needed for any formal conclusions from empirical studies.

Card and Krueger (1995), following the main methodology used by Begg and Berlin (1988) in Biology, have conducted a typical meta-analysis in Economics to examine the relationship between sample size and statistical significance in minimum-wage studies and found evidence for potential publication bias. This paper will follow Card and Krueger's (1995) methodology to test the potential publication bias of studies of the effect of market size and exchange rates on FDI.

According to Card and Krueger (1995), in OLS regressions, adding to sample size (and increasing degrees of freedom) should lower the standard errors of the estimated coefficients and raise the absolute t values of the regressors, under the two conditions that the model's structure does not change and the additional data are independent. These authors have pointed out a stronger relationship that "the absolute value of the t ratio should vary proportionally with the square root of the number of degrees of freedom, and a regression of the logarithm of the t ratio on the logarithm of the square root of the degrees of freedom should yield a coefficient of 1."[18]

This reasoning can be illustrated by the following formulas. The t values of explanatory variables in regressions can be calculated by equation (1), where *n* is sample size, *k* is the number of independent variables (including constant term), *B* is the coefficient, SE(*B*) is the standard error of the coefficient, e is the stochastic error term, and x is the mean deviation of the independent variable X.

[18] The strong relationship between degrees of freedom and t value indicates no publication bias and a genuine association in literature. While the weak relationship (that degrees of freedom have positive effect on t value) may indicate co-existence a genuine association and a publication bias in literature.

$$t_b = \frac{\hat{B}}{SE(\hat{B})} = \frac{\hat{B}}{\sqrt{\frac{e'e}{x'x(n-k)}}} = \frac{\hat{B}}{\sqrt{\frac{e'e}{x'x}}} \bullet \sqrt{n-k} \quad \text{---------- (1)}$$

The test for publication bias is based on the following equation (2) which is the logarithm transformation of equation (1):

$$\log(|t_b|) = \log\left(\left|\frac{\hat{B}}{\sqrt{\frac{e'e}{x'x}}}\right|\right) + \log(\sqrt{n-k}) \quad \text{---------- (2)}$$

The reasoning of equation (2) is as follows: if sample size *n* or the degrees of freedom (*n-k*) rise, the accuracy of coefficient estimates will also rise, that is, there will be lower standard errors and higher t statistics.

$$\log(|t_b|) = \alpha_0 + \alpha_1 \log(\sqrt{n-k}) + \varepsilon \quad \text{---------- (2*)}$$

Therefore, Card and Krueger (1995), Stanley (2001), and Doucouliagos (2005) propose to apply the coefficient of the logarithm of the square root of degrees of freedom in equation (2*), which is an estimation transformation from equation (2), to test for the existence of publication bias, genuine empirical effects, or both. According to Stanley (2001), equation (2*) is also known as Meta-Significance Testing (MST).

ε is an error term in equation (2*). The error may come from many resources, for example, the estimation of T ratio in FDI literature. If FDI determination model has econometric issues, such as multicollinearity, heteroskedasticity, autocorrelation, specification problems of inclusion of unimportant regressors or exclusion of critical explanatory variables, their T ratios will be biased, which affects the meta-analysis. In

addition, how researchers studied FDI may affect meta-analysis test: for example, the control variables included, the specific functional form imposed, the sample analyzed, and the estimation technique applied. Moreover, meta-analysis requires all FDI determination regressions in meta-analysis are stable and the data sets used in regressions are independent. Card and Krueger (1995) points out that "Another possibility is that structural change may alter the statistical model. In this case, the t ratio might rise of fall with sample size." More specifically, the character of data used in FDI determination model may also be noticed in meta-analysis. Are they FDI level data sets or FDI growth rates? Are they panel data, cross sections, or time series? Besides the above, the error term also includes all the other unobserved factors affect meta-analysis.

If $\alpha_1 > 0$, then the positive relationship between sample size and the absolute t values indicates a genuine association in empirical effects. To be more specific, asymmetrically if $\alpha_1 = 1$, then there are obviously genuine empirical effects and no obvious publication bias in FDI literature. If $0<\alpha_1<1$, then a genuine association and a potential publication bias may co-exist[19]. If $\alpha_1 \leq 0$, it is suggested that a potential publication bias problem exists in the FDI literature because $\alpha_1 \leq 0$ indicates an abnormal situation in which t statistics fall as sample size (degrees of freedom) rises. In other words, the explanation for smaller sample studies reporting larger t values is that some authors struggle to increase the chance of publication of their results. This is a typical case for publication bias.

[19] It is possible that $\alpha_1 >1$ in publication bias test when a genuine association and a potential publication bias may co-exist. In the empirical publication bias tests, it is rare to find $\alpha_1 >1$.

Because other factors may affect the relationship between sample size and t statistics, it is necessary to extend equation (2*) to incorporate other dimensions of FDI literature. Thus, the simple version of MST evolves into the following statistical hypothesis test:

$$\log(|\ t_b\ |) = \alpha_0 + \alpha_1 \log(\sqrt{n-k}) + \sum_{i=1}^{m}(\beta_i X_i) + \varepsilon \quad \text{---------- (3)}$$

where α and β are coefficients and X_i are the other attributes of FDI studies which may affect the absolute t value, such as differences in econometric methods, model specification, different data structure (panel or cross section), and dummy for a publication article (see Table 1).

There are two conditions for the above test of publication bias. First, the structure of the FDI models, where the t values come from, is stable. Second, there are no data issues in the FDI models. In other words, there is no serial correlation or other data problem to affect the relationship between sample size (or square root of degrees of freedom) and t statistics.

Publication Bias Analysis for Market Size:

In order to explore the potential publication bias in the literature on the effect of market size on FDI, the level of GDP, GNP, industrial production and sales have been chosen to represent host countries' market size. Most articles have consistently reported mainly

significant and positive effects of these variables on FDI, only a few studies show insignificant or ambiguous results, and only one presents negative effects. This dominance of the results showing a positive and significant relationship between market size and FDI suggests that the assumption of model stability for the publication bias test is satisfied. On the other hand, this may be a sign of potential publication bias, because researchers and editors may implicitly avoid challenging the prevailing assumption regarding the relationship between market size and FDI, and try to publish significantly positive results.

In this meta-analysis of publication bias, 311 OLS regressions of FDI inflows in 19 articles are collected, and all regressions include market size as an explanatory variable.

The following equation (4), which is a detailed version of equation (3), has been applied to test for publication bias for market size.

$$\log(|\ t_b\ |) = \alpha_0 + \alpha_1 \log(\sqrt{n - k}) + \sum_{i=1}^{m=13} (\beta_i X_i) + \varepsilon \quad \text{---------- (4)}$$

The dependent variable in the above regression (4) is the logarithm of the absolute t value of market size in each FDI study. The most important independent variable is the logarithm of the square root of the degrees of the freedom in 311 regressions from 19 articles, whose coefficient is expected to be significant and positive to be around 1. To control for other factors, such as different model specification and data structure, 13 more independent variables have been added in this meta-analysis (see Table 1).

The meta-analysis results are presented in Tables 1.2-1.5. Table 1.2 reports the publication bias test for the entire group of publications. Tables 1.3 and 1.4 show meta-analysis results for literature on FDI in developing countries and developed countries, respectively. Table 1.5, like Table 1.3, summarizes the publication bias test for developed counties, but adds an article dummy. In each table, 14 regressions have been estimated in different forms of equation (4). First, following equation (2*), the simplest estimation is reported in the far left column entitled with "Regression 1" with only the square root of degrees of freedom as an independent variable. Then, following equation (4), 12 different control variables listed in Table 1 are added by turn in regressions 2 to 12 (Regression 12 adds two new control variables for data type). Next, Regression 13 uses all control variables together. Finally, Regression 14 only adds all significant control variables. All 14 meta-analysis regressions include the square root of degrees of freedom as the most important explanatory variable. The explanation of the independent variables is in Table 1.

Table 1.2 summarizes the meta-analysis results for the entire group of publications. In the 12 out of 14 meta-analysis regressions, the effect of regressing the logarithm of the square root of degrees of freedom on the logarithm of the absolute t value is significantly positive, which clearly indicates a genuine association between market size and FDI inflows. Nevertheless, 13 out of 14 meta-analysis regressions reject the null hypothesis of coefficient of square root of degrees of freedom (α_1) is equal to 1. Because this "strong" relationship between degrees of freedom (sample size) and t value is rejected, publication bias may co-exist with a genuine relationship in the FDI literature ($0<\alpha_1<1$ or $\alpha_1>1$).

A smaller meta-analysis on only 56 regressions for FDI into developing countries is shown in Table 1.3. Because in this small data set, variables D3 (dummy for dependent variable is not level of FDI) and D11 (dummy for cross section data) are equal to 0 and variable D12 (dummy for panel data) is equal to 1, only 12 meta-analysis regressions can be estimated. All 12 yield a significant and positive relationship between the degrees of freedom and t statistics, unanimously indicating a genuine relationship between market size and FDI. Nonetheless, all 12 reject the null hypothesis of a "strong" relationship (slope coefficient equal to 1), which signals potential publication bias regarding FDI in developing countries.

Table 1.4 demonstrates meta-analysis of another small data set with 227 regressions for FDI into developed countries. In this case, only 2 out of 12 meta-analysis regressions confirm a significant positive relationship between the degrees of freedom and t value, 9 out of 12 find the relationship insignificant, and a meta-analysis regression, "Regression 4", even shows a significant negative relationship (the absolute value of the t statistic drops as sample size increases). This finding is consistent with a publication bias in the literature on FDI into developed countries. Furthermore, Table 1.4 also indicates that there is no genuine association between market size and FDI into developed countries.

For this meta-analysis regarding FDI in the developed countries, most of the regressions come from one article by Bandera and White (1968). Thus, a dummy variable, which is equal to 1 if the study comes from this article, is added into the meta-analysis to control for the specific effect of this article. This new meta-analysis is summarized in Table 1.5. None of the 12 meta-analysis regressions in Table 1.5 reports a

significant and positive relationship between degrees of freedom and t statistics. On the contrary, four meta-analysis regressions even show a significantly negative relationship, which indicates that the larger the sample size, the smaller the t statistic. The remaining eight meta-analysis regressions show insignificant results. As with Table 1.4, this result also consistently confirms a publication bias instead of a genuine relationship between market size and FDI in the studies for developed countries.

In conclusion, the meta-analysis of the effect of the host market size on FDI argues that there is a genuine association between market size and FDI in the literature for countries at all levels of development and in studies on FDI in developing countries because of the significantly positive relationship between the degrees of freedom and t value. On the other hand, the strong hypothesis that the slope coefficient of the degrees of freedom variable is equal to 1 does not hold in most cases (coefficients are positive but significantly different from 1). Hence, potential publication bias may co-exist with a genuine relationship.

The meta-analysis also reveals that there is publication bias for the research on the effect of market size on FDI into developed countries. In addition, a genuine association between market size and FDI into developed countries cannot be confirmed.

Two possible reasons for the existence of the publication bias (especially in literature concerning developed countries) are as follows: First, there is a real publication bias problem in the literature, in other words, there is a tendency to publish significant or popular results for developed countries because of the common assumption that host market size has a significantly positive effect on FDI into developed economies. Second, the two conditions for meta-analysis (stable structure and no data issues) may not be

satisfied for the meta-analysis in the “Developed Host” subset. Continued research on publication bias affecting studies of the effect of market size on FDI is in order.

Publication Bias Analysis for Exchange Rates

In this section, I test the potential publication bias in the studies on the effect of exchange rates on FDI, parallel to the above meta-analysis of market size. Exchange rates are defined as EX1 (FDI home country's currency over FDI host country's currency) or EX2 (FDI host currency over FDI home currency).

Due to the similarity between EX1 and EX2 and the relative small sample size for EX2, EX1 and EX2 are combined to undertake meta-analysis. Because EX1 and EX2 are mutually exclusive in each regression, a new variable, ex_g2, has been created to take either EX1 or EX2 value in 153 FDI regressions using exchange rates in 11 articles.

The meta-analysis results are summarized in Table 1.6. In 11 out of 13 meta-analysis regressions, the effect of the logarithm of the square root of degrees of freedom on the logarithm of the absolute t value of exchange rates is significantly positive, which indicates a genuine association between exchange rates and FDI. Particularly, 12 out of 13 meta-analyses regressions cannot reject the null hypothesis of a “strong” relationship (the slope coefficient of the degrees of freedom is equal to 1). This key finding clearly confirms that there is no publication bias in FDI literature on the effect of exchange rates.

From the above meta-analyses, the two genuine relationships of market size and FDI as well as exchange rates and FDI have been confirmed in most cases, excepting

only the relationship of market size and FDI into the developed economies. In addition, meta-analysis concludes that there is no publication bias in the literature on the effect of exchange rates on FDI. Nevertheless, there is potential publication bias co-existing with genuine association in literature on market size's effect on FDI for the full sample and in the sub-sample of developing countries. Especially in studies on market size's effect on FDI into developed countries, publication bias is clearly identified by meta-analysis without genuine association between market size and FDI.

Hence, as far as the use of empirical results is concerned, more attention should be paid and more cautious approaches to avoid publication bias should be taken on assessing the market size's effect on FDI, especially for literature on FDI into developed countries.

This publication bias test is only a beginning in the application of meta-analysis to evaluation of FDI literature and it deserves more efforts in the future.

Table 1: Independent Variables Used in Meta-Analysis of Publication Bias

ln_df	Logarithm of square root of Degrees of Freedom of the FDI determination regression.
D1	A dummy variable equal to 1 if Auto regression (AR1) is detected and 0 otherwise.
D2	A dummy variable taking a value of 1 if logarithm specification is used in model specification and 0 otherwise.
D3	A dummy variable equal to 1 if non-level of FDI as dependent variable, 0 otherwise.
D4	Number of explanatory variables in FDI model (excluding intercept).
D5	Number of independent variables other than the following 6 main categories: market size, exchange rate, human capital, international trade, tax (including tariff), and previous FDI.
D6	Number of the other market size independent variable (other than the level or growth rate of total host market size, or the host market size per capita).
D7	Total number of 6 specific recommended categories: market size (total level, growth rate and per capita average), exchange rate, human capital, international trade, tax & tariff, and previous FDI. The range is from 0 to 6.
D8	Total number of 6 generally recommended categories (independent variable can be any items in the big categories). The range is from 0 to 6.
D9	A dummy variable equal to 1 for model includes both FDI host and FDI home information as explanatory variables, 0 otherwise.
D10	A dummy variable taking a value of 1 if FDI determination model including dummies, 0 otherwise.
D11	A dummy variable equal to 1 if using cross section data, 0 otherwise.
D12	A dummy variable taking a value of 1 if using panel data, 0 otherwise.
D13	An article dummy variable equal to 1 for FDI determination model coming from article by Bandera and White (1968), 0 otherwise.

Table 1.2: Meta-Analysis Results for Publication Bias on the Host Market Size (Full Sample)

Explanatory Variables	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6	Regression 7	Regression 8	Regression 9	Regression 10	Regression 11	Regression 12	Regression 13	Regression 14
Intercept	**0.6407****	**0.66528****	**0.70086****	**1.44094****	**0.51526****	**0.5447****	**0.84337****	**0.85738****	**0.73007****	**0.52336****	**0.45115****	**0.69365****	**1.18992****	**1.2159****
	[0.16209]	**[0.16292]**	**[0.19127]**	**[0.17845]**	**[0.16257]**	**[0.16531]**	**[0.15783]**	**[0.16715]**	**[0.16378]**	**[0.17326]**	**[0.16211]**	**[0.26691]**	**[0.26492]**	**[0.21184]**
ln_df	**0.30343****	**0.27503****	**0.24409**	-0.02012	**0.54641****	**0.42163****	**0.40104****	**0.49469****	**0.50353****	**0.42608****	**0.5817****	0.25882	**0.62335***	**0.60868****
	[0.09825]	**[0.10038]**	**[0.14017]**	[0.09827]	**[0.11694]**	**[0.10839]**	**[0.09481]**	**[0.10704]**	**[0.12198]**	**[0.11788]**	**[0.11231]**	[0.22879]	**[0.25217]**	**[0.14241]**
D1		0.50631											-0.11403	
		[0.37795]											[0.3469]	
D2			0.14584										-0.15452	
			[0.24549]										[0.31281]	
D3				**-2.52128****									**-2.96121****	**-2.93415****
				[0.31531]									**[0.3208]**	**[0.31584]**
D4					**-0.04186****								-0.01212	-0.01912
					[0.01142]								[0.05175]	[0.04279]
D5						**-0.03147***							-0.04355	-0.03492
						[0.01264]							[0.05325]	[0.04578]
D6							**-0.51399****						-0.16705	-0.16898
							[0.08769]						[0.12608]	[0.12118]
D7								**-0.31528****					0.13519	0.09344
								[0.07832]					[0.18079]	[0.16519]
D8									**-0.21099****				-0.14434	-0.1131
									[0.07764]				[0.15404]	[0.14530]
D9										**-0.41994**			-0.04716	0.0071
										[0.22501]			[0.27611]	[0.25672]
D10											**-0.81067****		**-1.12041****	**-1.04587****
											[0.17401]		**[0.28958]**	**[0.25937]**
D11												0.40042	0.12652	
												[0.52876]	[0.65261]	
D12												-0.0183	0.16176	
												[0.34090]	[0.41501]	
Adj R Square	0.0268	0.0293	0.0248	0.1915	0.0644	0.0429	0.1216	0.0724	0.0465	0.0346	0.0879	0.0246	0.3495	0.3571
Obs	311	311	311	311	311	311	311	311	311	311	311	311	311	311
Test of coefficient of Log of square root of DF = 1 (10% level)	reject	reject	reject	reject	reject	reject	reject	reject	reject	reject	reject	reject	can not reject	reject

* Please see the notes in Table 1.

Standard errors for Meta-analysis are shown in brackets. If the independent var is significant at the level less than 10%, its standard error is in bold type.

** and * represent significence levels of less than 1% (p<0.01) and less than 5% (p<0.05), respectively.

Table 1.3: Meta-Analysis Results for Publication Bias on the Host Market Size (Developing Countries Only)

Explanatory Variables	Regression 1	Regression 2	Regression 3	Regression 4 (dropped, since all D3=0)	Regression 5	Regression 6	Regression 7	Regression 8	Regression 9	Regression 10	Regression 11	Regression 12 (dropped, since all D11=0 and D12=1)	Regression 13	Regression 14
	-3.8056**	**-3.61415****	**-3.94418****		**-4.10156****	**-4.62848****	**-5.39348****	**-4.75085****	**-3.77932****	**-4.34204****	**-4.40351****		**-11.20372****	**-5.58532****
Intercept	**[1.12201]**	**[1.13022]**	**[1.19313]**		**[1.06692]**	**[1.07574]**	**[1.84568]**	**[1.25729]**	**[1.13248]**	**[1.49562]**	**[1.45756]**		**[3.71223]**	**[1.29832]**
	2.06857**	**1.96347****	**2.08997****		**2.3593****	**2.52149****	**2.63669****	**1.91736****	**1.96434****	**2.25091****	**2.264****		**3.35254****	**2.7587***
ln_df	**[0.45641]**	**[0.46371]**	**[0.46384]**		**[0.44484]**	**[0.44857]**	**[0.69504]**	**[0.46018]**	**[0.52415]**	**[0.56756]**	**[0.54917]**		**[0.88361]**	**[0.48169]**
		0.45547											-1.30312	
D1		[0.39019]											[0.78569]	
			0.11513										1.23222	
D2			[0.31541]										[1.30303]	
D3														
					-0.02966**								-0.10738	0.06715
D4					**[0.01094]**								[0.11864]	[0.05172]
						-0.03417**							0.05496	**-0.10173**
D5						**[0.01105]**							[0.12105]	**[0.05318]**
							0.26218						0.10878	
D6							[0.2422]						[0.95207]	
								0.61335					1.66547	
D7								[0.38721]					[1.10939]	
									0.0881				0.15372	
D8									[0.21245]				[0.95207]	
										0.18285			-0.27439	
D9										[0.33423]			[2.26196]	
											0.21167		1.14858	
D10											[0.32675]		[1.27534]	
D11														
D12														
Adj R Square	0.2622	0.2671	0.2501		0.3398	0.3632	0.2645	0.2822	0.2507	0.2525	0.2541		0.3995	0.3713
Obs	56	56	56		56	56	56	56	56	56	56		56	56
Test of coefficient of Log of square root of DF = 1 (10% level)	reject	reject	reject		reject	reject	reject	reject	reject	reject	reject		reject	reject

* Please see the notes in Table 1.

Standard errors for Meta-analysis are shown in brackets. If the independent var is significant at the level less than 10%, its standard error is in bold type.

** and * represent significence levels of less than 1% (p<0.01) and less than 5% (p<0.05), respectively.

Table 1.4: Meta-Analysis Results for Publication Bias on the Host Market Size (Developed Countries Only)

Explanatory Variables	Regression 1	Regression 2	Regression 3 (dropped, since all D2=0)	Regression 4	Regression 5	Regression 6	Regression 7	Regression 8	Regression 9	Regression 10	Regression 11	Regression 12 (dropped, since all D11=0)	Regression 13	Regression 14
	1.21248**	**1.22748****		**2.4796****	**0.68918***	**0.89065****	**0.9227****	**0.99193****	**0.96543****	**1.07159****	0.22586		**1.27242***	**1.20989***
Intercept	**[0.2985]**	**[0.29936]**		**[0.28964]**	**[0.30866]**	**[0.30163]**	**[0.28477]**	**[0.30092]**	**[0.31629]**	**[0.33261]**	[0.37431]		**[0.51973]**	**[0.50305]**
	-0.20532	-0.22536		**-0.88563****	**0.76888****	0.33152	0.42568	0.39599	0.3462	-0.06515	**0.85198***		0.38013	0.36927
ln_df	[0.25326]	[0.25475]		**[0.22849]**	**[0.32422]**	[0.28277]	[0.26281]	[0.31287]	[0.35371]	[0.29231]	**[0.35393]**		[0.3847]	[0.32394]
		0.5806											-0.252	
D1		[0.73632]											[0.61248]	
D2														
				-2.93265**									**-3.08627****	**-3.06541****
D3				**[0.31861]**									**[0.35529]**	**[0.34337]**
					-0.1718**								-0.18717	-0.19555
D4					**[0.03787]**								[0.24542]	[0.24248]
						-0.27587**							-0.20304	-0.16919
D5						**[0.07179]**							[0.24883]	[0.24249]
							-0.66406**						-0.0727	-0.05973
D6							**[0.11814]**						[0.2865]	[0.27894]
								-0.32018**					0.40402	0.44316
D7								**[0.10132]**					[0.33768]	[0.2913]
									-0.23904*				0.18997	0.20707
D8									**[0.10798]**				[0.41331]	[0.40986]
										-0.50281			0.40096	
D9										[0.52326]			[0.43604]	
											-1.32214**		-1.24149	**-1.37661**
D10											**[0.31981]**		[0.88266]	**[0.81829]**
D11														
													-0.39745	
D12													[0.99819]	
Adj R Square	-0.0015	-0.0032		0.2701	0.0787	0.0562	0.1184	0.0369	0.0155	-0.0019	0.0653		0.4034	0.4086
Obs	227	227		227	227	227	227	227	227	227	227		227	227
Test of coefficient of Log of square root of DF = 1 (10% level)	reject	reject		reject	can not reject	reject	reject	reject	reject	reject	can not reject		can not reject	reject

* Please see the notes in Table 1.

Standard errors for Meta-analysis are shown in brackets. If the independent var is significant at the level less than 10%, its standard error is in bold type.

** and * represent significence levels of less than 1% (p<0.01) and less than 5% (p<0.05), respectively.

Table 1.5: Meta-Analysis for Publication Bias on the Host Market Size with Article Dummy (Developed Countries Only)

Explanatory Variables	Regression 1	Regression 2	Regression 3 (dropped, since all D2=0)	Regression 4	Regression 5	Regression 6	Regression 7	Regression 8	Regression 9	Regression 10	Regression 11	Regression 12 (dropped, since all D11=0)	Regression 13	Regression 14
Intercept	**2.16555**** **[0.43684]**	**2.15648**** **[0.43807]**		**2.25783**** **[0.37955]**	**2.2351**** **[0.39993]**	**1.98974**** **[0.42187]**	**2.43728**** **[0.39618]**	**2.36452**** **[0.42025]**	**2.49772**** **[0.42342]**	**2.02973**** **[0.46415]**	**1.37256**** **[0.43521]**		**1.51062*** **[0.61747]**	**1.20989*** **[0.50305]**
ln_df	**-0.70361*** **[0.30106]**	**-0.70584*** **[0.30163]**		**-0.77058**** **[0.26158]**	0.31286 [0.31491]	-0.19694 [0.3115]	-0.23831 [0.27937]	-0.07683 [0.31814]	0.13159 [0.33791]	**-0.57334** **[0.33641]**	0.43512 [0.35046]		0.31355 [0.39619]	0.36927 [0.32394]
D1		0.33197 [0.72992]											-0.33729 [0.62462]	
D2														
D3				**-3.08044**** **[0.35817]**									**-2.96273**** **[0.39528]**	**-3.06541**** **[0.34337]**
D4					**-0.25817**** **[0.03873]**								-0.19857 [0.24622]	-0.19555 [0.24248]
D5						**-0.31042**** **[0.07056]**							-0.17537 [0.25209]	-0.16919 [0.24249]
D6							**-0.84114**** **[0.11683]**						-0.08707 [0.28752]	-0.05973 [0.27894]
D7								**-0.48145**** **[0.10364]**					0.48403 [0.35603]	0.44316 [0.29130]
D8									**-0.57097**** **[0.12113]**				0.09168 [0.43593]	0.20707 [0.40986]
D9										-0.44794 [0.51509]			0.40354 [0.43655]	
D10											**-1.76818**** **[0.32083]**		-1.26585 [0.88431]	**-1.37661** **[0.81829]**
D11														
D12													-0.11233 [1.07565]	
D13	**-0.60942**** **[0.20687]**	**-0.59814**** **[0.20872]**		0.18264 [0.20190]	**-1.15672**** **[0.20636]**	**-0.72856**** **[0.20072]**	**-1.01787**** **[0.19519]**	**-0.9487**** **[0.21102]**	**-1.19913**** **[0.23397]**	**-0.60283**** **[0.20712]**	**-0.94606**** **[0.20388]**		-0.19353 [0.27011]	
Adj R Square	0.0315	0.0281		0.2695	0.1888	0.1049	0.2107	0.113	0.1153	0.0305	0.1438		0.402	0.4086
Obs	227	227		227	227	227	227	227	227	227	227		227	227
Test of coefficient of Log of square root of DF = 1 (10% level)	reject	reject		reject	reject	reject	reject	reject	reject	reject	can not reject		reject	reject

* Please see the notes in Table 1.

Standard errors for Meta-analysis are shown in brackets. If the independent var is significant at the level less than 10%, its standard error is in bold type.

** and * represent significence levels of less than 1% (p<0.01) and less than 5% (p<0.05), respectively.

Table 1.6: Meta-Analysis Results for Publication Bias on the Exchange Rates (Full Sample)

Explanatory Variables	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6	Regression 7	Regression 8	Regression 9	Regression 10	Regression 11	Regression 12 (dropped, since all D11=0)	Regression 13	Regression 14
	-1.92985**	**-2.55557****	**-2.62285****	**-1.92865****	**-1.87893****	**-1.52646****	-0.53032	**-1.25149***	**-1.34534***	**-2.39145****	**-1.92662****		**-3.4937**	**-2.73277***
Intercept	**[0.46426]**	**[0.52781]**	**[0.45646]**	**[0.46648]**	**[0.46638]**	**[0.4687]**	[0.50801]	**[0.53735]**	**[0.56566]**	**[0.51639]**	**[0.46551]**		**[2.04103]**	**[1.13093]**
	1.0862**	**1.46281****	**1.13771****	**1.08844****	**1.2917****	**0.58611***	**0.72048****	**1.049****	**1.0534****	**1.21807****	**1.03726****		0.5582	0.57502
ln_df	**[0.2318]**	**[0.27802]**	**[0.21661]**	**[0.23730]**	**[0.29957]**	**[0.27516]**	**[0.2258]**	**[0.22875]**	**[0.23088]**	**[0.23923]**	**[0.25452]**		[0.63523]	[0.54854]
		-0.00894*											0.00467	0.00476
D1		**[0.00377]**											[0.00674]	[0.00574]
			0.95404**										**1.82161**	**1.57147***
D2			**[0.19752]**										**[0.94916]**	**[0.61745]**
				-0.01004									0.1212	
D3				[0.21127]									[0.87281]	
					-0.04796								0.04113	
D4					[0.04433]								[0.07932]	
						0.14575**							0.06654	**0.10382**
D5						**[0.04609]**							[0.06732]	**[0.05847]**
							-0.70828**						-0.31538	-0.29228
D6							**[0.13743]**						[0.25806]	[0.21329]
								-0.23641*					0.22729	**0.40395**
D7								**[0.09845]**					[0.58288]	**[0.21501]**
									-0.15925				0.06837	-0.08143
D8									**[0.08933]**				[0.31088]	[0.16767]
										0.41618*			-0.09172	-0.1198
D9										**[0.21170]**			[0.41061]	[0.29693]
											0.12289		0.67999	
D10											[0.26060]		[0.53296]	
D11														
													-0.46091	-0.11432
D12													[0.64029]	[0.59294]
Adj R Square	0.1212	0.1474	0.2344	0.1153	0.1222	0.1706	0.2484	0.1481	0.1337	0.1375	0.1166		0.292	0.2959
Obs	153	153	153	153	153	153	153	153	153	153	153		153	153
Test of coefficient of Log of square root of DF = 1 (10% level)	can not reject	reject	can not reject	can not reject	can not reject	can not reject	can not reject	can not reject	can not reject	can not reject	can not reject		can not reject	can not reject

* Please see the notes in Table 1.

Standard errors for Meta-analysis are shown in brackets. If the independent var is significant at the level less than 10%, its standard error is in bold type.

** and * represent significence levels of less than 1% (p<0.01) and less than 5% (p<0.05), respectively.

Chapter2: A Cluster Analysis of Foreign Direct Investment

The World, 1980-2001

This chapter applies nine Cluster Analysis methods to partition 208 economies in the world using data on 44 variables, regarding FDI (Foreign Direct Investment), from 1980 to 2001. The key findings from the six snapshots of Cluster Analysis are: a) the top tier consists of the eight economies which are either the most developed economies or the large developing economies; b) the membership in the middle tier ("FDI Important") is constantly changing; c) finally, Japan, China and India have a more dynamic record regarding migration among different clusters in the past 25 years. As explained latter, income level is still crucial to define clusters. This paper supports arguments of IDP (Investment Development Path), which emphasizes the income level in segmentation.

This Cluster Analysis thus suggests that further studies on FDI should use econometric methods to control for different clusters' uniqueness, especially with regard to income level.

FDI inflows are motivated by various interests. The attributes used in cluster analysis are closely correlated with FDI determinants which have been discussed in the other chapters, such as market size (GDP or GNI), exchange rate, interest rate, and other relevant attributes.

2.1 Introduction

The main reason for the necessity of applying Cluster Analysis in FDI studies is the heterogeneity of FDI inflows across 208 economies. According to the World Development Indicator (WDI) 2003, the size of global FDI inflows increases dramatically from 1970 to 2001 (Figure 2). Surprisingly, both maximum and minimum values which country-level FDI inflows had ever reached before 2001 occur in 2000 when the U.S. attracted a phenomenal level of $307.74 billions of FDI. In contrast, Indonesia divested[20] $4.55 billions of FDI in that year. The stability of FDI inflows also varies dramatically among economies. For example, in Sierra Leone, the coefficient of variation of the time series of FDI (standard deviation over mean) is 45.9, an extremely high value, compared to the low value of USA's 1.43, and the even lower value of 0.37 in Tajikistan (Appendix 2.1).

In order to measure the degree of inequality in FDI's distribution across the world, a Quasi-Gini coefficient for FDI is calculated applying the Gini coefficient formula and is presented in Figure 1. The cumulative percentage of economies ranked by FDI is shown on the horizontal axis. The vertical axis marks the cumulative percentage of FDI inflows. The Quasi-Gini coefficient for FDI is the ratio of the shaded area (between the Quasi-Lorenz Curve and the diagonal line) to the total triangular area below and to the right of the diagonal. This Quasi-Gini coefficient reached 0.61 in 2000 and 0.51 in 2001, indicating an uneven distribution of FDI around the world.

[20] Divest means the decreases of investment, i.e. the withdrawal of the previous FDI.

FDI's heterogeneous nature clearly suggests the need to classify economies by their FDI related characteristics[21] in order to get a true picture of FDI.

Hitherto there have been few FDI theories on the classification of the world's economies. The most important is "the investment development path" (IDP) theory developed by Dunning (Dunning, 1981). Based on the relationship between FDI per capita and GDP per capita, IDP classifies the economies into five different stages (or groups): the first stage consists of LDC (Low Development Countries) with small FDI inflows (e.g. Bangladesh, Ethiopia). Other developing countries with FDI inflows belong to the second stage (e.g. China and India). Higher income countries with FDI outflows are in the third stage (e.g. Argentina and Mexico). Developed countries with FDI outflows exceeding inflows are in stage four (e.g. Republic of Korea). In the fifth stage, the most advanced countries' FDI outflows are prone to be matched by FDI inflows (e.g. U.S. and U.K.).

A recent extension of IDP includes more variables and applies Cluster Analysis to make the conclusion more robust (Duran and Ubeda, 2001). They find that variables related to education level, R&D and patents, tariff and tax, and health help to define the development level more precisely.

However, IDP and its extension focus on FDI stocks, which, in contrast to FDI inflow, have limited variation through time. Also, IDP mainly focuses on GDP per capita to indicate level of development. And its extension, although including more variables, is limited to the cross section data.

This paper will conduct Cluster Analysis to place 208 economies into different groups (from new angles). According to a literature review and meta-analysis based on

[21] FDI related characteristics in this paper refer to 44 selected variables which are listed in Appendix 2.2.

over 150 articles, 44 FDI-related variables have been selected for Cluster Analysis (Appendix 2.2). Moreover, unlike other studies on IDP, this analysis uses the 208 economies' time series from 1980 to 2001, instead of presenting only one cross-section view.

2.2 Methods and Data

The Cluster Analysis is a procedure to divide a population of observations based on the homogeneity or similarity of the observations' measured characteristics, using a set of statistical methods.

Cluster Analysis is different from regression method, e.g. OLS, because the goal of Cluster Analysis is to segment the data set which regression aims to discover the relationship between dependent and independent variables.

Each observation is a small cluster at the beginning. Then, the distances between clusters are calculated and two closest clusters are merged to form a new bigger cluster. This hierarchical merging procedure is repeated until all observations are merged into a huge and final cluster, the whole population.

Unlike other subjective methods of grouping, Cluster Analysis provides a set of statistical classification tools that are quantitative, systematic, objective, and repeatable. "An advantage of Cluster Analysis is that it explicitly recognizes the multivariate relationships among class variables. Moreover, Cluster Analysis minimizes research bias by not specifying classes according to prespecified conceptions." (Rosenberg and Turvey, 1991)

Cluster Analysis receives great attention in various fields such as finance, business, and marketing, but it is seldom applied in analyses of FDI. The only case found is the work of Duran and Uberda (2001), who use Cluster Analysis as an alternative tool to research the "Investment Development Path" (IDP) associated with FDI.

The variables used in Cluster Analysis are listed in Appendix 2.2. They are chosen based on the commonly used categories which are identified in a literature survey

of over 150 articles on FDI. The selection of variables also connects with the meta-analysis and theoretical foundation of FDI estimates. Literature review discovers commonly used FDI determinants, among them: market size, human capital and employment, international trade, previous FDI, taxation and tariff, exchange rate, interest rates, and dummies for time and region. This set of findings is supplemented by a meta-analysis, which shows generally no obvious publication bias in the FDI literature concerning market size and exchange rates, thus corroborating the credibility of the findings reported in the literature with respect to these variables.

Various statistical methods are available to calculate distances between observations (or clusters) in Cluster Analysis. Each method has its own formula and its own advantage for calculating distance. In order to get robust segmentation results, nine different methods are applied in this paper (Appendix 2.3 and 2.4). The final classification is based on the combination and comparison of the results from the nine methods.

2.3 Cluster Analysis

In this Cluster Analysis, the data containing 44 variables for 208 economies are extracted for six cross-sections: 2001, 2000, 1995, 1990, 1985, and 1980. There are missing values in the data set, especially for the earlier years. Cluster Analysis will automatically put the economies with missing values into a special cluster which is dropped from the normal cluster procedure. In the extreme cases of too many variables with missing values, Cluster Analysis even fails. A balance of selection of more variables and inclusion of more countries would make the Cluster Analysis both robust (using more variables) and geographically adequate (covering more countries). Based on this consideration, a smaller subset of variables is selected from 44 candidate variables in some cross-sections to make sure the top 12 FDI host economies and some especially important economies (e.g. Japan, India, and Germany) are included. Then, nine different methods of Cluster Analysis are applied to the six cross-section data sets. The classification of the countries in the world is based on the aggregated summary of the nine results of the Cluster Analysis.

The results of the first Cluster Analysis, which uses the data for 1980, are reported in Table 2.1 and the comparison of the means of variables among clusters is shown in Appendix 2.5[22].

As shown in the cluster tree in Table 2.1, the USA is different from all other countries in the 1980 cross-section. The comparison of means in Appendix 2.5 shows that the USA attracts the highest value of FDI inflows in the world in 1980 and keeps this No.

[22] The missing-FDI-variable group misses some important FDI-related variables, but not all variables. Hence, the means for no missing observations are reported in Appendix 2.5. The missing-FDI-variable group and the FDI-standard group are merged into one big cluster to report average values.

1 position in all five later cross-sections. The USA also has the largest economy in the world. Other characteristics worthy of note are its large population and very high per capita output. However, it has a huge trade deficit[23].

Japan (JPN) also forms a separate cluster. It has the highest nominal GDP per head in 1980[24], the second largest economy size and a large population of over 110 million. Yet, its FDI inflows are low, in fact, much lower than the global average, despite Japan's size and economic development level.

Four developed economies in Europe, Germany (DEU), France (FRA), Italy (ITA), and United Kingdom (GBR), also distance themselves from the others as the "Traditional Developed Powers" group, due to their large economies and population, high development levels, huge FDI inflows, and high trade deficits.

These six economies are classified as "top tier" in the Cluster Analysis.

The next tier contains five economies with relatively large size and high level of FDI inflows. This group contains the "FDI Important" sub-group that includes Canada (CAN), Spain (ESP) and Mexico (MEX), each having relatively high per capita income; and the "Developing Giant" sub-group, consisting of Brazil (BRA) and India (IND), with relatively large populations and economies but much lower income (GDP or GNI) per head.

The rest are grouped into either "FDI moderate" economies with 75 economies or the "FDI missing" group with 122 economies (including China). The characteristics of

[23] Trade deficit generally has a negative effect on an economy in the long run. But when a trade deficit is used to create a long term growth engine in the economy (as did Japan and South Korea), importing international technologies and know-how when the economy took off, this can actually help economic development in the long term. Many developed economies have a trade deficit which usually can be financed by a capital account surplus.

[24] Japan GDP per capita in PPP was lower than U.S.A in all six cluster snapshots.

this huge cluster ("FDI moderate" and "FDI missing") are smaller economies, lower economic development level, and smaller FDI inflows. However, the economies in this cluster generally have trade surpluses.

Table 2.2 illustrates the clusters in 1985. The pattern is almost the same as in 1980, except for the middle tier. China (CHN) opened its door to international direct investors at the end of the 1970s and started formal surveys of FDI at the beginning of the 1980s. Thus, in the tree of 1985, China enters the list as a member of the "Developing Giants" group with India (IND). China and India are both low-income economies with large populations and relatively high FDI inflows. In addition, Brazil (BRA) shifts to the "FDI Important" cluster from "Developing Giants" because Brazil has a per capita output higher than the global average, a larger economy than India, and a trade surplus.

Another interesting change is that the top tier's "Traditional Developed Powers" group (including Germany, France, Italy, and the United Kingdom) combines with the "FDI Attractive" group (middle tier) to build a bigger cluster. This occurs because the similarities between the "Traditional Developed Powers" and "FDI Attractive" groups are increasing. This structural change may come from the faster growth of the economies, population, and FDI inflows in the "FDI Attractive" cluster.

The tree of Cluster Analysis for 1990, presented in Table 2.3, brings in a new pattern of characteristics. The USA is no longer unique. Because the Japanese Yen appreciated significantly in the late 1980s, the difference between the USA and Japan in the size of the economy (calculated in US$) shrinks so much that they form a single

cluster. The ratio of the Japanese GDP to the USA GDP (valued in constant 1995 US$) increases from 70% in 1985 to 76% in 1990, and the ratio for GDP per capita (PPP)[25], from 73% to 80% or more. This "Economic Super" cluster attracts the highest FDI inflows in the world, and has the largest economies, plus large populations, and very high per capita output. The cluster, on the whole, has both a huge trade deficit (because of the USA) and high net FDI outward flows (due to Japan).

In addition, the "Developing Giants" group (China and India) combines with the European "Traditional Developed Powers" to compose a special cluster, "FDI large, Big Powers". Faster economic growth in China and India diminishes the difference between the developing and developed giants in the size of their economies. For example, the GDP ratio of "Developing Giants" to "European Developed" rises from 19% to 23%. In addition, both groups have a trade surplus.

The middle tier, "FDI Important" in Table 2.3, is especially unstable: two Latin American economies, Mexico and Brazil, drop out of the table for the 1990 cross-section because important information is not available, while Australia (AUS), Belgium (BEL), Indonesia (IND), Korea (KOR), Netherlands (NLD), Sweden (SWE), and Switzerland (CHE) are new member, and Canada (CAN) and Spain (ESP) continue in their membership. The nine countries in this cluster have relatively large economies, a high economic development level, and large FDI inflows, but report trade deficits.

Cluster Analysis for world economies in 1995, depicted in Table 2.4, shows almost the same picture as 1990. The only significant difference is in the middle cluster "FDI Important". Russian FDI inflows were first reported as a positive value in 1994 and

[25] Japan nominal GDP per capita was higher than U.S.A. in both 1985 and 1990.

in 1995. Russia attracted $2.1 billion FDI in 1995, a figure above the global mean. Large size and a huge trade surplus, indications of economic potential, put Russia in the "FDI Important" cluster. Mexico returns to the tier with Indonesia, Korea, Spain and Canada still in the group. This change is partially due to the uneven growth of the countries.

Changes in economies are reflected in the Cluster Analysis for 2000, shown in Table 2.5. After economic stagnation in Japan during the 1990s, the difference between the USA and Japan widens. The Japan/USA GDP ratio (in constant 1995 US$) decreases from 72% in 1995 to 63% in 2000, the ratio for GNI (in current US$) goes down from 73% in 1995 to 49% in 2000, and the ratio for GDP per capita (PPP)[26] drops from 80% in 1995 to about 74% in 2000. Thus, the picture of 2000 with only the USA in the "FDI Max" cluster shows a continued dominance of USA over all the other economies. Japan drops to the 2nd cluster ("FDI Peculiar"). It still forms a separate cluster as in the 1980s, with the second largest economy in the world, very high per capita output, and a huge trade surplus, which indicate the high FDI inflow potential. But actually, Japan has extremely low FDI inflows and large FDI net outflows.[27]

As in 1995 and 1990, the "FDI large, Big Powers" cluster in 2000 consists of two developing giants (China and India) and four European traditional developed powers (Germany, France, United Kingdom and Italy). But their difference in economic size keeps shrinking: the ratio of GDP between the "Developing Giants" and European

[26] In term of nominal GDP per capita, Japan was still higher than U.S.A. in both 1995 and 2000.
[27] One possible result from trade surplus is negative net FDI flows (outflows higher than inflows). Even though this is an explanation for Japanese high FDI outflow, it can not fully explain the extremely low FDI inflows to Japan.

"Developed Powers" increases from near 34% in 1995 to 43% or more in 2000, and the ratio of GNI between the two groups jumps from nearly 34% to about 54%.

Moreover, the middle cluster "FDI Important" in Table 2.5 remains unstable: Indonesia drops out of the cluster because its economy suffered significantly from the Asian financial crisis in 1997, and in 2000 Indonesia has not fully recovered. For example, Indonesian GNI in 2000 is only 72.0% of the 1995 level, and GDP per capita in 2000 is still 3.3% lower than 1995. In addition, starting from 1998, Indonesia has experienced four successive years of FDI divestment with total loss value of $10.9 billion, around 30% of FDI stock in 2007 when Indonesian FDI stock peaks[28]. And since Mexico lacks data on net FDI, it is placed in the FDI missing group. Brazil, however, reports the full set of FDI related variables, and thus appears again in the "FDI Important" cluster.

Only one year after the 2000 cross section, the 2001 Cluster Analysis, reported in Table 2.6, shows a new finding: after the USA and Japan, China becomes the third economy to form a separate cluster. After almost two decades' rapid growth, the Chinese economy has the same size as the European traditional powers and double the size of the "Developing Giants" cluster member- India. Its FDI inflows are also very important in the world, with annual inflows of near $47 billion in 2001, the 6th largest in the world and the largest among developing economies, even more than the total value of FDI inflows into South America in 2001.

Mexico returns to the middle cluster, "FDI Important", because it reported values for the full set of FDI-related variables in 2001.

[28] Indonesian FDI stock comes from World Investment Report (WIR) 2007.

2.4 Conclusion

In classifying global economies, IDP theory and its extension focus on the relation between FDI and income (development level). The foregoing six snapshots of Cluster Analyses have drawn a different picture.

The top tier consists of eight economies which are either the high-income, most developed economies or the largest developing economies. The USA is a cluster of one - distinct from all other economies in most cross-sections. After the USA, Japan is also a unique economy. China also stands out in the cross-section of 2001. After these three special individual countries, India and four European traditional developed economies form the "FDI Large" cluster. This top tier is relatively stable. The middle tier, "FDI Important", however, keeps changing its membership. Finally, two large categories of "FDI Standard" and "Missing Values" are found in the bottom tier.

Besides economies in the unstable middle tier "FDI Important" (which are migrating among clusters regularly), three countries have obviously shifted clusters: Japan, which enters the "Super Economies" cluster with the USA in the 1990 and 1995 cross sections, then returns to its own cluster in 2000 and 2001. China and India come from an unstable "FDI Important" cluster and jump up to join the traditional European powers' "FDI Large, Big Powers" group in the 1990, 1995, and 2000 pictures. At the end, China advances a step further to form an individual cluster in the top tier in the 2001 cross-section.

These findings prompt the following questions: How are the USA, Japan and recent China unique? Why are they unique? Why is the top tier (with eight economies)

relatively stable but the middle tier changing? Why are three Asian countries (Japan, China and India) more dynamic than other global economies?

The previous analysis shows that the USA has the largest economy in the world, the highest FDI net inflows for most years, and a remarkably high economic development level. Politically stable and mature economic policies make the USA a FDI paradise in the world. It also has a huge trade deficit which may need high FDI inflows to compensate[29]. These unique characteristics make the USA outstanding among the economies in the world.

Japan is the second largest economy in the world, with an even higher nominal GDP per capita than the USA in all six cluster snapshots. But Japanese FDI inflow is especially low considering its high weight in GDP and trade in the global economy.

China, with the largest population in the world, has a large economy. It is also growing rapidly and attracting a particularly high level of FDI, especially the green field FDI (new plants instead of Mergers & Acquisitions).

The top tier includes consistently and obviously unique economies in the world. But the middle tier is between the unique top tier and standard economies in the third tier. The middle tier members keep evolving in an unstable pattern.

The relatively high economic growth rate and large size of the three Asian economies (Japan, China, and India) make them move very sharply and significantly across the clusters. Russia, also a large economy with a fast growth rate, may show an equally dramatic shift.

[29] A way to finance a trade deficit is to have positive net FDI flows (FDI inflows larger than FDI outflows). Thus, a trade deficit often drives high FDI inflows.

The three big tiers of clusters produced by this empirical analysis show that income level is the crucial factor in defining the clusters. Even though this paper did not yield the same conclusion, IDP's concentration on the income level in segmentation is still confirmed by this paper.

This Cluster Analysis, from a simple and clear way, proves that segmentation of economies in the world is necessary to study FDI inflows. Moreover, from the pictures of clusters, the income related variables should be used in segmentation.

Some econometric methods, such as dummy variables, separate models for different economic groups, and fixed-effect regressions can be applied to future FDI analyses to take care of the clusters' particularity.

Table 2.1: Tree Diagram of Cluster Analysis of World Economies in 1980

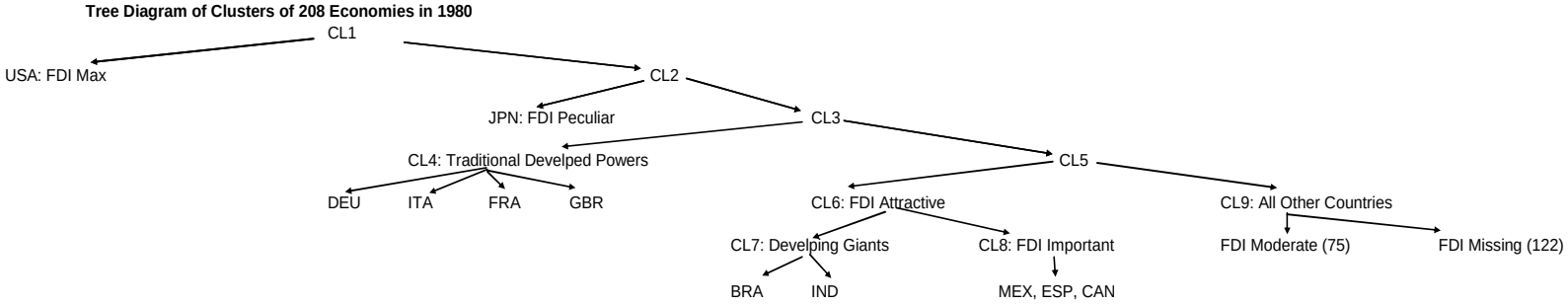


Table 2.2: Tree Diagram of Cluster Analysis of World Economies in 1985

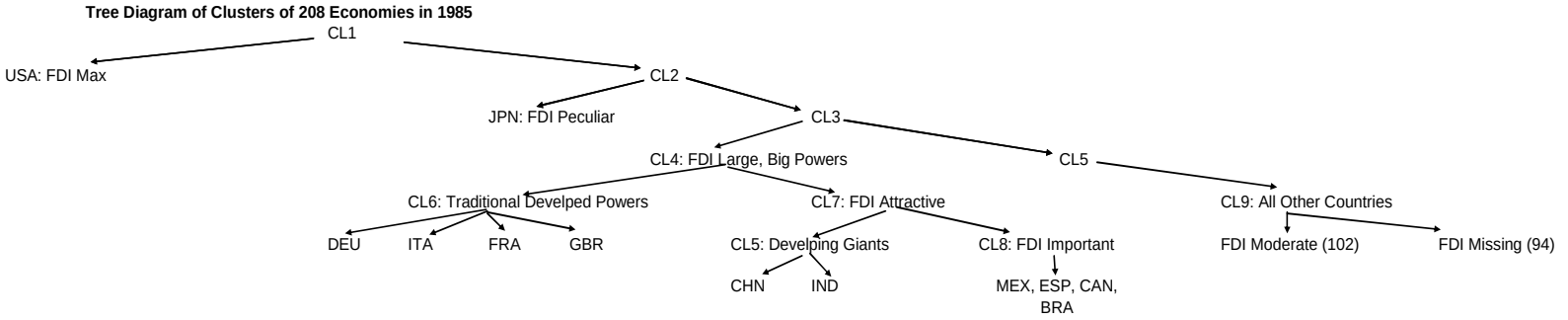


Table 2.3: Tree Diagram of Cluster Analysis of World Economies in 1990

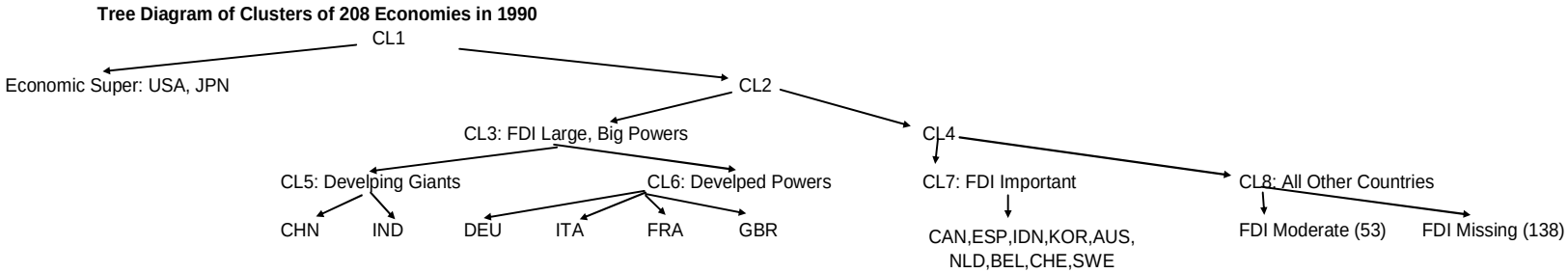


Table 2.4: Tree Diagram of Cluster Analysis of World Economies in 1995

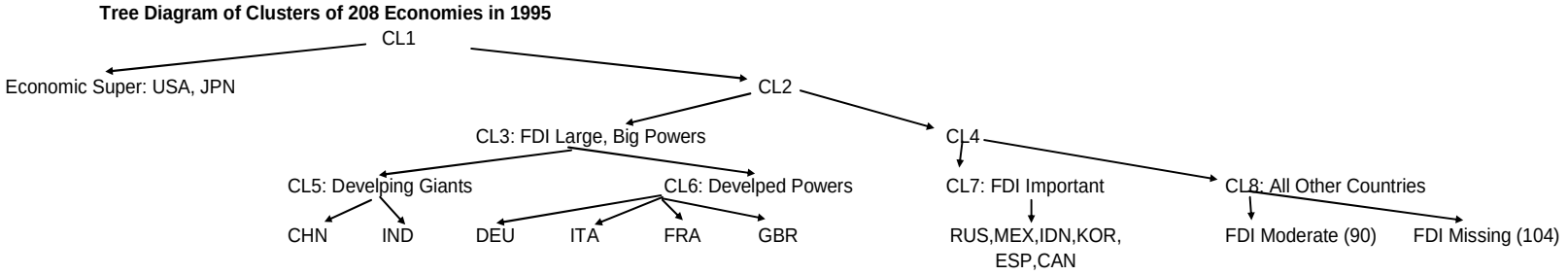


Table 2.5: Tree Diagram of Cluster Analysis of World Economies in 2000

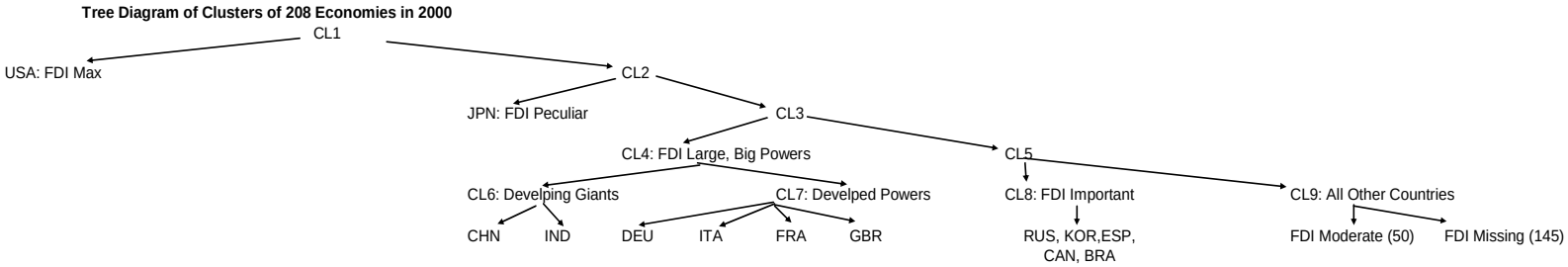


Table 2.6: Tree Diagram of Cluster Analysis of World Economies in 2001

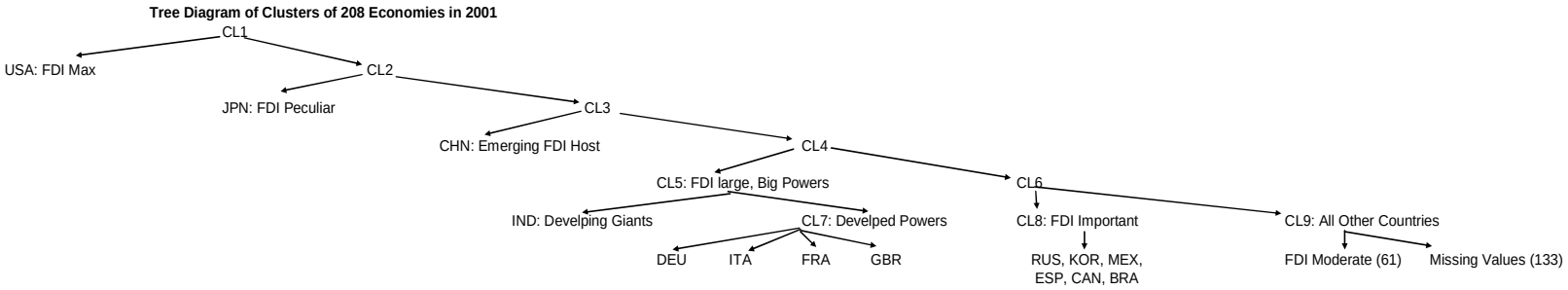
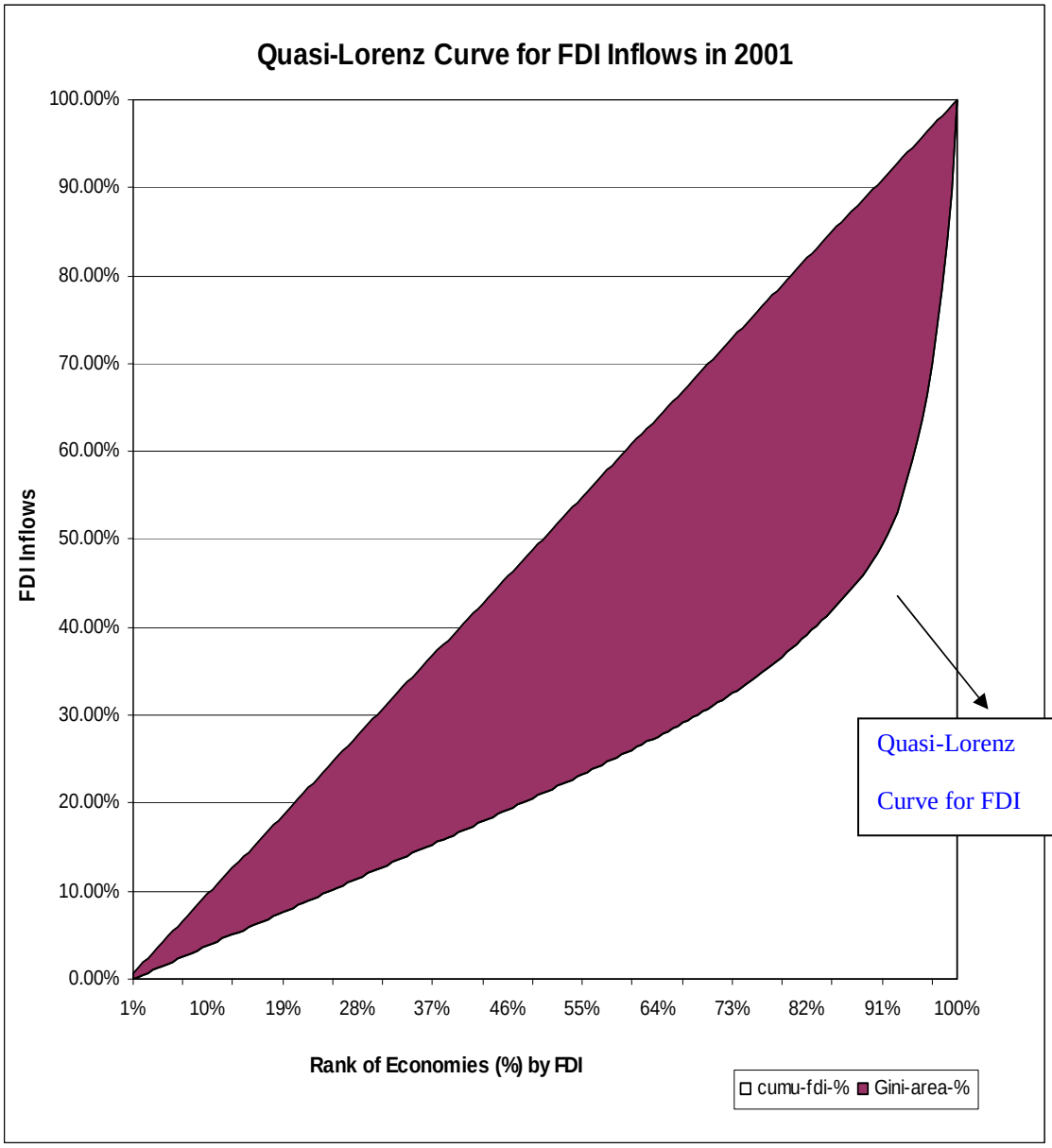


Figure 1: Quasi Lorenz Curve for Distribution of FDI Inflows in 2001



Chapter 3: The Determinants of Foreign Direct Investment Inflows: Do Different Average Income Levels Matter? (Blundell-Bond System GMM Estimations)

A large number of studies emphasize FDI determinants but ignore the income distribution on the results, which biases the estimates. I correct for heterogeneity due to income distribution by using the Blundell-Bond System GMM (Generalized Method of Moments), which controls for endogeneity problem as well. I categorize the countries according to their level of development: high, middle and low income. I further break down the middle income category into upper and lower segments. I consider level effects and various interactive effects.

I find that income levels play a significant role in FDI determination model. Controlling for income levels corrects the sign and the magnitude of a number of estimates. In particular, results show that low income countries attract more FDI, ceteris paribus. This result is in stark contrast with the traditional consensus that capital flows to rich countries (Lucas 1990). Moreover, modeling income levels shows that lagged FDI has consistently positive effect on FDI, which is a dynamic model structure. Consistent with the literature, market potential and education boost FDI and results are robust to income levels. FDI increases with risk levels because during financial or economic crises it replaces other investments. Tax rates overall exert downward pressure on FDI, but mostly when the middle and low income levels are controlled for. This article also supports the Tariff Jumping FDI argument in middle and low income economies,

according to which, FDI is a potential substitute for international trade. My results reject the hypothesis of the wealth effect of exchange rate, and there is weak evidence that the depreciation of local currency discourages FDI in particular in poorer countries. Results are broadly robust to the modelization of income dummies; in other words, results are stable for different specifications of income dummies (one intercept dummy, two intercept dummies, and slope dummies, etc).

3.1 Introduction

Foreign direct investment (FDI) is widely perceived as a critical and powerful development engine for many countries. Its importance stems not only from adding to gross capital formation, improving balance of payments, and creating employment in the FDI receiving (host) countries, but also from a spillover of technological know-how and business skills, as well as increase of competition and efficiency, which is crucial for a quick take–off for development. At the firm level, many FDI enterprises have become the market leaders and technology pioneers in FDI host economies. Comparing with other types of international investment, FDI has some unique advantages. For example, FDI inflows are much less volatile than short-term investment (Albuquerque, 2003), because FDI is mainly private and stimulated by business motivation with the long-term[30] goal of acquiring control over enterprises.[31]

The purpose of this paper is to propose and test a FDI determination model, controlling for country income levels (dummies proposed in previous Chapter 2), which includes the most commonly-used variables which are found in previous Chapter 1 and applies to a large panel data.

There is a large volume of literature examining the determinants of FDI. Unfortunately, almost all analyses are fragmented and focus on restricted regions and a subset of important explanatory variables. There are very few articles that comprehensively study FDI inflows based on the global panel data with various

[30] FDI is generally considered long term international investment because the acquisition process may exceed one year, and more important, the holding time is generally longer than one year, which is clearly different from international indirect investment.

[31] The benefits of FDI are focal points here. FDI does have some negative effects for some specific industries in the short term. However, on the whole, FDI produce net benefits for both home and host economies in the long run.

commonly-used variables. Moreover, FDI inflows clearly differ across economies in terms of level, growth rate and volatility. Government policy towards FDI is also diverse among economies. In addition, the Cluster Analysis in the previous Chapter 2 recommends grouping global economies according to their income levels. Therefore, it is necessary to carefully segment economies to study global FDI inflows.

My study tries to answer the following questions. Is there a general FDI determination model for the full sample of global economies or does one find different models for economies with different income levels? In other words, does controlling for the income level affect the FDI model?

Traditional OLS (random effect) and fixed effect regression methods are not good tools to answer these questions and estimate panel data with different time spans, a lagged dependent variable and potential endogeneity problems. Fortunately, the new Blundell-Bond system GMM method has been introduced into FDI determination research, e.g., Carstensen and Toubal (2004) and Anghel (2006).[32] The method uses all available information in the panel data without bias and consistently estimates the model using a lagged dependent variable. It effectively applies instrument variables to solve endogeneity problems. This paper will apply the Blundell-Bond system GMM method to estimate the FDI determination model. But unlike Carstensen and Toubal (2004) and Anghel (2006), who concentrate on Central and Eastern Europe and transition economies, this paper will expand FDI studies into the full sample of global country-level panel data.

I find a negative correlation between the level of average income (dummies) and the FDI flows, but no significant relation with the middle average income level. This

[32] Blundell-Bond system GMM is also used to study the effect of FDI in Uctum and Doytch (2008).

result only partially supports the Investment Development Path (IDP) theory[33] with respect to the highest income level but not for the middle and low income levels.

Consistent with the literature, GDP and human capital are significant attractors of FDI at all income levels. The positive relation between FDI and country risk suggests that FDI substitutes for other investment flows in periods of financial instability. Similarly, the positive relation between tariffs and FDI suggests that FDI is a potential substitute for international trade. When middle and low income levels are controlled for, evidence suggests that an increase in taxes and depreciation of the currency exert downward pressure on FDI flows.

The structure of this paper is as follows. Section II summarizes major advances in the literature on FDI determinants. And Section III proposes a new model. Then the stylized facts on FDI are introduced in Section IV. Section V briefly explains the new Blundell-Bond system GMM econometric method, and Section VI describes the data used in GMM estimations. The empirical econometric results are reported and discussed in Section VII. Then Section VIII tests the robustness of the model by analyzing two model variations with additional explanatory variables. Section IX presents a general conclusion with policy implications.

[33] IDP theory proposes a unique relationship between FDI and host income level: FDI is very small for a low income economy; it increases quickly as host incomes grow (for Middle and Low-end of High Income economies); but for the topmost income niche, FDI does not keep the same robust trend and sometimes declines. For details, see Dunning (1981, 1986) and Dunning et al (2001).

3.2 A Short Literature Review

The FDI literature starts with the articles by Scaperlanda (1967), Wallis (1968), d'Arge (1969, 1971a, 1971b) and Schmitz (1970), which focus the relationship between international trade (especially when Customs Unions are included) and FDI. Meanwhile, Bandera and White (1968) are among the first to establish the importance of host market size (GNP) as a major determinant of FDI.

From the 1980s onwards, an extensive literature has begun to examine the influences of exchange rate (Cushman, 1985) and interest rates (Cushman, 1985, and Culem, 1988). The first manifestation of inflation rate and political variables, e.g. the type of government and political system, also goes back to the 1980s in work by Schneider and Frey (1985). And host labor cost is introduced in Culem's model (1988).

Since the 1990s, taxation has been extensively analyzed by many researchers, e.g. Hines and Rice (1994), Altshuler and Grubert (1996), Wei (1997a, 1997b, 2000), Lipsey (1999a), Klein and Rosengren (2000), and Bandelj (2002). Host tariff is found to be positively correlated with FDI by Grubert and Mutti (1991), Jun and Singh (1996), and Hasnat (1997), although some researchers do end with mainly insignificant results. Lagged FDI, a lagged dependent variable, is generally a significant and positive determinant of FDI (Tu and Schive, 1995, Barrell and Pain, 1996, 1998, Kogut and Chang, 1996, List, 1999, Lopez-Duarte and Garcia-Canal 2002). Education also has a positive effect in Eaton and Tamura (1994, 1995, and 1996), Asiedu and Esfahani (2001), Castellani and Zanfei (2002). Dummy variables (time, region, or country dummies, etc) are also applied in many FDI determination models.

In a recent development of econometric methodology, the Blundell-Bond system GMM approach has been used by Carstensen and Toubal (2004) and Anghel (2006) in dynamic models to study FDI. The method is also applied by Uctum and Doytch (2008) to analyze the effect of FDI. Similarly, I apply the Blundell-Bond system GMM method to the study of FDI. Carstensen and Toubal (2004) focus on FDI in Central and Eastern European countries and Anghel (2006) concentrates in transition economies. The main contribution of this paper is to provide a comprehensive study of country level FDI in the world.

3.3 Stylized Facts

Actual global FDI inflows are soaring dramatically. The sum of global FDI inflows was less than US$13.5 billion in 1970; in 2007, it has risen to a record level of around US$ 2 trillion, which is almost 3.4% of global GDP and about 14.8% of global gross fixed capital formation (UNCTAD). One obvious attribute of FDI is that its remarkable growth is far from a straight line. Global FDI inflows were around US$ 400 billion in 1996. Then, FDI inflows grew rapidly in 1997-1999 and peaked in 2000 with nearly US$1.4 trillion. However, they had dropped for the next three years to around US$ 564 billion in 2003, less than half of the previous peak, due to the economic downturn in the U.S. and other developed economies. Since then, FDI inflows have recovered for four consecutive years and set a new record level in 2007 (Figure 2).

Another feature of FDI is that they are so different across economies. Both the maximum and minimum country level FDI inflows in FDI history were marked in 2000: the U.S. attracted $307.74 billion (21.8% of global FDI) of FDI while Indonesia divested $4.55 billion of FDI. According to WDR 2009, when global economies are divided into three groups by their gross national income (GNI) per capita in 2007: high income (HIC, $11,456 and above), middle income (MC, $936-$11,455), and low income (LIC, $935 or less), then FDI inflows to high income countries accounted for nearly 73.8% of global FDI in 2006, the middle income group attracted 24.7% of total FDI in 2006, while the low income group only received about 1.5% (Figure 3). FDI's heterogeneity, which is significant across time and countries, makes it necessary to carefully segment the panel data by including time and country group dummies into the model.

3.4 Model Specification

According to Chapter 1, various forms of the dependent variable have been used in the literature on FDI determination, e.g. the level of FDI inflows, the level of annual FDI adjusted for inflation (GDP deflator), annual FDI inflow/GDP, FDI stock (by year end), and the number of annual FDI projects. In this model, the dependent variable is the level of annual FDI inflows that is the most commonly selected in the FDI literature.[34]

The FDI determination model is based on the proposition that FDI is a function of the following eleven explanatory variables, which recommended in Chapter 1.

Market size, which can be represented by host GDP or GNI (Gross National Income), has been identified as one of the most important explanatory variables. It is expected to be positively related to FDI inflows[35]. The size of host GDP or GNI indicates the FDI host country's general economic conditions. Specifically, a larger GDP or GNI represents a larger potential demand for FDI enterprises' output in the host economy that results in achieving economies of scale. Ito and Rose (2002) and Bevan et al. (2002) have also proposed that a larger host market allows the co-existence of multiple FDI firms.

Previous FDI stands as another very important variable expected to have a positive sign in the model. Wheeler and Mody (1992), Lee and Mansfield (1996), and Dilyard (1999) have summarized agglomeration economies for FDI, which are the increasing benefits to co-location by FDI enterprises.[36] Moreover, Ito and Rose (2002)

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[34] Scaperlanda (1967, 1968), Goldberg (1972), Summary and Summary (1995), Lipsey (2000a), Dunning (2001) are leading researchers who use level of FDI inflows as dependent variable in the FDI determination models. For a full list of studies using level of FDI inflows as dependent variable, please see Appendix 3.6.
[35] According to Grubert and Mutti (1991), Lee and Mansfield (1996), Lipsey (1999a), Billington (1999), Dilyard (1999), and Fung et al. (2002).
[36] This co-location benefit exists in both manufacturing and service industries, making production costs lower (in manufacturing) and providing a larger market for customers (in retail, hotel and other service industries).

proposed a learning curve hypothesis regarding FDI: Foreign investors with previous FDI have more relevant experience and knowledge that are positively associated with their tendency to have additional FDI in the future. Noorbakhsh et al. (2001) propose that an oligopolistic reaction, in which market competitors tend to match each other's FDI, may be a reason for the strong explanatory power of previous FDI. Examples include European, American and Japanese FDI in the automobile, food, detergent, and retail industries in China.

Also relevant to FDI level are production factors, such as wage rate, education (for quality of labor), and real interest rate (as capital price). They should be added to the model. The argument on wage's effect on FDI is two-pronged. Labor cost or wage in the host country has been found to be a major component of FDI cost, implying that higher labor cost (wage) will deter FDI inflows. In other words, FDI inflows chase cheap labor. However, higher labor cost in the host country may represent higher quality of human capital and greater productivity of FDI, hence more FDI inflows.

Education should increase FDI because education improves human capital. Nevertheless, research on the effect of school enrollment has not always yielded positive conclusions.

Host interest rate may have a positive effect on FDI inflows, as has been demonstrated by several studies which analyze the costs of borrowing that an international investor faces in securing funds for FDI: if host interest rate is low (relative to home interest rates), foreign investors will raise more funds within the host country for their investments and a smaller FDI will flow in.

Tax rate is also added to the model with a negative sign since tax is seen by FDI investors as a burden on their business.

FDI, as international investment, could be expected to be correlated with three international economic components: exchange rates (local currency per US$), tariffs and the host openness to trade (indicated by imports or foreign trade as a proportion of GDP). The expected effect of exchange rate on FDI is twofold. Cushman (1985), Froot and Stein (1991), and Goldberg and Klein (1997) argue that currency depreciation in the host country will generally lower production cost relative to the home country, resulting in higher FDI. In addition, lowering the value of that currency raises the wealth of foreign investors relative to that of domestic (FDI host) investors, thus stimulating FDI. However, if the production inputs are imported, then the depreciation will increase production cost, which may harm the FDI enterprises and hurt FDI inflows. Another argument for host currency depreciation's negative effect is that it is perceived as financial weakness which may both alarm foreign direct investors and hurt them financially. For example, during the financial crises in Mexico in 1984 and in Indonesia and the other southeastern Asian economies in 1997, dramatic local currency depreciation was followed by sharp drops in FDI inflows. Hence, the sign of the exchange rate / FDI relation is an empirical matter.

Tariff rate (import duties) has two possible counter-effects on FDI. According to Grubert and Mutti (1991), tariffs on foreign goods and services in the host country may encourage FDI because tariff, as a trade barrier, may protect foreign investors' activities in the local market. In addition, a higher tariff raises import prices and makes international trade more costly. In order to maintain their market share in a promising

economy, former exporters may be forced to undertake FDI to avoid the tariff or other trade barriers. This behavior has been very common in the history of FDI in the United States (Wilkins, 1989).

Tariffs, however, have other potential effects that may discourage FDI. A higher tariff is not only a financial burden to business, but also may be an unfavorable indicator of macro-economic conditions: it may suggest lack of freedom of enterprises' activities. Tariffs are often accompanied by other restrictive measures which dampen profits and distort resource allocation. In some extreme cases, tariffs may cause trade partners to take retaliatory actions which directly depress the FDI enterprises' potential to export to the global market. Hence, tariff's net effect on FDI depends on the sum of the two counter-forces.

The trade openness (imports or foreign trade as a proportion of GDP) of the host economy is expected to increase FDI inflows. Morisset (2000) suggested that a high degree of openness should positively influence foreign investors through trade liberalization and more competition. Noorbakhsh et al. (2001) showed that open economies encourage more confidence and FDI since even in host countries with small domestic markets, FDI enterprises can reap economies of scale and scope, by increasing participation in international trade and regional integration schemes.

In investigating the effect of country characteristics on FDI, a country risk variable (represented by investment profile) and dummies for income groups are also important explanatory variables. A country risk index (higher score means lower risk) is expected to have a positive correlation with FDI in the model, if FDI investors are risk

averse. Country income group dummies can also help to test Dunning's IDP (Investment Development Path) theory on the relationship between FDI and income level.

In addition, time (year) dummies are added to the model to control for time - specific effects.

3.5 Methodology

The Pooled OLS or the Random Effect method is not unbiased or consistent because the assumption that individual effect is uncorrelated with the other regressors for OLS and Random Effect is not valid any more in the dynamic FDI determination model including lagged dependent variable.

The Fixed Effects method also has the problem of "within transformation" which takes deviations from time-averaged sample means. This "within transformation" may increase standard errors by exacerbating any measurement errors and may be not informative when dealing with variables with little time variation or ones that are infrequently measured.

Moreover, certain variables in the model may have endogeneity problems, such as GDP, real interest rate, and openness of the economy, since the dependent variable FDI in the host economy may affect these explanatory variables, due to its far-reaching influence on the host economy. The usual Pooled OLS, the Random and Fixed Effects methods are inappropriate to deal with endogeneity problems.

Arellano and Bond (1991) have created a generalized method of moments (GMM) estimation to specifically solve the issues in the unbalanced (different time spans) panel data with lagged dependent variables. Because Arellano and Bond (1991) have designed a new set of instrumental variables, their method offers a solution to potential endogeneity.

As specified in Section 2, the new FDI model can be written as:

$$Y_{i,t+1} = \gamma_i + Y_{i,t}\,\alpha + X'_{i,t}\,\beta + W'_{i,t}\,\gamma + \varepsilon_{i,t}, \qquad (1)$$

$$\text{and} \quad \varepsilon_{i,t} = \zeta_{i,} + \omega_{i,t} \qquad (2)$$

where subscript i=1,…,95 which denotes the 95 FDI host economies and another subscript t is the time dimension of the panel data, ranging from the year 1984 to the year 2000. Thus, γ_i stands for the country-specific effect. $Y_{i,t+1}$ is the dependent variable, FDI inflows into economy i in the year t+1. And $Y_{i,t}$ is the lagged dependent variable. α is the stationary parameter measuring the self-adjustment of FDI across different time periods.

$X_{i,t}$ is the "traditional" vector of explanatory-variables. It contains, according to the model specification, independent variables as follows: exchange rate (Exchange Rate), and the following host country measures, GDP in current billion US$, tax rate (Tax), wage rate (Wage), real interest rate (Real Interest Rate), tariff (Import Duties or Tariff), Openness (Open), education (School Enrollment), and political risk (Risk).

In addition, $W'_{i,t}$ denotes the host economy's income dummies, high income (HIC), low income (LIC), middle income (MC), upper middle income (UMC), lower middle income host economy (LMC). Lastly, time (year) dummies are also included to capture time-specific effects.

Equation (2) represents the error structure: $\zeta_{i,}$ stands for the time-invariant country-specific component and $\omega_{i,t}$ is a pure stochastic error term, which is assumed to be uncorrelated with i and t.

Arellano and Bond (1991) apply the GMM method to transform equation (1) into the following first differences (3):

$$\Delta Y_{i,t+1} = \Delta Y_{i,t}\,\alpha + \Delta X'_{i,t}\,\beta + \Delta \omega_{i,t}, \qquad (3)$$

One advantage of the first-difference form is that the individual economy's specific effect item γ_i is eliminated. Arellano and Bond (1991) use all appropriate lags of

$Y_{i,t}$ and $X_{i,t}$ (as well as $W'_{i,t}$) to generate the instruments on the assumption that there is no autoregression. The following matrix of instruments is used to estimate coefficients:

$$Z_i = \begin{pmatrix} 0 & \dots & \dots & 0 \\ Y_{i,1}\ X_{i1}\ W_{i1} & 0 & \dots & 0 \\ 0 & Y_{i,1}\ X_{i1}\ W_{i1}\ Y_{i,2}\ X_{i2}\ W_{i2} & \dots & 0 \\ \dots & & & \\ 0 & \dots & Y_{i,1}\ X_{i1}\ W_{i1} \dots Y_{i,t-2}\ X_{it-2}\ W_{i\,t-2} & \end{pmatrix}$$

For predetermined variables in X_{it} , Arellano and Bonds (1991) use two moment conditions: $E[X_{it-1} \Delta \omega_{i,s}] = 0$ and $E[Y_{it-2} \Delta \omega_{i,s}] = 0$ for $t \leq s$. The procedure just discussed is called Arellano-Bond difference GMM estimation.

However, when the autoregressive parameter is fairly large and the number of time series observations is fairly small, the Arellano-Bond estimator has large finite-sample bias which resulting in poor precision in simulation studies (Alonso-Borrego and Arellano, 1996). Furthermore, if the dependent variable follows a random walk, then its first lag (t-1) is a poor instrument. Moreover, if the explanatory variables are persistent over time, their lagged levels provide weak instruments according to Alonso-Borrego and Arellano (1999) and Blundell and Bond (1998).

To solve these issues, Blundell and Bond (1998) extend the Arellano-Bond method by adding lagged differenced variables as instruments for equation (1) and thereby dramatically improve efficiency. This system GMM method can apply information on cross-country differences, which is unavailable with the difference GMM

method. The additional moment conditions are: E[$\Delta X_{it-1}\ \varepsilon_{i,t}$] = 0 and E[$\Delta Y_{it-1}\ \varepsilon_{i,t}$] = 0. The system GMM method requires two additional conditions: first, the error term is not serially correlated. Second, even though the unobserved country-specific effect may be correlated with the levels of the explanatory variables, there is no correlation between the difference in the explanatory variables and the error term.

The new instrument matrix for this system GMM is:

$$
Z_i^{+} = \begin{pmatrix}
Z_i & 0 \ldots & \ldots & & 0 \\
0 & \Delta Y_{i,1}\, \Delta X_{i1} & & & 0 \\
0 & 0 & 0 & \Delta Y_{i,2}\, \Delta X_{i2} \quad \ldots & 0 \\
\ldots & \ldots & \ldots & \ldots & \ldots \\
0 & \ldots\ 0 & \ldots & & \Delta Y_{i,t-1}\, \Delta X_{it-1}
\end{pmatrix}
$$

where Z_i is defined in the previous page.

In order to validate the assumptions of no series correlation, the AR(2) test is also established in Blundell-Bond system GMM method.

3.6 Data

This paper analyzes panel data on global FDI inflows covering 95 economies in the world from 1984 to 2001. These 95 economies are divided into the following three income groups according to their 2001 gross national income (GNI) per capita: low income (LIC), $745 or less; middle income (MC), $746–$9,205, and high income (HIC), $9,206 or more. In some cases, the middle income (MC) group has been further divided into lower middle income (LMC, $746-$2,975) and upper middle income (UMC, $2,976–9,205). Five dummies for different income groups (HIC, LIC, MC, LMC and UMC) are created for the regressions, with one intercept dummy only, or with both an intercept dummy and one set of slope dummies. In addition, three income dummies (HIC, LIC, and MC) figure in the scenario, including two intercept dummies.

As the dependent variable in the FDI determination model, FDI inflows refer to the annual international investment (in current millions of U.S. dollars[37]), used to acquire a lasting management interest (10 percent or more of voting stock)[38] in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvested earnings, other long-term capital, and short-term capital as shown in the balance of payments.

Most of the explanatory variables used in this paper come from the World Development Indicators (2003). They are all for FDI host economies. These variables include the host's GDP in current billions of US$; the official exchange rate (the FDI

[37] FDI can be in current US$, in real terms (adjusted by the GDP deflator), or normalized by GDP. This paper's usage of FDI in current US$ follows the setup of the dependent variable by Scaperlanda (1967, 1968), Bandera and White (1968), Summary and Summary (1995), Lipsey (2000a), and Dunning et al. (2001). For a full list of studies on FDI in current US$, please see Appendix 3.7.

[38] The 10 percent threshold is determined by the IMF and the UN and is commonly used by most countries in the world. The optimal definition (the percentage of voting shares) for FDI is an interesting topic in literature.

host's currency per US$); the host tax rate calculated by the share of net taxes in GDP (both in current US$); the host wage rate created by the share of the wage bill in GDP in basis points; the host real interest rate (the lending interest rate adjusted for inflation as measured by the GDP deflator); the host tariff represented by import duties (% of tax revenue); and the host openness measured by the value of imports (of goods and services) divided by GDP.

Host education is represented by secondary school enrollment ratio (the number of students enrolled in the secondary school, regardless of age, as a percentage of the population of the official secondary school age). This variable has been compiled from the World Development Indicators (2003) and the web site of United Nation Educational, Scientific and Cultural Organization.

The country's political risk variable in the model is referred to as Investment Profile in ICRG (International Country Risk Guide). It is a measure of the government's attitude to inward investment as determined by four sub-components: the risk to operations, taxation, repatriation, and labor costs, with a higher value standing for lower risk in each case.

3.7 Empirical Results

Estimation results for the Blundell-Bond system GMM with one income dummy are presented in Table 3.1, with three panels for different income dummies (High Income, Middle Income, and Low Income). Each column represents results for instrument variables (IVs) with different lags indicated at the top of the column. I also broke down the Middle Income group into Lower Middle Income (LMC) and Upper Middle Income (UMC) economies, results are reported in Appendixes 3.1 and 3.2. As previously pointed out, the inclusion of different income dummies can clarify the effect of income class on FDI and evaluate the robustness of the Blundell-Bond system GMM estimation more explicitly.

Furthermore, estimation using different IV (instrument variable) lags can take advantage of the sophistication of the Blundell-Bond system GMM method with respect to IV lags, and assess the robustness and stability of the model which captures the traditional determinants for FDI inflows. Time (year) dummies have also been added to all regressions to account for time-specific effects, such as legal and political changes, threshold effect, and structural changes.

The Arellano-Bond AR(2) statistics are computed to test the restriction of no autocorrelation for the Blundell-Bond system GMM estimation. As shown at the bottom of Table 3.1, all specifications can not reject the null hypothesis of absence of autocorrelation at the 10% significance level. Therefore, the result of the AR(2) test supports the use of the Blundell-Bond system GMM method in the FDI model.

Income levels play a significant role in FDI determination model. If I do not control for income levels, results give unintuitive coefficient estimates for determinants

such as Openness, lagged FDI and education. Including income dummies keeps the significance of the coefficients of GDP, Tax, and Risk Index but affects their magnitude. This change reflects a misspecification problem when the model does not include income level dummies, because the GMM estimates become biased.

In all Blundell-Bond system GMM specifications, the lagged dependent variable is significant and positive, consistently confirming the dynamic model structure. This finding also shows hysteresis in the behavior of FDI, which is again consistent with previous literature. The range of the coefficients of lagged FDI is very similar across different income dummies, regardless of the different model specifications. The coefficients range from 0.43 to 0.44 with the "High Income" dummy (left panel in Table 3.1) and between 0.43 and 0.46 in the scenario with the "Low Income" dummy (right panel of Table 3.1). The coefficient increases marginally to the range 0.45 - 0.49 for the case with the "Middle Income Group" dummy (middle panel in Table 3.1). To see behind these results, I broke down the middle income category into Upper-Middle income and Lower-Middle income. I find similar results to aggregate "Middle Income Group" case (Appendixes 3.1 and 3.2 for cases with Lower-Middle Income and Upper-Middle Income dummies), indicating the robustness of the results.

The coefficients of the lagged dependent variable indicate that current FDI inflows will induce FDI inflows in the next period by the amount which is equal to about 46% of the current FDI inflows.

This conclusion is marginally larger than other researchers' findings, such as Carstensen and Toubal (2004) and Anghel (2006), which using similar GMM method. This difference may be due to the different regression data bases. They are estimating

country-level FDI in Central and Eastern European countries or firm-level FDI in transition economies. Before these economies experienced reform and became open to the world, they had little FDI. Thus, the industrial agglomeration effect of FDI is very small a priori. Another traditional reason for FDI is a reaction to competition: a company's FDI is triggered by its competitors' FDI. In order to defend its position in fierce competition, a company usually follows its main competitors' footprints in foreign investment (Oligopolistic Reaction[39]). In transitional economies, the existing FDI stocks are much smaller, resulting in smaller FDI driven by market competition. In addition, the shorter FDI history and smaller scale of FDI could make potential international investors worry about the FDI environment in these transitional economies. Small FDI inflows in Russia at the beginning of the 1990s can be served as evidence on this argument.

In contrast to Carstensen and Toubal (2004) and Anghel (2006), the present paper extends the FDI analysis to all income groups. All high income countries and many middle income economies have a long history of welcoming FDI, which may ease the international investors' political or legal concerns. In addition, the extensive existing FDI stocks may induce more FDI either through the industrial agglomeration effect or the "Oligopolistic Reaction". Therefore, the estimation for the effect of a lagged dependent variable is larger for the full sample than that for transition economies.

In the FDI literature, market potential, which can be represented by host economies' GDP, has a consistently positive effect on FDI inflows. This paper clearly supports this conclusion from a standpoint of global economies. On the whole, if host total GDP increases by US$1 billion, we find that the FDI inflows will increase by about

[39] Oligopolistic Reaction Theory is introduced by Knickerbocker (1973) to explain why firms follow rivals' investment into foreign markets.

US$8.5 million, which is the simple average of all coefficients of GDP in Table 3.1. Among different income group dummies in Table 3.1, the value of the coefficient is very similar, indicating the robustness of the model specification.

Education traditionally supports FDI according to the literature. This paper reaches the same conclusion that secondary school enrollment rate has a positive effect on FDI inflows in all regressions. The estimated parameters suggest that a percentage point increase in secondary school enrollment will lift FDI inflows by about US$145 millions. International investors fully understand the long-term benefits of education expenditure: good education not only provides high-quality labor for FDI projects, but also intensifies the other FDI drivers, for example improving domestic market potential through the increased productivity of an educated labor force.

Income group dummies are the focus of this analysis. The empirical results show that ceteris paribus, FDI will be lower by US$ 8.7 billion or so for high income economies compared to all the other economies, but FDI will be higher by about US$ 5.9 billion for low income economies compared to all the others. The coefficients are insignificant for the middle income group dummies. For the relationship between FDI and host income level, according to Dunning's Investment Development Path (IDP) theory (Durrning, 1981 and 1986), FDI is very small for the low income economies; it increases quickly as host incomes grow (for middle and some high income economies); but for the very top income niche, FDI inflows more slowly or sometime are lower. This paper's empirical results partially support Dunning's theory with respect to the highest income level but not for the middle and low income levels.

The potential explanation for this result is that IDP theory assumes a static and simple relationship between country's income level and FDI. By contrast, this paper is controls for eleven factors affecting FDI, and by using a dynamic approach, it also takes into account the income growth. The actual FDI trends in the world have generally supported most of the IDP theory, but few studies try to isolate the income level effect from the other FDI triggers, especially host market size. Thus, even though FDI inflows to high income economies are substantial, this is due, not to their income level, but to the other determinants: a vast domestic market, high previous FDI inflows, etc. In this analysis, FDI does not keep a linear relationship with host income. In high income economies, the big market potential and high historical FDI have already attracted very large FDI inflows, but FDI investors also cautiously constrain their investment in these economies. This can be seen from the negative sign of the high income dummy, which can also be regarded as setting a maximum for FDI. But in the low income group, the much smaller host market, sparse previous FDI and other social and economic barriers severely curtail FDI in these poor economies. But international investors eventually take the calculated risk and invest more than what the other variables predicted. This is reflected by the positive low income group dummy. FDI investors in the low income group presumably expect higher returns from taking higher risk. This can be seen as a floor effect (setting minimum) on FDI.

Country risk is also analyzed here. Surprisingly, low risk level, represented by a higher index score of the investment profile, has an adverse effect on FDI. In other words, on average, FDI increases by about US$ 810 million as the investment profile index score decreases by 1 (indicating a worse investment profile). The coefficients are

higher for the low income and middle income dummies and lower for the high income dummy. This result can be interpreted as follows: FDI replaces other investment flows when the market environment is unfavorable, because by controlling companies (through voting stock) in host economies, FDI investors obtain more say in their management and a safer situation for operation. Moreover, in a riskier situation, the project's price may be lower than its intrinsic value and the future appreciation potential is far greater. This is consistent with the rises in FDI in Southeastern Asian countries after the 1997 Asian financial crisis.

Tax rates exert significant pressure on FDI in most cases with middle and low income dummies, and in some cases for high income dummies. With a percentage point increase of host tax rate, calculated by net tax value over GDP, the FDI will decline by about US$ 160 million. From the averages of coefficients in Table 3.1, this negative effect is equivalent to the effect of a decrease of US$ 356 million in previous FDI inflows, or loss of almost US$ 18.8 billion host GDP, or the adverse effect of a 1.1 percentage point decrease in school enrollment.

Tariff has a positive effect in scenarios with middle or low income dummies. This supports the Tariff Jumping FDI argument that FDI is a potential substitute for international trade. One reason why international entrepreneurs build FDI enterprises to produce in foreign countries instead of exporting to these economies is avoidance of tariffs or other trade barriers. A higher tariff will intensify this FDI motivation, and if tariffs increase by one percentage point, then FDI will go up by over US$ 8 million.

The effect of the exchange rate, defined as local currency per US dollar, is ambiguous. The coefficient is negative in the scenario with the low income group

dummies and in some cases with the middle income dummy. Hence this analysis rejects the wealth effect hypothesis due to the decline in the value of host currencies. Instead, the negative estimates for less wealthy countries are consistent with the view that prolonged depreciation discourages FDI for one of two reasons: prolonged depreciation may signal financial distress in the host economy, or increased prices of imported inputs may reduce profits of FDI enterprises.

The three variables representing wage, interest rate, and trade openness are all insignificant. It is possible that the effects of some other significant explanatory variables dominate. Some other reasons are as follows. As for the first, the estimates of wage's effect on FDI do not confirm either the "labor cost" or the "human capital" argument, possibly because these two opposite impacts cancel each other. As for the second, the interest rate, as a rental cost of FDI, does not contribute to explaining FDI well, a result that is inconsistent with the costs-of-borrowing argument. The reason may be that the interest rate has become a proactive financial policy tool for government instead of the outcome of supply and demand in the financial market, and no longer accurately reflects cost of capital. The last of these variables, trade openness, the ratio of imports to GDP, is not a significant determinant of FDI, because globalization bring almost all economies open and connected with each other which results in convergence of the value of this ratio.

3.8 Robustness Tests

To test the robustness of the FDI determination model, I introduced two variations of the model specification a) by adding another income dummy (thus using two income dummies in one regression) and b) by including slope dummies (income dummy interacted with other independent variables).

Table 3.2 describes the Blundell-Bond system GMM estimation for the new model specification with two income dummies. The new results unanimously confirm the key findings in the one-income-dummy specification in the previous round. The estimates of lagged FDI inflows, education, host GDP and tariff are still positive. In addition, the size of the coefficients for lagged FDI, education, and host GDP is similar to the one-income-dummy case, especially for the coefficients of previous FDI inflows. The coefficient for tariff is marginally smaller in the two-income-dummy case. The results for income dummies (intercept dummies) are also in agreement with the one-income-dummy case. For example, in the middle panel of Table 3.2, dummies for HIC (High Income Countries) and LIC (Low Income Countries) reveal that compared with MC (Middle Income Countries), high income economies (HIC) have a negative effect and low income countries (LIC) affect FDI positively, which is exactly the conclusion in the one-dummy scenario.

Nevertheless, some changes results from adding a second income dummy. The effect of Risk (Investment Profile) declines from about $810 million to around $745 million, and tax is no longer significant. However, the exchange rate becomes negative, with much larger coefficients than in the one-dummy case. This empirical result does not

confirm the wealth-effect theory but instead supports the "financial distress" and "imported input" arguments. All regressions in the two-dummy case pass the AR(2) test.

The results for another new model specification – the one with slope dummies - are illustrated in Table 3.3. In addition to all the explanatory variables in the one-dummy case, the regressions in Table 3.3 also include 10 slope dummies, which are the interactions between the income dummy and each of the other ten individual regressors. Table 3.3 summarizes the results for the High/Middle/Low income dummy in the left, middle, and right panels, respectively. The estimates for Lower Middle Income (LMC) and Upper Middle Income (UMC) are displayed in Appendixes 3.3 and 3.4.

Parallel to the comparison between using a one-income dummy and two-income dummies, the new results in the slope-dummy scenario are broadly consistent with the core conclusion of the one-dummy case. Previous FDI inflows, education, and host GDP still affect FDI positively with coefficients of similar magnitude, except for the high-income dummy case, where only previous FDI is significant. For the intercept income dummies, the result in the slope-dummy scenario is similar to the one-income case: the high-income dummy has a negative effect and the low income dummy, a positive one. The middle income dummy becomes significantly positive in most regressions to explain FDI. Overall, the estimations of the income dummy in the slope-dummy scenario still support the main ideas of IDP theory.

The difference in results between slope-dummy and one-dummy cases is much wider than the difference between two-dummy and one-dummy. There are many fewer significant coefficients for the tax, education, and risk variables, and the coefficients are inconsistent among regressions, especially for risk.

This difference may come from two sources: a set of ten new interactive independent variables were added to the slope dummy regressions, which reduces both the degrees of freedom of the regression equation and the significance of some individual explanatory variables. Moreover, in the slope dummy case, the effect of each explanatory category (market size, tax, tariff, etc.) consists of two parts: the individual variable and the interactive variable. This is different from the one-dummy scenario, where the effect of each category on FDI comes solely from the individual variable. Thus, in the slope dummy case, the significance of an individual variable may be much smaller and its coefficient may change dramatically because the interactive variable may be a much more significant contributor to the aggregate effect. For example, even though the individual education variable in the "intercept and slope high income country dummy case" (the left panel of Table 3.3) is insignificant, the interactive variable of education and the high income dummy is very significant and positive that it makes the aggregate effect of education in the high income countries significant and positive. This result is consistent with the one income dummy case.

Among the ten additional slope dummies, only the interactive variables of education and income group dummies are consistently significant. They have opposite signs to the intercept income dummies in each regression. In other words, since the high income intercept dummy has a negative effect on FDI, then the education and high income dummy interactive variable has a positive effect on FDI. With the same logic, for the interactive variable of the education and the low-income dummy, the sign is negative and statistically significant. So does the sign of another interactive variable of education

and the middle-income dummy. These results for the slope dummy of education are different from the previous conclusion in the case of the one-income dummy.

On average, the absolute value of the education and income dummy interactive variables is around 200. It means that for high-income economies, FDI will increase by around US$ 200 million for each percentage point of secondary school enrollment. The interactive variable can be regarded as a “reacting variable”, working against the intercept dummies to mitigate their impact on FDI.

The slope dummies for education can also be regarded as an additional part of the net marginal effect of education, which comes not only from the individual explanatory variable “education”, but also from the interactive variable of “education” and “income dummy”. In the high-income dummy case (left panel), education has a net positive effect on FDI in high income economies after its individual effect and the interactive effect with the high income dummy are combined. But with the low and middle income dummies, education’s net effect is much smaller, or even turns to negative, due to the negative coefficients of the interactive variables.

The negative effect of education in low and middle income economies is at odds with the other studies in the FDI literature and dramatically different from education’s identical positive effect in the one-dummy case. From the one-dummy case, education on average increases FDI inflows. But in the slope-dummy case, education clearly attracts FDI only in high-income economies. In contrast, education’s effect in low and middle income economies can be negative.

Instead of using middle-income-group dummies, two new slope-dummy scenarios are generated to include upper-income-group dummies and lower-income-group dummy respectively. The estimates are displayed in Appendixes 3.3 and 3.4.

Very similar with the other slope-dummy cases with high, low or middle income dummies, the two new scenarios confirm the positive effect of previous FDI inflows, education, and host GDP. Moreover, parallel to the previous slope-dummy results, most of the slope dummies in these two new scenarios are insignificant. And just like the previous results on the middle income slope dummies, only the interactive variables of education and lower or upper middle income group dummies are consistently significant and negative. However, these two new scenarios do yield some different results. First, the coefficients of risk (investment profile) become significant and negative in cases with upper or lower middle income slope dummies. These coefficients are insignificant in the case with aggregate middle income slope dummy. Second, the intercept upper middle income dummy turns into insignificant while the aggregate middle income intercept dummy is mainly significant positive. In general, the new scenarios with upper or lower middle income slope dummies confirms the previous conclusions in the cases with high, middle or lower income slope dummies and therefore shows the robustness of the model and conclusions.

As in the two-dummy scenario, all regressions in the slope-dummy scenario pass the AR(2) test at the confidence level of 10%[40].

The above two-dummy and slope-dummy cases, generally have mimicked the previous one-dummy scenario with the following explanatory variables: lagged FDI,

[40] Most regressions in the slope-dummy case pass the AR(2) test at the confidence level of 5%. Only a few regressions fail the AR(2) test at 5%.

GDP, education and intercept income dummies with significant results; and wage rate, trade openness, and real interest rate with insignificant results. Three significant variables in the one-dummy case - risk, tax and tariff - become less significant but retain their signs. Exchange rate, which is insignificant in the one-dummy case, turns into mostly negative in the new cases, supporting the hypothesis that host currency depreciation will either hurt FDI enterprises' imports or signal financial weakness. In the two-dummy case, the additional income dummy gets the same regression conclusions as one-dummy case. In the slope dummy case, only the education and income dummy interactive variables are significant, offsetting the individual income dummy and dampening the education's effect. The reason why new specifications do not improve estimation may be that adding more variables introduces multicollinearity to depress the significance level of each explanatory variable.[41] Moreover, in the two new specifications, all regressions pass the AR(2) test. In conclusion, the robustness tests basically confirm the stability, consistency and generality of the original one-dummy specification, and thus can be regarded as the recommended model.

[41] The existence of multicollinearity problem can be confirmed by the obvious changes of the sign and significance of explanatory variables, after dropping the interactive variable of education and income dummies.

3.9 Conclusion

From the above empirical estimation results for the FDI determination model, the questions raised in Section I can be answered. First, for the question on the existence of a general FDI determination model for global economies, there does exist a general FDI determination model which covers global economies in all income groups. This model performs robustly when applying the Blundell-Bond system GMM method, including traditional explanatory variables, and time and income group dummies.

Second, the answer to the inquiry of the importance of the explanatory variables is that: the following seven explanatory variables, lagged dependent variable, host GDP, education, income group dummies, country risk, tax, and tariff, are statistically significant in the model, which generally confirms the conclusions in the previous literature. Exchange rate, however, only has significant results in some regressions, especially in the two-income-dummy scenario. Wage rate, interest rate, and openness are insignificant in the GMM estimations, even though they are influential according to some other studies.

More specifically, the main findings in this article show that different average income levels do play a significant role in FDI determination model, which can be represented by adding income group dummies into the model.

Ceteris paribus, high income level has a negative effect on FDI inflows, and low income level has a positive effect. But the effect of middle income on FDI is insignificant. These effects of income group dummies only partially support the Investment Development Path (IDP) theory with respect to the highest income level but not for the middle and low income levels. When I control for income dummies, I find that

lagged FDI has consistently positive effect on FDI. This hysteresis in FDI has indicated that the FDI model should use a dynamic structure. Consistent with the literature, market potential (GDP) and human capital (education) encourage FDI and the result is robust to all income dummies. FDI increases with risk levels because it presumably replaces other investments during financial instability. The positive relation between FDI and tariffs supports the Tariff Jumping FDI argument, suggesting that FDI is a potential substitute for international trade. When middle and low income levels are controlled for, evidence suggests that an increase in taxes and a depreciation of the currency exerts downward pressure on FDI flows. I do not find the wealth effect of exchange rate. On the contrary, there is weak evidence that the depreciation of local currency discourages FDI.

The empirical results also shed light on government policy regarding promotion of FDI inflows. The results suggest that the government can proactively and consistently apply specific policies to attract FDI inflows. One of the most important strategies is to constantly follow the growth path to make the host market more enticing and vital for international investors. Another simple scheme to attract FDI is to lower the tax rate to establish a business-friendly environment. From the analysis, the FDI model is clearly dynamic, with the significantly positive effect of previous FDI. Accordingly, government should maintain consistent long-term efforts instead of short term one-shot speculation. The government should be very cautious on negative policy on FDI. Even though it may be a one-shot game, but FDI has memory and the negative effect may persist. Moreover, since the low income economy dummy is positive, no matter how low the previous FDI level or how poor the country's economy, there will be some potential FDI, if the country

proactively opens the door to the world. At last, improvement of education level is an effective way to attract FDI inflows.

The empirical results also suggest that further study is needed to improve the Blundell-Bond system GMM specification, especially on how to construct the instruments. Furthermore, economic growth rate may be more significant than the level of GDP to explain FDI. Similarly, the change of exchange rates may be more appropriate as FDI determinant than the level of exchange rate. In addition, the conclusions should be tested by the newest FDI data as they appear, particularly regarding the insignificant impact of wage, interest rate and trade openness on FDI; and also for new tariff data available in World Development Indicators. A very promising and interesting proposal is to test if this model is still robust for separated horizontal and vertical FDI if data are available. At last, for more accurate analysis, the definition and measurement of the variables should be standardized across countries, especially for FDI and wage.

The FDI is a newly burgeoning strength in the global economy and the Blundell-Bond system GMM sets up a new way to study this promising topic. Let us fully leverage this effective method and keep researching.

Table 3.1: GMM Result of FDI with One Income Dummy†

High/Middle/Low Income Dummies, Dependent variable: FDI inflows

	Left Panel with dummy for HIC			Middle Panel with dummy for MC			Right Panel with dummy for LIC		
Independent Var	**(ivlag=2 .)**	**(ivlag=2 14)**	**(ivlag=3 5)**	**(ivlag=6 10)**	**(ivlag=5 6)**	**(ivlag=6 7)**	**(ivlag=2 8)**	**(ivlag=2 9)**	**(ivlag=3 10)**
Exchange Rate (EX)	-0.290	-0.352	-0.337	0.276	-0.558	-0.424	-1.163*	-0.999*	-0.944*
	(0.55)	(0.65)	(0.66)	(0.56)	(0.80)	(0.77)	(0.63)	(0.55)	(0.56)
Lagged FDI Inflows (FDIL)	0.436***	0.433***	0.438***	0.492***	0.449***	0.463***	0.434***	0.456***	0.458***
	(0.13)	(0.13)	(0.13)	(0.12)	(0.13)	(0.12)	(0.13)	(0.13)	(0.13)
Tax Rate (Tax)	-13803	-15793*	-13616	-15469*	-18496*	-17377**	-13344*	-12111	-11445
	(9425)	(9415)	(10403)	(8543)	(9325)	(8456)	(8018)	(7529)	(7538)
Wage Rate (Wage)	-0.634	-0.155	-0.942	1.368	1.410	1.073	1.011	0.590	0.520
	(0.74)	(0.83)	(0.90)	(1.21)	(1.29)	(1.23)	(0.82)	(0.75)	(0.78)
Real Interest Rate (r)	-49.27	-41.25	-83.30	-80.33	-102.5	-72.21	-11.18	-30.83	-46.97
	(33.6)	(35.8)	(63.0)	(111)	(137)	(123)	(43.0)	(40.6)	(55.2)
Import Duties (Tariff)	4.250	5.484	7.212	5.496	10.50*	10.33*	10.70**	11.85***	11.62***
	(3.43)	(3.93)	(4.70)	(5.13)	(5.34)	(5.34)	(4.14)	(4.08)	(4.15)
Openness (Open)	90.67	56.21	117.9	-63.72	-49.55	-23.81	-29.05	8.694	13.77
	(68.5)	(70.4)	(74.9)	(101)	(126)	(129)	(73.2)	(70.8)	(78.1)
School Enrollment (EDU)	162.6***	163.0***	162.7***	138.7**	142.1**	136.3**	160.7***	153.5***	152.5***
	(39.4)	(41.3)	(39.4)	(53.3)	(55.3)	(55.6)	(45.2)	(43.4)	(44.6)
GDP	9.764***	9.686***	9.839***	7.439***	8.368***	8.182***	8.920***	8.526***	8.475***
	(2.16)	(2.07)	(2.14)	(1.27)	(1.64)	(1.40)	(1.88)	(1.77)	(1.72)
HICD	-9321***	-7640***	-9219***						
	(2315)	(2340)	(2529)						
MCD				-1117	-1421	-1289			
				(1130)	(1323)	(1281)			
LICD							5616***	5981***	5978***
							(2045)	(1995)	(2016)
Risk	-374.7*	-801.7**	-788.3**	-352.3	-1222***	-1260***	-1155***	-858.1***	-821.9***
	(208)	(322)	(312)	(258)	(421)	(418)	(359)	(256)	(252)
# of Observations	1313	1313	1313	1313	1313	1313	1313	1313	1313
P-value of AR(2) test	0.215	0.120	0.163	0.506	0.182	0.245	0.156	0.369	0.348

Robust standard errors in parentheses.

*****, ** and * represent significence levels of less than 1% (p<0.01), less than 5% (p<0.05), and less than 10% (p<0.1), respectively.**

All regressions include a constant term and time (year) dummies which are not reported in the table.

All independent variables are lagged in one period.

Each column represents results for instrument variables (IVs) with different lags indicated at the top.

HICD, MCD, and LICD are country dummies for high, middle, and low income countries, respectively.

EX, FDIL, r and EDU are Exchange Rate, Lagged FDI inflows, real interest rate, and school enrollment, respectively

Table 3.2: GMM Result of FDI with Two Income Dummy†

High/Middle/Low Income Dummies, Dependent variable: FDI inflows

	Left Panel with dummy for HIC & MC			Middle Panel with dummy for HIC & LIC			Right Panel with dummy for MC & LIC		
Independent Var	**(ivlag=2 .)**	**(ivlag=2 14)**	**(ivlag=5 6)**	**(ivlag=2 9)**	**(ivlag=3 5)**	**(ivlag=3 10)**	**(ivlag=2 8)**	**(ivlag=2 9)**	**(ivlag=3 10)**
Exchange Rate (EX)	-0.888*	-1.016*	-1.083*	-1.158*	-0.962*	-1.024*	-1.187*	-1.004*	-0.943*
	(0.47)	(0.57)	(0.65)	(0.60)	(0.56)	(0.60)	(0.61)	(0.53)	(0.54)
Lagged FDI Inflows (FDIL)	0.432***	0.425***	0.403***	0.419***	0.434***	0.418***	0.416***	0.439***	0.436***
	(0.13)	(0.13)	(0.14)	(0.13)	(0.13)	(0.14)	(0.13)	(0.13)	(0.13)
Tax Rate (Tax)	-6735	-8903	-8743	-8900	-7891	-8623	-9485	-7827	-6627
	(7116)	(7644)	(8772)	(8188)	(8355)	(8446)	(8298)	(7589)	(7977)
Wage Rate (Wage)	-0.455	-0.0560	-0.394	-0.0942	-0.689	-0.431	-0.0736	-0.461	-0.724
	(0.62)	(0.71)	(0.98)	(0.76)	(0.74)	(0.80)	(0.76)	(0.68)	(0.75)
Real Interest Rate (r)	-34.63	-23.46	-67.84	-22.73	-57.10	-16.95	-23.44	-49.33	-67.33
	(32.8)	(33.9)	(128)	(40.0)	(60.7)	(52.6)	(40.2)	(39.0)	(55.4)
Import Duties (Tariff)	5.334**	6.475**	6.860**	7.326**	8.658**	7.262**	7.543**	8.664**	8.064**
	(2.23)	(2.94)	(3.12)	(3.28)	(3.53)	(3.20)	(3.29)	(3.40)	(3.44)
Openness (Open)	72.39	44.10	101.8	43.56	98.17	90.32	44.27	65.44	94.68
	(68.2)	(70.5)	(112)	(76.1)	(75.3)	(94.1)	(77.7)	(66.8)	(74.4)
School Enrollment (EDU)	171.2***	173.3***	176.1***	174.6***	171.6***	175.2***	174.1***	170.8***	171.1***
	(37.0)	(38.0)	(41.3)	(38.1)	(36.9)	(39.1)	(38.6)	(35.4)	(35.6)
GDP	9.805***	9.818***	10.45***	9.910***	9.855***	10.12***	9.956***	9.636***	9.794***
	(2.19)	(2.11)	(2.27)	(2.17)	(2.14)	(2.18)	(2.18)	(2.13)	(2.12)
HICD	-13371***	-11812***	-13041***	-5661**	-7154***	-6802***			
	(2884)	(2888)	(3335)	(2155)	(2017)	(2241)			
MCD	-6069***	-5789***	-5950***				5592**	6520***	7256***
	(1513)	(1542)	(1685)				(2177)	(2016)	(2084)
LICD				5726***	5881***	5943***	11290***	12300***	13144***
				(1596)	(1606)	(1628)	(3233)	(3085)	(3111)
Risk	-208.1	-633.6*	-849.8**	-897.9**	-660.2**	-855.1**	-924.9**	-580.9**	-556.5*
	(199)	(322)	(418)	(379)	(307)	(394)	(386)	(288)	(288)
# of Observations	1313	1313	1313	1313	1313	1313	1313	1313	1313
P-value of AR(2) test	0.415	0.186	0.152	0.151	0.289	0.289	0.136	0.353	0.276

† See footnote in Table 3.1.

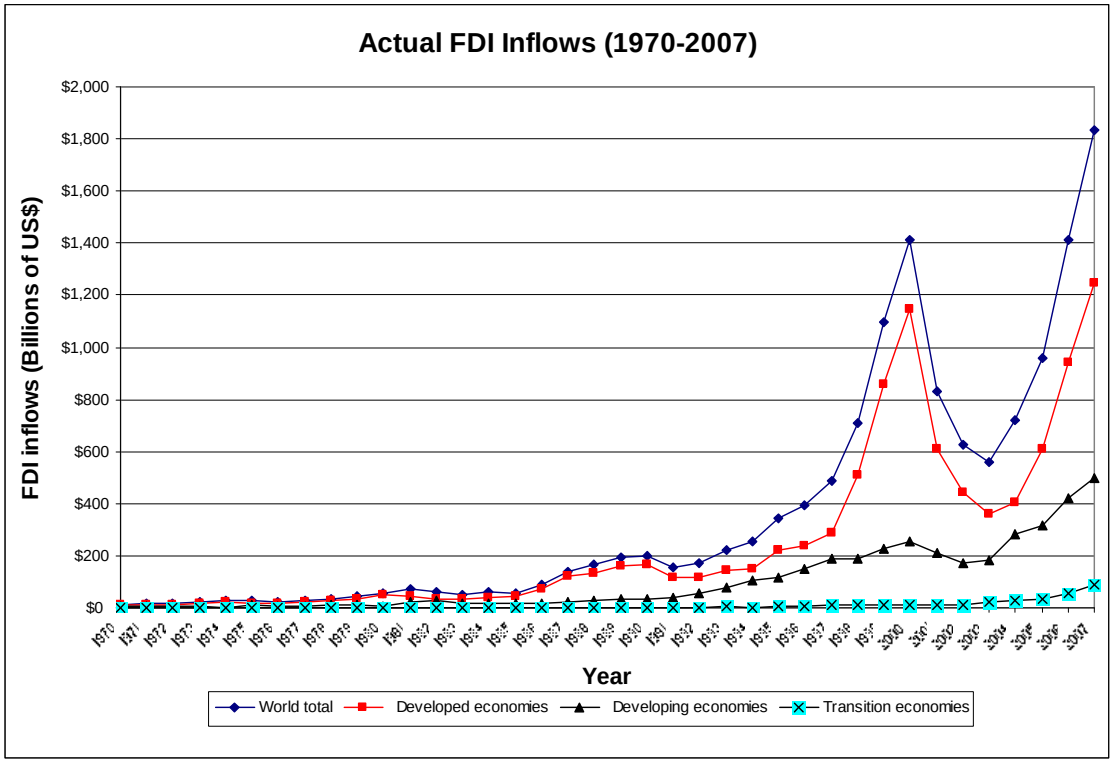
Table 3.3: GMM Result of FDI with both Intercept and Slope Income Dummies†

High/Middle/Low Income Dummies, Dependent variable: FDI inflows

		Left Panel with dummy for HIC			Middle Panel with dummy for MC			Right Panel with dummy for LIC		
	Independent Var	(ivlag=2 .)	(ivlag=2 14)	(ivlag=3 5)	(ivlag=6 10)	(ivlag=5 6)	(ivlag=6 7)	(ivlag=2 8)	(ivlag=2 9)	(ivlag=3 10)
Individual Independent Var	Exchange Rate (EX)	-1.150**	-1.059**	-1.367**	0.430	-0.847	-0.725	-1.564	-1.628	-1.580
		(0.49)	(0.49)	(0.61)	(1.03)	(1.12)	(1.18)	(1.71)	(1.46)	(1.50)
	Lagged FDI Inflows (FDIL)	0.928***	1.213**	0.996***	0.477***	0.439***	0.453***	0.428***	0.448***	0.450***
		(0.27)	(0.59)	(0.37)	(0.12)	(0.13)	(0.13)	(0.14)	(0.14)	(0.13)
	Tax Rate (Tax)	6294	2012	3955	10448	-13002	-14845	-13301	-15226	-15024
		(7998)	(7680)	(8526)	(29084)	(27351)	(33414)	(11126)	(11242)	(11739)
	Wage Rate (Wage)	-0.286	0.160	-0.631	1.483	1.869	1.769	0.271	0.00130	0.0360
		(0.58)	(0.62)	(0.76)	(2.92)	(1.83)	(1.71)	(1.16)	(1.02)	(1.03)
	Real Interest Rate (r)	-24.06	-15.08	-32.34	-468.6*	-211.0	-169.2	-21.52	-47.79	-57.11
		(22.6)	(23.7)	(37.5)	(259)	(281)	(362)	(81.8)	(88.8)	(108)
	Import Duties (Tariff)	3.727	5.551**	7.114*	3.363	10.01	10.20	149.8**	160.0**	157.7**
		(2.71)	(2.73)	(4.01)	(7.31)	(6.17)	(6.64)	(61.7)	(64.0)	(63.6)
	Openness (Open)	50.47	4.876	63.63	-133.8	-124.3	-106.2	-37.39	12.99	12.20
		(35.8)	(37.6)	(46.2)	(124)	(157)	(157)	(106)	(99.6)	(102)
	School Enrollment (EDU)	-92.71	-78.80	-94.51	145.7**	150.4***	146.7***	169.5***	161.3***	161.6***
		(56.8)	(63.9)	(67.1)	(55.7)	(55.7)	(55.2)	(43.3)	(42.1)	(42.7)
	GDP	7.120	1.257	2.442	7.409***	8.231***	8.020***	9.165***	8.860***	8.798***
		(6.72)	(14.8)	(11.6)	(1.28)	(1.64)	(1.43)	(2.12)	(1.98)	(1.93)
	HICD	-35485***	-37805***	-34606***						
		(11652)	(10115)	(11796)						
	MCD				7903	11825*	11061**			
					(4869)	(5962)	(5464)			
	LICD							12946***	13356***	13368***
								(4075)	(3918)	(3881)
	Risk	-362.7	-594.3	-686.4*	-5.587	-927.1	-966.2	-893.8**	-638.5**	-618.3*
		(250)	(359)	(375)	(466)	(646)	(690)	(444)	(307)	(318)
Slope Dummies or Interactive Var with HIC	EX * HICD	-0.285	-1.534	-1.603						
		(2.12)	(2.38)	(2.03)						
	FDIL * HICD	-0.530*	-0.834	-0.588						
		(0.32)	(0.65)	(0.40)						
	Tax * HICD	-17506	-4362	-17771						
		(26680)	(23478)	(25912)						
	Wage * HICD	0.852	1.144	1.899						
		(2.41)	(2.57)	(2.85)						
	r * HICD	58.96	171.6	125.4						
		(303)	(313)	(332)						
	Tariff * HICD	93.99	125.1	200.4						
		(219)	(260)	(273)						
	Open * HICD	-54.45	-22.73	-65.62						
		(36.0)	(42.1)	(42.3)						
	Edu * HICD	274.9***	271.4***	272.8***						
		(72.7)	(69.9)	(81.1)						
	GDP * HICD	2.494	8.741	7.069						
		(7.09)	(15.5)	(11.7)						
	Risk * HICD	2130*	2124**	1998*						
		(1131)	(1042)	(1166)						
Slope Dummies or Interactive Var with MC	EX * MCD				-1.030	-0.964	-0.836			
					(1.06)	(1.06)	(1.04)			
	FDIL * MCD				-0.0116	-0.303	-0.217			
					(0.19)	(0.25)	(0.22)			
	Tax * MCD				-11319	10449	13753			
					(29672)	(27381)	(32983)			
	Wage * MCD				-2.458	-3.628	-3.850*			
					(2.99)	(2.21)	(2.14)			
	r * MCD				475.1*	219.7	174.0			
					(259)	(286)	(367)			
	Tariff * MCD				2.605	3.371	2.833			
					(14.3)	(29.9)	(29.6)			
	Open * MCD				151.3	163.1	140.9			
					(126)	(168)	(168)			
	Edu * MCD				-161.5***	-225.5***	-214.0***			
					(56.8)	(68.6)	(67.1)			
	GDP * MCD				4.901	9.325	6.916			
					(3.80)	(6.35)	(5.43)			
	Risk * MCD				-438.9	-473.8	-355.6			
					(513)	(767)	(740)			
Slope Dummies or Interactive Var with LIC	EX * LICD							0.644	0.718	0.686
								(1.65)	(1.42)	(1.45)
	FDIL * LICD							0.333	-0.0578	-0.0221
								(0.82)	(0.71)	(0.70)
	Tax * LICD							12836	18424	17906
								(12305)	(12858)	(13308)
	Wage * LICD							0.147	0.00130	-0.0103
								(1.33)	(1.14)	(1.16)
	r * LICD							29.07	34.26	46.10
								(84.0)	(87.0)	(106)
	Tariff * LICD							-142.9**	-153.1**	-150.9**
								(62.6)	(64.5)	(64.1)
	Open * LICD							63.59	21.86	21.72
								(110)	(102)	(111)
	Edu * LICD							-239.2***	-224.6***	-224.2***
								(55.5)	(49.3)	(51.2)
	GDP * LICD							2.124	0.759	0.765
								(8.84)	(7.44)	(7.54)
	Risk * LICD							-200.8	-192.8	-204.1
								(471)	(369)	(391)
	# of Observations	1313	1313	1313	1313	1313	1313	1313	1313	1313
	P-value of AR(2) test	0.702	0.422	0.638	0.179	0.189	0.294	0.237	0.466	0.451

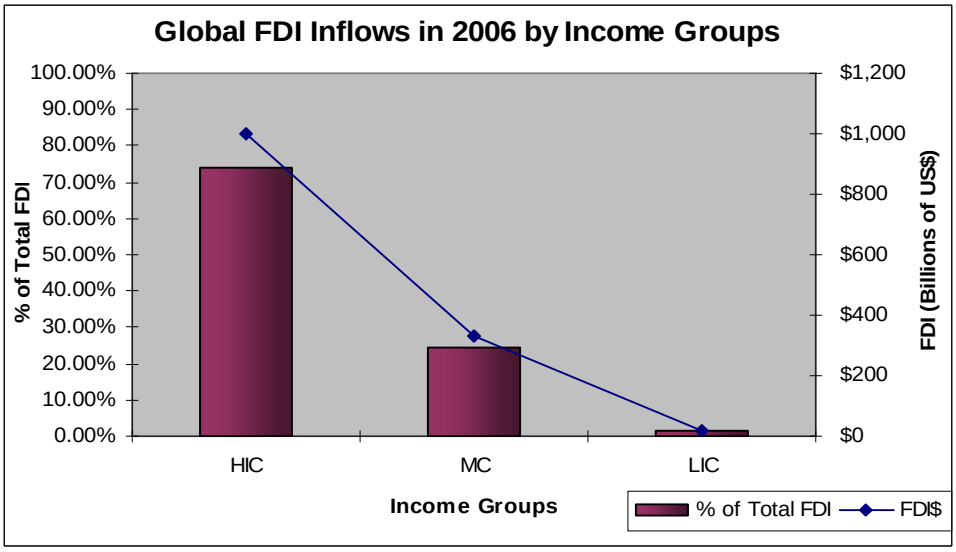
† See footnote in Table 3.1 and Appendix 3.3.

Figure 2: Actual FDI Inflows, (1970-2007, Billions of US$)



Source: UNCTAD, http://stats.unctad.org/FDI/TableViewer/tableView.aspx. And WIR 2008 pp.2

Figure 3: Distribution of Global FDI Inflows in 2006 by Income Groups



Source: World Development Report 2009, pp. 350 & 359

Appendix

Appendix 1.1: Summary of FDI Studies on Market Size and Exchange Rate

Explanatory variable		Effect on FDI			
		Mainly positive +	Mainly negative -	Mainly insignificant ?	Ambiguous
Level of host countries' GDP, GNP, industrial sales, value added, or production: [40+, 1-, 6?, 4 "Ambig."]	host GDP (including log form, and host regional GDP) [22+.1-,2?, 3"Ambig."]	Cushman (1985, some GNP), Grubert and Mutti (1991), Wheeler and Mody (1992), Hines and Rice (1994), Lee & Mansfield (1996), Wei (1997a, 1997b), Altshuler, et al. (1998), United Nations (1998), Lipsey (1999a), Dilyard (1999), Billington (1999), Smarzynska and Wei (2000), Wei (2000), Blonigen and Davies (2001), Manfra (2001), Chakrabarti (2001), Smarzynska and Wei (2001), Balasubramanyam, et al. (2002), Bevan, et al. (2002), Fung, et al. (2002), Ito and Rose (2002)	Hines Jr. (1998),	Baek and Kwok (2002), Jensen (2002)	Edwards (1990), Goldberg and Kolstad (1994), Morisset (2000),
	previous host GDP (including log form) [4+,3?]	Goldberg & Klein (1997), Hasnat (1997), Ramirez (2002), Sun, et al. (2002)		Lipsey (2000), Kudrle (1995), Tuman and Emmert (1999)	
	host GNP [6+,1?]	Bandera & White (1968), Scaperlanda & Mauer (1969 & 1971), Scaperlanda & Mauer (1972), Scaperlanda & Balough (1983), Lunn (1980 & 1983), Buch (2001)		Sagari (1992)	
	host GNP lagging 1 period [3+]	Schmitz and Bieri (1972), Lunn (1980 and 1983), Culem (1988)			
	log of real output in host (UK) sectors. [1"Ambig"]				Girma (2002)
	host sales in product j [1+]	Milner and Pentecost (1996)			
	host industrial value added output [1+]	Barrell and Pain (1997)			
	host industrial production or enterprises' sales (current or previous) [2+]	Boatwright & Renton (1975), Gorecki (1976)			
	host industrial production index [1+]	Buch (2001)			
Exchange Rates: [2+, 7-, 5?, 1"Ambig."]	EX1: Direct Pricing (FDI home currency / FDI host currency) [6-, 4?, 1"Ambig."]		Cushman (1985), Klein and Rosengren (1994), Blonigen and Feenstra (1996), Kogut and Chang (1996), Jun and Singh (1996), Hasnat (1997)	Goldberg and Kolstad (1994), Cassou (1997), Goldberg & Klein (1997), Tuman and Emmert (1999)	Feliciano and Lipsey (2002)
	EX2: Indirect Pricing (FDI host currency / FDI home currency) [2+, 1-, 1?]	Blonigen (1997), Baek and Okawa (2001)	Summary and Summary (1995),	Kudrle (1995)	

1. **"+"** refers to significant and positive results.
2. **"-"** denotes to significant and negative results.
3. **"?"** is for insignificant results.
4. **"Ambig"** refers to ambiguous results.

Appendix 2.1: The Rank of Coefficient of Variation of FDI Inflows of 208 Economies in the World

Country Name	CV of FDI (sd/avg)
Afghanistan	Missing
American Samoa	Missing
Andorra	Missing
Antigua and Barbuda	Missing
Bahrain	Missing
Bermuda	Missing
Brunei	Missing
Cayman Islands	Missing
Channel Islands	Missing
Cuba	Missing
Faeroe Islands	Missing
French Polynesia	Missing
Greenland	Missing
Guam	Missing
Iraq	Missing
Isle of Man	Missing
Kiribati	Missing
Korea, Dem. Rep.	Missing
Libya	Missing
Liechtenstein	Missing
Luxembourg	Missing
Macao, China	Missing
Marshall Islands	Missing
Mayotte	Missing
Micronesia, Fed. Sts.	Missing
Monaco	Missing
Namibia	Missing
New Caledonia	Missing
Northern Mariana Islands	Missing
Palau	Missing
Puerto Rico	Missing
Qatar	Missing
San Marino	Missing
Saudi Arabia	Missing
Suriname	Missing
Timor-Leste	Missing
United Arab Emirates	Missing
Virgin Islands (U.S.)	Missing
West Bank and Gaza	Missing
Netherlands Antilles	(7.14)
Tajikistan	0.37
Cyprus	0.42
Greece	0.42
Ukraine	0.51
Turkmenistan	0.52
Barbados	0.55
Kazakhstan	0.56
Estonia	0.58
St. Lucia	0.59
Latvia	0.61
Eritrea	0.62
Slovenia	0.66
Hong Kong, China	0.68
Oman	0.68
Egypt, Arab Rep.	0.75
Uzbekistan	0.75
Australia	0.79
Croatia	0.79
New Zealand	0.82
Rwanda	0.85
Nigeria	0.85
Mongolia	0.88
Dominica	0.89
Albania	0.92
Azerbaijan	0.93
Seychelles	0.93
Tunisia	0.94
Haiti	0.94
Kenya	0.94
St. Kitts and Nevis	0.95
Moldova	0.95
Kyrgyz Republic	0.96
Singapore	0.98
Malaysia	0.99
Lithuania	1.01
Belarus	1.02
China	1.02
Costa Rica	1.03
Armenia	1.03
Papua New Guinea	1.03
Vanuatu	1.03
Trinidad and Tobago	1.04
Switzerland	1.05
France	1.06
Tonga	1.07
Georgia	1.08
Spain	1.08
Malawi	1.10
Swaziland	1.10
Guatemala	1.12
Pakistan	1.12
South Africa	1.13
Maldives	1.14
Chad	1.16
Vietnam	1.18
Djibouti	1.19
Grenada	1.20
Ecuador	1.22
Mexico	1.22
Italy	1.23
Philippines	1.24
Belize	1.24
Paraguay	1.25
Uruguay	1.25
Sri Lanka	1.25
Portugal	1.26
Ghana	1.26
Burkina Faso	1.29
Thailand	1.32
Poland	1.33
Solomon Islands	1.34
Cote d'Ivoire	1.35
United Kingdom	1.35
Honduras	1.36
Cambodia	1.36
Colombia	1.38
Syrian Arab Republic	1.39
Jamaica	1.40
Norway	1.40
Turkey	1.41
Myanmar	1.42
Angola	1.42
United States	1.43
Czech Republic	1.46
Fiji	1.46
Russian Federation	1.47
Canada	1.48
Hungary	1.48
Senegal	1.50
Dominican Republic	1.52
Chile	1.52
Togo	1.53
Zambia	1.53
St. Vincent and the Grenadines	1.54
Niger	1.54
Madagascar	1.55
Austria	1.57
Macedonia, FYR	1.57
Bahamas, The	1.58
Gambia, The	1.58
Korea, Rep.	1.59
India	1.60
Netherlands	1.61
Benin	1.61
Brazil	1.62
Congo, Rep.	1.63
Bulgaria	1.65
Bolivia	1.66
Tanzania	1.66
Israel	1.67
Guinea	1.68
Central African Republic	1.71
Uganda	1.72
Nepal	1.73
Argentina	1.73
Peru	1.77
Malta	1.77
Iceland	1.78
Cape Verde	1.78
Nicaragua	1.79
Mozambique	1.79
Algeria	1.80
Japan	1.80
Venezuela, RB	1.80
Guyana	1.84
Morocco	1.86
Lesotho	1.86
Lao PDR	1.91
Mali	1.96
Slovak Republic	1.96
Cameroon	1.97
Finland	1.98
Burundi	2.00
Romania	2.02
Lebanon	2.06
Ireland	2.09
Panama	2.10
Jordan	2.11
Sweden	2.16
Denmark	2.20
Botswana	2.20
Guinea-Bissau	2.21
Bangladesh	2.23
Comoros	2.25
Ethiopia	2.31
Belgium	2.32
Equatorial Guinea	2.38
Mauritius	2.51
Sudan	2.58
Yugoslavia, Fed. Rep.	2.66
Bosnia and Herzegovina	2.90
El Salvador	2.98
Aruba	3.00
Germany	3.01
Zimbabwe	3.05
Iran, Islamic Rep.	3.06
Kuwait	3.28
Congo, Dem. Rep.	3.42
Bhutan	3.48
Sao Tome and Principe	3.51
Indonesia	3.58
Samoa	4.42
Liberia	4.72
Mauritania	6.09
Somalia	8.17
Yemen, Rep.	10.35
Gabon	12.58
Sierra Leone	45.90

Appendix 2.2: 44 Selected Variables for Cluster Analysis

FDI Predict Model Var Summary

Variable In model	Variable Name & Data Resources	field name in WDI2003
FDI inflow value	Foreign direct investment, net inflows (BoP, current US$, from WDI CD-ROM)	BX_KLT_DINV_CD_WD
	'Foreign direct investment, net (BoP, current US$)'	BN_KLT_DINV_CD
	Foreign direct investment, net inflows (% of GDP)'	BX_KLT_DINV_DT_GD_ZS
	'Foreign direct investment, net inflows (% of gross capital formation)'	BX_KLT_DINV_DT_GI_ZS
	'Gross foreign direct investment (% of GDP)'	BG_KLT_DINV_GD_ZS
Wages (labor cost)	Wages and salaries (% of total expenditure) (from WDI CD-ROM)	GB_XPC_WAGE_ZS
cost of capital	Deposit interest rate (%) WDI-CD-ROM	FR_INR_DPST
	Lending interest rate (%) WDI-CD-ROM	FR_INR_LEND
	Real interest rate (%) WDI-CD-ROM	FR_INR_RINR
	Interest rate spread (lending rate minus deposit rate) WDI-CD-ROM	FR_INR_LNDP
Exchange rate	Official exchange rate (LCU per US$, period average)	PA_NUS_FCRF
	Real effective exchange rate index (1995 = 100)	PX_REX_REER
	PPP conversion factor to official exchange rate ratio	PA_NUS_PPPC_RF
GDP/GNI/Income	GDP (current US$)	NY_GDP_MKTP_CD
	GDP growth (annual %)	NY_GDP_MKTP_KD_ZG
	GDP per capita (constant 1995 US$)	NY_GDP_PCAP_KD
	GDP per capita growth (annual %)	NY_GDP_PCAP_KD_ZG
	GDP, PPP (current international $)	NY_GDP_MKTP_PP_CD
	GDP per capita, PPP (current international $)	NY_GDP_PCAP_PP_CD
	GDP (constant 1995 US$)	NY_GDP_MKTP_KD
	GNI (current US$)	NY_GNP_MKTP_CD
	GNI, Atlas method (current US$)	NY_GNP_ATLS_CD
	GNI, PPP (current international $)	NY_GNP_MKTP_PP_CD
	GNI per capita, Atlas method (current US$)	NY_GNP_PCAP_CD
	GNI per capita, PPP (current international $)	NY_GNP_PCAP_PP_CD
Tax	Highest marginal tax rate, corporate rate (%)	GB_TAX_CMAR_ZS
	Highest marginal tax rate, individual (on income exceeding, US$)	GB_TAX_IMAR_CD
	Highest marginal tax rate, individual rate (%)	GB_TAX_IMAR_ZS
	Other taxes (% of current revenue)*	GB_TAX_OTHR_RV_ZS
	Social security taxes (% of current revenue)	GB_TAX_SSEC_RV_ZS
	Tax revenue (% of GDP)	GB_TAX_TOTL_GD_ZS
	Taxes on goods and services (% of current revenue)	GB_TAX_GSRV_RV_ZS
	Taxes on goods and services (% value added of industry and services)	GB_TAX_GSRV_VA_ZS
	Taxes on income, profits and capital gains (% of current revenue)	GB_TAX_YPKG_RV_ZS
Tariff	Export duties (% of tax revenue)	GB_TAX_EXPT_ZS
	Import duties (% of tax revenue)	GB_TAX_IMPT_ZS
	Taxes on international trade (% of current revenue)	GB_TAX_INTT_RV_ZS
International Trade	Net barter terms of trade (1995 = 100)*	TT_PRI_MRCH_XD_WD
	Net trade in goods (BoP, current US$)*	BN_GSR_MRCH_CD
	Net trade in goods and services (BoP, current US$)	BN_GSR_GNFS_CD
	Trade (% of GDP)	NE_TRD_GNFS_ZS
	Trade in goods (% of GDP)	TG_VAL_TOTL_GD_ZS
	Trade in goods (% of goods GDP)	TG_VAL_TOTL_GG_ZS
Population	Population, total	SP_POP_TOTL

Note

1 Other taxes include employer payroll or labor taxes, taxes on property, and taxes not allocable to other categories.

2 Net barter terms of trade are the ratio of the export price index to the corresponding import price index.

3 Net trade in goods is the difference between exports and imports of goods.

Appendix 2.3: Summary of Nine Methods in Cluster Analysis

Summary of Nine Methods in Cluster Analysis

Method	Characters
Average Link	Average link tends to join clusters with small variances, and it is slightly biased toward producing clusters with the same variance.
Centroid Method	The Centroid method is more robust to outliers than most other hierarchical methods but in other respects may not perform as well as Ward's method or average linkage.
Complete Linkage	Complete linkage is strongly biased toward producing clusters with roughly equal diameters, and it can be severely distorted by moderate outliers.
EML Method	The EML method is similar to Ward's minimum-variance method but removes the bias toward equal-sized clusters. Practical experience has indicated that EML is somewhat biased toward unequal-sized clusters.
Flexible-Beta method	Developed by G. N. Lance and W. T. Williams in 1967, the distance between two clusters is defined combinatorially, that is, by an equation for updating a distance matrix when two clusters are joined. This method is very flexible because by changing Beta parameter, the combinatorial formula is also adjusted accordingly.
McQuitty's Similarity Analysis	Independently developed by R. R. Sokal and C. D. Michener in 1958 and L. L. McQuitty in 1966, this method defines a very simple cluster combinatorial formula that the distance between two clusters is the simple average of the distances among the elements of the two clusters.
Median Method	Median method was developed by J. C. Gower in 1967 which is an extension for McQuitty's Similarity Analysis. This method add a small adjustment element to the McQuitty's Similarity Analysis.
Single Linkage	Single linkage has many desirable theoretical properties but has fared poorly in Monte Carlo studies. By imposing no constraints on the shape of clusters, single linkage sacrifices performance in the recovery of compact clusters in return of the ability to detect elongated and irregular clusters.
Ward's Minimum-Variance Method	Ward's method tends to join clusters with a small number of observations, and it is strongly biased toward producing clusters with roughly the same number of observations. It is also very sensitive to outliers.

Note: The detailed formulas are on SAS/STAT User's Guide, Version 8, pp. 854-861.

Appendix 2.4: Formulas in Cluster Analysis

(following the notation in SAS/STAT User's Guide, Version 8. pp. 854-861)

Notation:

Lower-case symbols generally pertain to observations and upper-case symbols, to clusters:

n: number of observations

υ: number of variables if data are coordinates

G: number of clusters at any given level of the hierarchy

x_i or X_i: ith observation (row vector if coordinate data)

C_K: Kth cluster, subset of {1,2,…,n}

N_K: number of observations in C_K

$\bar{X}$: sample mean vector

$\bar{X}_k$: mean vector for cluster Ck.

||X||: Euclidean length of the vector X, that is, the square root of the sum of the squares of the elements of X

T: $\sum_{i=1}^{n} \| Xi - \bar{X} \|^2$

W_K: $\sum_{i \in Ck} \| Xi - \bar{X} \|^2$

P_G: $\sum W_J$, where summations over the G clusters at the Gth level of the hierarchy

B_{KL}: $W_M - W_K - W_L$ if $C_M = C_K \cup C_L$

d (x, y) any distance or dissimilarity measure between observations or vectors x and y

D_{KL}: any distance or measure of dissimilarity between cluster C_K and C_L

Formulas:

1. Average Linkage:

The distance between two clusters is defined by

$$D_{KL} = \frac{1}{N_K \, N_L} \sum_{i \in C_K} \sum_{j \in C_L} d(x_i, x_j)$$

2. Centroid Method

The distance between two clusters is defined by

$$D_{KL} = \| \bar{X}_K - \bar{X}_L \|^2$$

3. Complete Linkage

The distance between two clusters is calculated by

$$D_{KL} = \max_{i \in C_K} \max_{j \in C_L} d(x_i, x_j)$$

4. EML

The distance between two clusters is given by

$$D_{KL} = nv \ln(1 + \frac{B_{KL}}{P_G}) - 2(N_M \ln(N_M) - N_K \ln(N_K) - N_L \ln(N_L))$$

5. Flexible – Beta Method

The combinatorial formula is:

$$D_{JM} = (D_{JK} + D_{JL}) \frac{1-b}{2} + D_{KL} b$$

Where b is the value of the BETA=option, or -0.25 by default.

6. McQuitty's Similarity Analysis

The combinatorial formula is:

$D_{JM} = \frac{D_{JK} + D_{JL}}{2}$

7. Median Method

If d (x, y)=||x-y||^2, then the combinatorial formula is

$D_{JM} = \frac{D_{JK} + D_{JL}}{2} - \frac{D_{KL}}{4}$

8. Single Linkage

The distance between two clusters is given by

$D_{KL} = \min_{i \in C_K} \min_{j \in C_L} d(x_i, x_j)$

9. Ward's Minimum-Variance Method

The distance between two clusters is defined by

$D_{KL} = B_{KL} = \frac{\| \bar{X}_K - \bar{X}_L \|^2}{\frac{1}{N_K} + \frac{1}{N_L}}$

Appendix 2.5: Mean Comparison among Clusters (in each cross section snapshot, 1980-2001)

Comparison of Means of FDI Related Variables in Cluster Analysis in 1980 Cross Section

Name	Global	Cluster of USA		Cluster of Japan		Cluster4: Developed Powers		Cluster7: Developing Giants		Cluster8: FDI Important		Cluster9: All Other Countries	
	208 Economies	1 (USA)	USA-global	1 (JPN)	JPN - global	4 (DEU, ITA, FRA, GBR)	Cluster4-global	2 (BRA, IND)	Cluster7-global	3 (MEX,ESP, CAN)	Cluster8 - global	197 Econs	Cluster9 - global
GDP (billion constant 1995 US$)	$133.2	$4,771.9	$4,638.7	$3,304.4	$3,171.2	$1,151.4	$1,018.1	$337.2	$203.9	$344.8	$211.6	$33.8	$ (99.4)
GNI, Atlas method (billion current US$)	$84.8	$2,959.0	$2,874.2	$1,229.8	$1,145.0	$655.6	$570.8	$224.9	$140.1	$222.8	$138.0	$24.5	$ (60.3)
GNI, PPP (billion current international $)	$92.9	$2,958.5	$2,865.5	$1,085.1	$992.2	$590.1	$497.1	$490.5	$397.6	$269.4	$176.5	$35.1	$ (57.8)
GDP, PPP (billion current international $)	$93.9	$2,957.1	$2,863.2	$1,085.0	$991.1	$590.9	$497.0	$497.7	$403.8	$275.2	$181.3	$31.9	$ (62.0)
GNI (billion current US$)	$72.3	$2,772.8	$2,700.5	$1,072.8	$1,000.6	$649.7	$577.4	$204.7	$132.4	$222.5	$150.2	$21.3	$ (51.0)
GDP (billion current US$)	$71.1	$2,771.5	$2,700.4	$1,072.7	$1,001.6	$650.5	$579.4	$208.4	$137.3	$227.2	$156.1	$21.0	$ (50.1)
Foreign direct investment, net inflows (BoP, million current US$)	$447.8	$16,930.0	$16,482.2	$280.0	$ (167.8)	$3,578.7	$3,131.0	$995.1	$547.3	$3,132.0	$2,684.2	$123.1	$ (324.7)
Population, total (million)	22.9	227.2	204.4	116.8	93.9	61.2	38.4	404.5	381.6	43.2	20.3	15.8	(7.0)
GDP per capita (constant 1995 US$)	$ 5,840	$ 21,001	$ 15,161	$ 28,296	$ 22,456	$ 18,388	$ 12,548	$ 2,242	$ (3,598)	$ 10,227	$ 4,387	$ 5,113	$ (727)
GNI per capita, Atlas method (current US$)	$ 3,971	$ 13,020	$ 9,049	$ 10,530	$ 6,559	$ 10,460	$ 6,489	$ 1,230	$ (2,741)	$ 6,550	$ 2,579	$ 3,594	$ (378)
GDP per capita, PPP (current international $)	$ 4,260	$ 13,010	$ 8,750	$ 9,290	$ 5,030	$ 9,588	$ 5,328	$ 2,305	$ (1,955)	$ 7,490	$ 3,230	$ 3,907	$ (352)
GNI per capita, PPP (current international $)	$ 4,361	$ 13,020	$ 8,659	$ 9,290	$ 4,929	$ 9,573	$ 5,211	$ 2,240	$ (2,121)	$ 7,330	$ 2,969	$ 4,046	$ (315)
Official exchange rate (LCU per US$, period average)	43.424	1.000	-42.424	226.741	183.317	0.612	-42.813	3.931	-39.493	0.541	-42.883	44.990	1.566
Taxes on income, profits and capital gains (% of current revenue)	25.693	56.558	30.865	70.828	45.134	26.020	0.327	14.487	-11.207	36.630	10.936	24.816	-0.877
Trade in goods (% of GDP)	75.026	17.411	-57.615	25.331	-49.695	40.873	-34.154	16.044	-58.982	31.472	-43.554	78.758	3.731
Taxes on goods and services (% of current revenue)	22.714	4.411	-18.303	20.815	-1.899	26.647	3.933	37.304	14.590	26.537	3.824	22.352	-0.362
Tax revenue (% of GDP)	19.853	18.073	-1.779	10.850	-9.002	29.931	10.078	13.500	-6.353	17.059	-2.793	19.764	-0.089
Other taxes (% of current revenue)	4.250	1.174	-3.076	5.405	1.155	3.099	-1.151	2.100	-2.151	2.469	-1.781	4.412	0.162
GDP growth (annual %)	2.561	-0.240	-2.801	2.818	0.257	0.992	-1.569	7.900	5.340	4.260	1.699	2.505	-0.056
Taxes on goods and services (% value added of industry and services)	7.138	0.965	-6.173	2.475	-4.664	10.095	2.956	8.768	1.630	5.238	-1.900	7.155	0.017
Import duties (% of tax revenue)	20.378	1.483	-18.895	2.452	-17.927	0.051	-20.327	16.946	-3.432	5.927	-14.451	22.079	1.700
Taxes on international trade (% of current revenue)	20.899	1.392	-19.507	2.356	-18.543	0.047	-20.852	14.582	-6.317	5.933	-14.965	22.689	1.790
GDP per capita growth (annual %)	0.420	-1.193	-1.614	2.015	1.594	0.707	0.287	5.480	5.060	2.682	2.262	0.275	-0.145
PPP conversion factor to official exchange rate ratio	0.754	0.937	0.183	0.989	0.235	1.095	0.341	0.434	-0.320	0.828	0.074	0.742	-0.012
Foreign direct investment, net inflows (% of gross capital formation)	4.307	3.042	-1.265	0.081	-4.227	3.310	-0.997	1.858	-2.449	5.386	1.079	4.420	0.113
Foreign direct investment, net inflows (% of GDP)	1.131	0.611	-0.520	0.026	-1.105	0.633	-0.497	0.428	-0.702	1.312	0.181	1.173	0.043
Social security taxes (% of current revenue)	8.662	28.224	19.562	0.000	-8.662	36.395	27.733	12.500	3.838	23.620	14.958	6.918	-1.744
Export duties (% of tax revenue)	4.439	0.000	-4.439	0.000	-4.439	0.000	-4.439	0.444	-3.994	0.672	-3.767	4.903	0.464
Net trade in goods and services (BoP, million current US$)	$ (233.9)	$ (18,930.0)	$ (18,696.1)	$ (9,990.0)	$ (9,756.1)	$ (1,297.2)	$ (1,063.3)	$ (6,264.5)	$ (6,030.6)	$ (2,041.9)	$ (1,808.1)	$181.0	$414.8

Comparison of Means of FDI Related Variables in Cluster Analysis in 1985 Cross Section

Name	Global	Cluster of USA		Cluster of Japan		Cluster5: Developing Giants		Cluster6: Developed Powers		Cluster8: FDI Important		All Other Countries	
	208 Economies	1 (USA)	USA-global	1 (JPN)	JPN - global	2 (CHN, IND)	Cluster5 - global	4 (DEU, ITA, FRA, GBR)	Cluster6-global	4 (MEX,ESP, CAN,BRA)	Cluster8 - global	196 Econs	Cluster9 - global
GDP (billion constant 1995 US$)	$138.1	$5,563.5	$5,425.4	$3,884.9	$3,746.8	$237.9	$99.8	$1,250.1	$1,111.9	$422.5	$284.4	$33.5	$ (104.6)
GNI (billion current US$)	$77.1	$4,188.5	$4,111.4	$1,370.9	$1,293.8	$266.1	$189.0	$530.8	$453.8	$224.3	$147.2	$18.1	$ (58.9)
GDP (billion current US$)	$75.6	$4,174.9	$4,099.3	$1,365.8	$1,290.2	$266.1	$190.5	$532.5	$456.9	$232.5	$156.9	$18.0	$ (57.5)
GNI, Atlas method (billion current US$)	$82.5	$4,034.6	$3,952.1	$1,335.5	$1,253.0	$260.9	$178.4	$539.6	$457.1	$222.9	$140.4	$19.9	$ (62.6)
GNI, PPP (billion current international $)	$117.4	$4,035.2	$3,917.8	$1,492.4	$1,375.0	$811.7	$694.3	$750.3	$632.9	$400.5	$283.1	$40.2	$ (77.2)
GDP, PPP (billion current international $)	$119.2	$4,022.1	$3,902.9	$1,486.9	$1,367.7	$812.0	$692.8	$752.7	$633.5	$416.4	$297.2	$35.5	$ (83.7)
Foreign direct investment, net inflows (BoP, million current US$)	$379.6	$20,010.0	$19,630.4	$637.7	$258.1	$882.6	$502.9	$2,409.3	$2,029.7	$1,687.4	$1,307.7	$124.1	$ (255.6)
Population, total (million)	24.9	237.9	213.1	120.8	95.9	908.1	883.2	61.5	36.7	68.8	43.9	11.6	(13.2)
GDP per capita (constant 1995 US$)	$ 5,595	$ 23,384	$ 17,789	$ 32,172	$ 26,578	$ 262	$ (5,332)	$ 19,865	$ 14,271	$ 9,127	$ 3,532	$ 4,856	$ (739)
GNI per capita, Atlas method (current US$)	$ 3,358	$ 16,960	$ 13,602	$ 11,060	$ 7,702	$ 285	$ (3,073)	$ 8,645	$ 5,287	$ 5,365	$ 2,007	$ 3,009	$ (349)
GNI per capita, PPP (current international $)	$ 4,928	$ 16,960	$ 12,032	$ 12,360	$ 7,432	$ 915	$ (4,013)	$ 12,118	$ 7,189	$ 7,798	$ 2,869	$ 4,543	$ (386)
GDP per capita, PPP (current international $)	$ 4,932	$ 16,900	$ 11,968	$ 12,310	$ 7,378	$ 920	$ (4,012)	$ 12,163	$ 7,230	$ 8,038	$ 3,105	$ 4,508	$ (425)
GDP per capita growth (annual %)	0.366	2.900	2.535	3.728	3.363	7.729	7.364	2.454	2.088	3.016	2.650	0.091	-0.275
GDP growth (annual %)	2.152	3.816	1.664	4.364	2.212	9.565	7.413	2.597	0.445	4.410	2.258	1.950	-0.202
PPP conversion factor to official exchange rate ratio	0.570	1.038	0.468	0.919	0.348	0.326	-0.244	0.708	0.138	0.584	0.014	0.562	-0.008
Foreign direct investment, net inflows (% of GDP)	0.797	0.479	-0.318	0.047	-0.751	0.295	-0.502	0.503	-0.294	0.813	0.016	0.824	0.026
Gross foreign direct investment (% of GDP)	1.948	1.121	-0.827	0.522	-1.426	0.389	-1.559	1.492	-0.456	1.384	-0.564	2.025	0.077
Foreign direct investment, net inflows (% of gross capital formation)	4.685	2.375	-2.310	0.165	-4.520	0.819	-3.866	2.593	-2.091	3.954	-0.731	4.911	0.227
Trade in goods (% of GDP)	58.603	13.684	-44.919	22.525	-36.077	17.396	-41.206	37.070	-21.533	30.819	-27.784	61.235	2.633
Trade (% of GDP)	72.982	17.253	-55.729	24.959	-48.023	19.137	-53.844	52.180	-20.801	35.311	-37.671	76.434	3.452
Official exchange rate (LCU per US$, period average)	88.061	1.000	-87.061	238.536	150.475	7.653	-80.408	1.160	-86.901	0.661	-87.400	93.289	5.228
Net trade in goods and services (BoP, million current US$)	$ (210.5)	$ (121,117.0)	$ (120,906.5)	$45,687.8	$45,898.3	$ (9,616.5)	$ (9,406.0)	$8,185.9	$8,396.4	$7,409.9	$7,620.4	$14.9	$225.4

Comparison of Means of FDI Related Variables in Cluster Analysis in 1990 Cross Section

Name	Global	Cluster of USA & Japan		Cluster5: Developing Giants		Cluster6: Developed Powers		Cluster7: FDI Important		Cluster8: All Other Countries	
	208 Economies	2 (USA, JPN)	USA & JPN - global	2 (CHN, IND)	Cluster5 - global	4 (DEU, ITA, FRA, GBR)	Cluster6- global	9 (IDN, ESP, CAN, KOR, AUS,NLD, BEL,CHE,SWE)	Cluster7- global	191 Econs	Cluster8 - global
GDP (billion constant 1995 US$)	$148.2	$5,728.2	$5,580.1	$336.4	$188.2	$1,453.4	$1,305.3	$338.4	$190.2	$31.3	$ (116.9)
GNI, Atlas method (billion current US$)	$132.4	$4,596.9	$4,464.5	$349.4	$216.9	$1,168.5	$1,036.0	$285.8	$153.4	$23.8	$ (108.7)
GNI (billion current US$)	$124.4	$4,410.2	$4,285.8	$334.4	$210.0	$1,243.4	$1,119.0	$297.9	$173.4	$27.5	$ (97.0)
GDP (billion current US$)	$121.3	$4,401.4	$4,280.2	$335.8	$214.5	$1,249.1	$1,127.8	$302.2	$180.9	$27.3	$ (94.0)
GNI, PPP (billion current international $)	$161.1	$4,095.6	$3,934.4	$1,411.9	$1,250.7	$1,078.6	$917.5	$296.4	$135.3	$57.3	$ (103.8)
GDP, PPP (billion current international $)	$165.4	$4,089.1	$3,923.6	$1,417.9	$1,252.5	$1,084.0	$918.5	$301.6	$136.2	$58.8	$ (106.7)
Foreign direct investment, net inflows (BoP, million current US$)	$1,365.9	$25,133.7	$23,767.8	$1,861.9	$496.0	$13,907.5	$12,541.6	$6,472.0	$5,106.1	$253.2	$ (1,112.7)
Population, total (million)	27.0	186.5	159.5	992.4	965.4	62.6	35.7	38.3	11.4	12.9	(14.1)
GDP per capita (constant 1995 US$)	$ 5,766	$ 33,048	$ 27,282	$ 337	$ (5,429)	$ 22,695	$ 16,929	$ 20,489	$ 14,723	$ 4,213	$ (1,554)
GNI per capita, Atlas method (current US$)	$ 5,053	$ 25,270	$ 20,217	$ 355	$ (4,698)	$ 18,390	$ 13,337	$ 16,870	$ 11,817	$ 3,660	$ (1,392)
GNI per capita, PPP (current international $)	$ 6,446	$ 21,210	$ 14,764	$ 1,440	$ (5,006)	$ 17,138	$ 10,691	$ 14,867	$ 8,420	$ 5,507	$ (939)
GDP per capita, PPP (current international $)	$ 6,481	$ 21,155	$ 14,674	$ 1,450	$ (5,031)	$ 17,245	$ 10,764	$ 14,974	$ 8,494	$ 5,510	$ (971)
GDP per capita growth (annual %)	0.176	2.824	2.648	2.991	2.815	1.684	1.508	2.754	2.578	-0.090	-0.266
GDP growth (annual %)	2.192	3.538	1.347	4.804	2.613	2.151	-0.041	3.767	1.575	2.048	-0.143
PPP conversion factor to official exchange rate ratio	0.611	1.147	0.536	0.251	-0.360	1.149	0.538	1.065	0.454	0.557	-0.054
Real interest rate (%)	5.278	5.145	-0.133	4.436	-0.842	6.869	1.591	8.200	2.922	4.974	-0.304
Gross foreign direct investment (% of GDP)	2.896	2.242	-0.654	0.595	-2.301	3.582	0.686	4.362	1.466	2.814	-0.082
Foreign direct investment, net inflows (% of GDP)	1.812	0.451	-1.362	0.529	-1.284	1.300	-0.512	2.123	0.310	1.849	0.036
Export duties (% of tax revenue)	1.802	0.000	-1.802	0.031	-1.771	0.005	-1.797	0.022	-1.780	2.168	0.366
Tax revenue (% of GDP)	19.606	15.336	-4.270	7.041	-12.565	32.700	13.094	26.863	7.257	18.606	-1.000
Foreign direct investment, net inflows (% of gross capital formation)	7.098	2.485	-4.613	1.570	-5.528	6.179	-0.918	8.737	1.640	7.176	0.078
Import duties (% of tax revenue)	20.080	1.537	-18.543	28.924	8.844	0.006	-20.074	4.055	-16.025	23.019	2.939
Trade in goods (% of GDP)	59.737	16.484	-43.253	22.456	-37.281	39.074	-20.663	56.266	-3.471	61.688	1.950
Lending interest rate (%)	61.734	8.480	-53.254	12.930	-48.804	12.751	-48.983	14.214	-47.520	69.617	7.883
Trade (% of GDP)	76.116	20.216	-55.900	24.527	-51.588	46.951	-29.165	67.279	-8.837	78.875	2.760
Official exchange rate (LCU per US$, period average)	161.492	72.896	-88.595	11.143	-150.348	0.710	-160.782	284.733	123.242	161.572	0.080
Foreign direct investment, net (BoP, million current US$)	$ (282.1)	$ (18,714.8)	$ (18,432.8)	$1,377.0	$1,659.1	$ (7,726.7)	$ (7,444.6)	$621.7	$903.7	$174.1	$456.1
Net trade in goods and services (BoP, million current US$)	$ (35.1)	$ (27,237.0)	$ (27,201.9)	$1,105.5	$1,140.6	$7,475.4	$7,510.5	$ (620.1)	$ (585.0)	$175.2	$210.3

Comparison of Means of FDI Related Variables in Cluster Analysis in 1995 Cross Section

Name	Global	Cluster of USA & Japan		Cluster5: Developing Giants		Cluster6: Developed Powers		Cluster7: FDI Important		Cluster8: All Other Countries	
	208 Economies	2 (USA, JPN)	USA & JPN - global	2 (CHN, IND)	Cluster5 - global	4 (DEU, ITA, FRA, GBR)	Cluster6-global	6 (IDN, ESP, CAN, KOR, RUS, MEX)	Cluster7-global	194 Econs	Cluster8 - global
GNI (billion current US$)	$157.3	$6,332.4	$6,175.0	$520.2	$362.9	$1,549.8	$1,392.5	$405.5	$248.2	$37.5	$ (119.9)
GDP (billion current US$)	$155.7	$6,315.1	$6,159.4	$527.7	$372.0	$1,560.9	$1,405.2	$413.5	$257.8	$37.4	$ (118.3)
GDP (billion constant 1995 US$)	$158.1	$6,315.1	$6,157.0	$527.7	$369.7	$1,560.9	$1,402.8	$413.5	$255.5	$37.8	$ (120.2)
GNI, Atlas method (billion current US$)	$158.8	$6,301.8	$6,142.9	$486.4	$327.6	$1,489.6	$1,330.7	$414.3	$255.5	$36.6	$ (122.2)
GNI, PPP (billion current international $)	$202.5	$5,170.7	$4,968.1	$2,467.8	$2,265.2	$1,317.6	$1,115.0	$618.3	$415.7	$63.4	$ (139.1)
GDP, PPP (billion current international $)	$204.5	$5,162.9	$4,958.4	$2,502.1	$2,297.6	$1,327.7	$1,123.2	$632.5	$427.9	$64.4	$ (140.1)
Foreign direct investment, net inflows (BoP, million current US$)	$1,934.8	$28,919.7	$26,984.8	$18,996.4	$17,061.6	$15,572.9	$13,638.0	$5,554.9	$3,620.1	$867.5	$ (1,067.3)
Population, total (million)	29.0	195.1	166.1	1,068.5	1,039.5	63.7	34.7	90.9	61.9	12.8	(16.2)
GDP per capita (constant 1995 US$)	$ 5,979	$ 34,949	$ 28,970	$ 481	$ (5,498)	$ 23,906	$ 17,927	$ 8,672	$ 2,693	$ 5,167	$ (812)
GNI per capita, Atlas method (current US$)	$ 5,864	$ 34,545	$ 28,681	$ 450	$ (5,414)	$ 22,745	$ 16,881	$ 8,603	$ 2,739	$ 5,058	$ (806)
GNI per capita, PPP (current international $)	$ 7,486	$ 25,520	$ 18,034	$ 2,290	$ (5,196)	$ 20,565	$ 13,079	$ 10,573	$ 3,088	$ 6,859	$ (627)
GDP per capita, PPP (current international $)	$ 7,526	$ 25,445	$ 17,919	$ 2,320	$ (5,206)	$ 20,725	$ 13,199	$ 10,797	$ 3,271	$ 6,891	$ (635)
PPP conversion factor to official exchange rate ratio	0.556	1.423	0.867	0.208	-0.347	1.151	0.596	0.670	0.114	0.528	-0.027
Real interest rate (%)	5.741	5.197	-0.543	2.499	-3.242	6.543	0.802	15.986	10.245	5.269	-0.472
GDP per capita growth (annual %)	2.035	1.284	-0.751	7.541	5.506	2.107	0.071	1.156	-0.879	2.008	-0.027
GDP growth (annual %)	3.688	2.135	-1.554	9.090	5.402	2.305	-1.383	2.091	-1.597	3.732	0.044
Foreign direct investment, net inflows (% of GDP)	3.000	0.394	-2.606	2.861	-0.138	1.093	-1.907	1.522	-1.477	3.147	0.148
Gross foreign direct investment (% of GDP)	4.410	1.453	-2.957	3.307	-1.104	3.401	-1.010	2.432	-1.979	4.594	0.183
Foreign direct investment, net inflows (% of gross capital formation)	10.964	2.174	-8.790	7.406	-3.558	5.919	-5.045	6.692	-4.272	11.468	0.504
Lending interest rate (%)	28.769	6.168	-22.601	13.759	-15.009	9.556	-19.213	70.906	42.138	27.949	-0.819
Trade in goods (% of GDP)	63.381	16.597	-46.784	31.374	-32.008	40.695	-22.686	41.115	-22.266	65.710	2.329
Trade (% of GDP)	82.887	20.118	-62.769	35.631	-47.256	49.762	-33.124	57.313	-25.574	86.030	3.143
Official exchange rate (LCU per US$, period average)	590.264	47.530	-542.734	20.389	-569.875	0.742	-589.522	505.497	-84.767	619.528	29.264
Net trade in goods and services (BoP, million current US$)	$618.9	$ (10,967.6)	$ (11,586.5)	$200.8	$ (418.1)	$22,094.4	$21,475.5	$4,609.7	$3,990.9	$61.5	$ (557.4)

Comparison of Means of FDI Related Variables in Cluster Analysis in 2000 Cross Section

Name	Global	Cluster of USA		Cluster of Japan		Cluster6: Developing Giants		Cluster7: Developed Powers		Cluster8: FDI Important		Cluster9: All Other Countries	
	208 Economies	1 (USA)	USA-global	1 (JPN)	JPN - global	2 (CHN, IND)	Cluster6 - global	4 (DEU, ITA, FRA, GBR)	Cluster7- global	5 (BRA, ESP, CAN, KOR, RUS)	Cluster8 - global	195 Econs	Cluster9 - global
GNI (billion current US$)	$171.8	$9,928.5	$9,756.7	$4,824.9	$4,653.1	$759.3	$587.5	$1,418.8	$1,247.1	$505.9	$334.1	$38.6	$ (133.2)
GDP (billion current US$)	$170.1	$9,810.2	$9,640.1	$4,765.3	$4,595.1	$768.5	$598.4	$1,418.6	$1,248.4	$516.5	$346.3	$39.0	$ (131.1)
GNI, Atlas method (billion current US$)	$172.8	$9,700.6	$9,527.8	$4,493.3	$4,320.5	$758.4	$585.7	$1,539.2	$1,366.5	$510.5	$337.8	$39.2	$ (133.6)
GNI, PPP (billion current international $)	$261.6	$9,700.0	$9,438.5	$3,247.4	$2,985.9	$3,704.8	$3,443.2	$1,557.6	$1,296.1	$884.9	$623.4	$79.9	$ (181.7)
GDP, PPP (billion current international $)	$263.5	$9,584.5	$9,321.0	$3,207.3	$2,943.9	$3,748.4	$3,485.0	$1,558.2	$1,294.7	$906.9	$643.4	$81.7	$ (181.8)
GDP (billion constant 1995 US$)	$188.1	$8,986.9	$8,798.8	$5,680.6	$5,492.5	$754.2	$566.2	$1,742.1	$1,554.0	$635.6	$447.5	$43.4	$ (144.7)
Foreign direct investment, net inflows (million BoP, current US$)	$8,720.9	$307,740.0	$299,019.1	$8,227.2	$ (493.7)	$20,357.2	$11,636.3	$95,999.4	$87,278.5	$29,544.9	$20,824.0	$3,720.7	$ (5,000.2)
Foreign direct investment, net (BoP, million current US$)	$846.1	$129,450.0	$128,603.9	$ (23,306.6)	$ (24,152.7)	$19,914.6	$19,068.5	$ (29,202.7)	$ (30,048.9)	$7,218.6	$6,372.5	$329.4	$ (516.7)
Population, total (million)	29.3	282.2	252.9	126.9	97.6	1,139.2	1,109.9	64.4	35.1	86.8	57.5	13.7	(15.5)
GNI per capita, Atlas method (current US$)	$ 5,899	$ 34,370	$ 28,471	$ 35,420	$ 29,521	$ 645	$ (5,254)	$ 23,613	$ 17,713	$ 10,162	$ 4,263	$ 5,058	$ (841)
GNI per capita, PPP (current international $)	$ 8,655	$ 34,370	$ 25,715	$ 25,600	$ 16,945	$ 3,200	$ (5,455)	$ 24,115	$ 15,460	$ 14,788	$ 6,133	$ 7,837	$ (817)
GDP per capita (constant 1995 US$)	$ 6,622	$ 31,843	$ 25,221	$ 44,775	$ 38,153	$ 642	$ (5,980)	$ 26,469	$ 19,847	$ 12,132	$ 5,510	$ 5,662	$ (960)
GDP per capita, PPP (current international $)	$ 8,867	$ 33,960	$ 25,093	$ 25,280	$ 16,413	$ 3,235	$ (5,632)	$ 24,113	$ 15,246	$ 15,062	$ 6,195	$ 8,063	$ (804)
Highest marginal tax rate, corporate rate (%)	28.326	35.000	6.674	30.000	1.674	34.800	6.474	31.075	2.749	30.200	1.874	27.909	-0.417
PPP conversion factor to official exchange rate ratio	0.484	1.024	0.540	1.486	1.002	0.198	-0.286	0.912	0.428	0.594	0.110	0.462	-0.022
GDP per capita growth (annual %)	2.493	2.865	0.372	2.184	-0.310	4.733	2.240	2.954	0.460	5.616	3.123	2.363	-0.130
GDP growth (annual %)	3.947	4.175	0.229	2.361	-1.586	5.977	2.031	3.173	-0.773	6.276	2.330	3.880	-0.067
Real interest rate (%)	7.205	6.796	-0.409	4.132	-3.073	6.407	-0.798	6.040	-1.165	9.679	2.474	7.184	-0.021
Foreign direct investment, net inflows (% of GDP)	4.779	3.137	-1.642	0.173	-4.607	2.031	-2.748	6.014	1.234	4.901	0.121	4.821	0.041
Gross foreign direct investment (% of GDP)	8.109	5.438	-2.671	0.945	-7.163	2.457	-5.651	17.098	8.989	9.023	0.914	7.939	-0.170
Foreign direct investment, net inflows (% of gross capital formation)	21.485	15.134	-6.350	0.665	-20.819	6.034	-15.451	29.942	8.457	21.900	0.415	21.644	0.159
Lending interest rate (%)	18.937	9.233	-9.703	2.067	-16.870	9.071	-9.866	7.143	-11.794	20.451	1.514	19.588	0.651
Trade in goods (% of GDP)	67.959	20.799	-47.160	18.021	-49.938	32.256	-35.703	48.812	-19.148	54.272	-13.687	69.895	1.935
Trade (% of GDP)	90.414	26.197	-64.217	20.095	-70.319	39.802	-50.612	59.133	-31.281	65.465	-24.949	93.547	3.133
Official exchange rate (LCU per US$, period average)	4,118.897	1.000	-4,117.897	107.766	-4,011.131	26.610	-4,092.286	0.979	-4,117.917	232.698	-3,886.199	4,418.990	300.093
Net trade in goods and services (BoP, million current US$)	$ (107.2)	$ (378,680.0)	$ (378,572.8)	$69,090.5	$69,197.7	$8,490.8	$8,598.0	$2,638.3	$2,745.5	$16,775.0	$16,882.2	$1,146.2	$1,253.4

Comparison of Means of FDI Related Variables in Cluster Analysis in 2001 Cross Section

Name	Global	Cluster of USA		Cluster of Japan		Cluster of China		Cluster of India		Cluster7: Developed Powers		Cluster8: FDI Important		Cluster9: All Other Countries	
	208 Economies	1 (USA)	USA-global	1 (JPN)	JPN - global	1 (CHN)	CHN-global	1 (IND)	IND-global	4 (DEU,ITA, FRA,GBR)	Cluster7-global	6 (BRA, ESP, CAN, KOR, RUS, MEX)	Cluster8 - global	194 Econs	Cluster9 - global
GDP (billion current US$)	$173.5	$10,065.3	$9,891.8	$4,141.4	$3,967.9	$1,159.0	$985.5	$477.3	$303.8	$1,417.2	$1,243.7	$521.5	$347.9	$36.4	$ (137.1)
GNI (billion current US$)	$172.8	$10,053.2	$9,880.4	$4,209.9	$4,037.1	$1,139.9	$967.1	$474.6	$301.8	$1,417.7	$1,244.9	$510.2	$337.4	$35.8	$ (137.0)
GNI, Atlas method (billion current US$)	$175.1	$9,780.8	$9,605.8	$4,523.3	$4,348.2	$1,131.2	$956.1	$477.4	$302.3	$1,480.2	$1,305.2	$508.3	$333.2	$36.6	$ (138.5)
GDP, PPP (billion current international $)	$277.8	$9,792.5	$9,514.6	$3,193.0	$2,915.2	$5,111.2	$4,833.4	$2,930.0	$2,652.1	$1,589.2	$1,311.4	$920.1	$642.2	$80.5	$ (197.4)
GNI, PPP (billion current international $)	$275.2	$9,780.7	$9,505.5	$3,245.8	$2,970.6	$5,026.7	$4,751.5	$2,913.4	$2,638.3	$1,589.1	$1,314.0	$898.0	$622.8	$78.8	$ (196.3)
GDP (billion constant 1995 US$)	$194.4	$9,013.9	$8,819.4	$5,647.7	$5,453.2	$1,117.2	$922.8	$492.5	$298.1	$1,766.6	$1,572.2	$604.7	$410.3	$42.9	$ (151.5)
Foreign direct investment, net inflows (BoP, million current US$)	$4,501.3	$130,800.0	$126,298.7	$6,191.3	$1,690.0	$44,241.0	$39,739.7	$3,403.0	$ (1,098.3)	$40,503.3	$36,002.0	$17,001.9	$12,500.6	$1,964.2	$ (2,537.1)
Foreign direct investment, net (BoP, million current US$)	$975.5	$2,960.0	$1,984.5	$ (32,306.1)	$ (33,281.6)	$37,357.0	$36,381.5	$3,300.0	$2,324.5	$ (4,981.7)	$ (5,957.2)	$5,359.9	$4,384.3	$860.6	$ (115.0)
Population, total (million)	29.6	285.3	255.7	127.0	97.4	1,271.9	1,242.2	1,032.4	1,002.7	64.6	34.9	89.3	59.7	13.5	(16.1)
GNI per capita, Atlas method (current US$)	$ 5,593	$ 34,280	$ 28,687	$ 35,610	$ 30,017	$ 890	$ (4,703)	$ 460	$ (5,133)	$ 22,700	$ 17,107	$ 9,340	$ 3,747	$ 4,731	$ (863)
GNI per capita, PPP (current international $)	$ 8,510	$ 34,280	$ 25,770	$ 25,550	$ 17,040	$ 3,950	$ (4,560)	$ 2,820	$ (5,690)	$ 24,548	$ 16,038	$ 13,940	$ 5,430	$ 7,630	$ (880)
GDP per capita, PPP (current international $)	$ 8,727	$ 34,320	$ 25,593	$ 25,130	$ 16,403	$ 4,020	$ (4,707)	$ 2,840	$ (5,887)	$ 24,543	$ 15,815	$ 14,210	$ 5,483	$ 7,859	$ (868)
GDP per capita (constant 1995 US$)	$ 6,489	$ 31,592	$ 25,103	$ 44,458	$ 37,969	$ 878	$ (5,610)	$ 477	$ (6,012)	$ 26,787	$ 20,298	$ 10,860	$ 4,371	$ 5,496	$ (993)
PPP conversion factor to official exchange rate ratio	0.475	1.028	0.553	1.297	0.822	0.227	-0.248	0.165	-0.310	0.893	0.418	0.592	0.117	0.452	-0.023
GDP per capita growth (annual %)	1.480	-0.788	-2.267	-0.708	-2.188	6.508	5.028	3.722	2.243	1.282	-0.198	1.320	-0.160	1.473	-0.007
GDP growth (annual %)	2.924	0.300	-2.624	-0.579	-3.503	7.300	4.376	5.400	2.476	1.595	-1.329	2.239	-0.686	2.978	0.053
Foreign direct investment, net inflows (% of GDP)	4.032	1.300	-2.732	0.149	-3.882	3.817	-0.215	0.713	-3.319	2.878	-1.153	2.952	-1.079	4.177	0.145
Real interest rate (%)	9.729	4.525	-5.204	3.440	-6.289	5.847	-3.882	8.293	-1.436	5.112	-4.617	11.137	1.409	9.949	0.220
Lending interest rate (%)	16.787	6.922	-9.865	1.970	-14.817	5.850	-10.937	12.083	-4.703	7.148	-9.638	18.014	1.227	17.345	0.559
Trade in goods (% of GDP)	65.906	18.986	-46.921	18.172	-47.734	44.322	-21.584	19.531	-46.375	48.268	-17.638	51.761	-14.145	67.999	2.092
Official exchange rate (LCU per US$, period average)	7653.105	1.000	-7652.105	121.529	-7531.576	8.277	-7644.828	47.186	-7605.919	1.012	-7652.093	222.422	-7430.683	8281.836	628.732
Net trade in goods and services (BoP, million current US$)	$ (183.6)	$ (358,290.0)	$ (358,106.4)	$26,480.3	$26,663.9	$28,084.0	$28,267.6	$ (8,500.0)	$ (8,316.4)	$10,300.5	$10,484.1	$9,734.7	$9,918.3	$1,189.3	$1,372.8

Appendix 3.1: GMM Result of FDI with One Lower Middle Income Dummy

Dependent variable: FDI inflows

Independent Var	(ivlag=2 .)	(ivlag=4 .)	(ivlag=6 10)
Exchange Rate (EX)	0.334	-0.0793	-0.220
	(0.52)	(0.64)	(0.74)
Lagged FDI Inflows (FDIL)	0.488***	0.466***	0.466***
	(0.12)	(0.13)	(0.12)
Tax Rate (Tax)	-16101*	-17721*	-17504**
	(8857)	(9141)	(8697)
Wage Rate (Wage)	1.204	0.604	0.944
	(1.03)	(1.05)	(1.14)
Real Interest Rate (r)	-18.21	-69.19	-47.08
	(33.0)	(66.8)	(105)
Import Duties (Tariff)	5.814	7.760	10.11*
	(5.23)	(5.36)	(5.53)
Openness (Open)	-33.94	24.43	-15.62
	(80.7)	(117)	(118)
School Enrollment (EDU)	136.9***	130.9**	138.6**
	(50.8)	(53.3)	(53.6)
GDP	7.690***	8.111***	8.168***
	(1.46)	(1.59)	(1.40)
LMCD	-759.4	-255.9	-839.9
	(1070)	(1357)	(1417)
Risk	-499.5***	-676.3**	-1218***
	(179)	(274)	(416)
# of Observations	1313	1313	1313
P-value of AR(2) test	0.526	0.376	0.278

Robust standard errors in parentheses.

***, ** and * represent significence levels of less than 1% (p<0.01), less than 5% (p<0.05), and less than 10% (p<0.1), respectively.

All regressions include a constant term and time (year) dummies which are not reported in the table.

All independent variables are lagged in one period.

Each column represents results for instrument variables (IVs) with different lags indicated at the top.

LMCD is country dummy =1 if being LMC (Lower Middle Income Country), =0 otherwise.

EX, FDIL, r and EDU are Exchange Rate, Lagged FDI inflows, real interest rate, and school enrollment, respectively

Appendix 3.2: GMM Result of FDI with One Upper Middle Income Dummy†

Dependent variable: FDI inflows

Independent Var	(ivlag=3 6)	(ivlag=3 5)
Exchange Rate (EX)	0.255	0.252
	(0.50)	(0.50)
Lagged FDI Inflows (FDIL)	0.494***	0.494***
	(0.12)	(0.12)
Tax Rate (Tax)	-18206*	-18110*
	(9194)	(9160)
Wage Rate (Wage)	1.046	1.049
	(0.92)	(0.91)
Real Interest Rate (r)	2.237	2.396
	(11.7)	(11.7)
Import Duties (Tariff)	5.564	5.573
	(4.35)	(4.36)
Openness (Open)	-26.42	-27.64
	(80.5)	(80.3)
School Enrollment (EDU)	133.1**	133.4***
	(50.7)	(50.6)
GDP	7.551***	7.550***
	(1.31)	(1.31)
UMCD	-863.5	-858.0
	(805)	(805)
Risk	-431.3***	-427.2***
	(132)	(132)
# of Observations	1313	1313
P-value of AR(2) test	0.576	0.576

† See footnote in Appendix 3.1.

UMCD is country dummy =1 if being UMC (Upper Middle Income Country), =0 otherwise.

Appendix 3.3: GMM Result of FDI with Slope Lower Middle Income Dummy†

Both Intercept and Slope Income Dummies, Dependent variable: FDI inflows

	Independent Var	(ivlag=2 .)	(ivlag=4 .)	(ivlag=6 10)
Individual Independent Var	Exchange Rate (EX)	0.158	-0.353	-0.617
		(0.54)	(0.67)	(0.74)
	Lagged FDI Inflows (FDIL)	0.484***	0.464***	0.463***
		(0.13)	(0.13)	(0.12)
	Tax Rate (Tax)	-17810	-16552	-20768*
		(10874)	(10771)	(12122)
	Wage Rate (Wage)	1.415	0.953	1.528
		(1.12)	(1.14)	(1.17)
	Real Interest Rate (r)	-26.82	-77.43	-3.465
		(53.4)	(82.6)	(132)
	Import Duties (Tariff)	5.573	8.146	10.64**
		(4.98)	(5.00)	(5.14)
	Openness (Open)	-48.58	-19.78	-69.58
		(86.7)	(132)	(143)
	School Enrollment (EDU)	140.4***	134.9**	145.3***
		(50.5)	(53.9)	(53.9)
	GDP	7.716***	8.025***	8.064***
		(1.48)	(1.61)	(1.40)
	LMCD	6118***	9322***	9602**
		(2133)	(3238)	(3683)
	Risk	-534.8**	-661.1**	-1201**
		(212)	(325)	(486)
Slope Dummies or Interactive Var	EX * LMCD	-0.233	-0.401	0.0196
		(0.56)	(0.61)	(0.68)
	FDIL * LMCD	-0.929**	-1.139**	-1.702**
		(0.47)	(0.52)	(0.85)
	Tax * LMCD	15646	6712	10782
		(12287)	(16320)	(20028)
	Wage * LMCD	-2.798*	-2.579	-4.649**
		(1.45)	(1.67)	(1.97)
	r * LMCD	34.70	66.52	2.253
		(54.7)	(79.9)	(126)
	Tariff * LMCD	1.251	6.557	14.66
		(11.2)	(28.7)	(34.2)
	Open * LMCD	82.02	105.1	162.5
		(93.0)	(144)	(162)
	Edu * LMCD	-148.7***	-196.2***	-204.5***
		(49.9)	(59.6)	(64.6)
	GDP * LMCD	4.693	8.891	8.166
		(7.56)	(7.46)	(10.3)
	Risk * LMCD	174.7	161.7	186.1
		(254)	(327)	(487)
	# of Observations	1313	1313	1313
	P-value of AR(2) test	0.571	0.470	0.318

† See footnote in Appendix 3.1.

EX*LMCD is the interactive variable (slope dummy) between EX (exchange rate) and LMCD (country dummy for lower middle income county). Similarly hereinafter.

Appendix 3.4: GMM Result of FDI with Slope Upper Middle Income Dummy†

Both Intercept and Slope Income Dummies, Dependent variable: FDI inflows

	Independent Var	(ivlag=3 6)	(ivlag=3 5)
Individual Independent Var	Exchange Rate (EX)	0.216	0.211
		(0.52)	(0.52)
	Lagged FDI Inflows (FDIL)	0.496***	0.497***
		(0.12)	(0.12)
	Tax Rate (Tax)	-24211**	-24082**
		(9898)	(9855)
	Wage Rate (Wage)	1.359	1.360
		(0.95)	(0.95)
	Real Interest Rate (r)	1.244	1.457
		(11.1)	(11.0)
	Import Duties (Tariff)	5.868	5.870
		(4.27)	(4.27)
	Openness (Open)	-39.76	-41.67
		(95.7)	(95.5)
	School Enrollment (EDU)	132.7**	133.0**
		(53.3)	(53.2)
	GDP	7.443***	7.438***
		(1.22)	(1.22)
	UMCD	3366	3363
		(2358)	(2368)
	Risk	-416.3***	-410.6***
		(148)	(148)
Slope Dummies or Interactive Var	EX * UMCD	-0.582	-0.567
		(0.79)	(0.78)
	FDIL * UMCD	0.0823	0.0820
		(0.15)	(0.15)
	Tax * UMCD	24266**	24237**
		(10354)	(10343)
	Wage * UMCD	-1.675	-1.668
		(1.14)	(1.13)
	r * UMCD	10.11	9.815
		(26.5)	(26.4)
	Tariff * UMCD	3.077	3.058
		(22.8)	(22.9)
	Open * UMCD	52.73	54.94
		(92.6)	(92.5)
	Edu * UMCD	-126.1***	-126.3***
		(47.7)	(47.7)
	GDP * UMCD	6.229*	6.309*
		(3.27)	(3.28)
	Risk * UMCD	168.7	163.3
		(206)	(207)
	# of Observations	1313	1313
	P-value of AR(2) test	0.704	0.703

† See footnote in Appendix 3.1, 3.2, & 3.3.

Appendix 3.5: Country List

High Income Group 21	Middle Income Group 43	Low Income Group 31	Upper Middle Income Group 20	Lower Middle Income Group 23
Australia	Argentina	Azerbaijan	Argentina	Bulgaria
Austria	Bulgaria	Burkina Faso	Brazil	Belarus
Belgium	Belarus	Bangladesh	Botswana	Bolivia
Canada	Bolivia	Côte d'Ivoire	Chile	Colombia
Switzerland	Brazil	Cameroon	Costa Rica	Dominican Republic
Germany	Botswana	Congo, Rep.	Czech Republic	Algeria
Denmark	Chile	Ethiopia	Estonia	Ecuador
Spain	Colombia	Ghana	Gabon	Egypt, Arab Rep.
Finland	Costa Rica	Guinea	Croatia	Guyana
France	Czech Republic	Gambia, The	Hungary	Jamaica
United Kingdom	Dominican Republic	Guinea-Bissau	Lebanon	Jordan
Greece	Algeria	Haiti	Lithuania	Kazakhstan
Ireland	Ecuador	Indonesia	Latvia	Sri Lanka
Italy	Egypt, Arab Rep.	India	Mexico	Peru
Korea, Rep.	Estonia	Kenya	Malaysia	Philippines
Norway	Gabon	Moldova	Panama	Paraguay
New Zealand	Guyana	Madagascar	Poland	Romania
Portugal	Croatia	Mali	Trinidad and Tobago	Russian Federation
Slovenia	Hungary	Malawi	Uruguay	El Salvador
Sweden	Jamaica	Nigeria	Venezuela, RB	Thailand
United States	Jordan	Nicaragua		Tunisia
	Kazakhstan	Pakistan		Turkey
	Lebanon	Papua New Guinea		South Africa
	Sri Lanka	Senegal		
	Lithuania	Sierra Leone		
	Latvia	Togo		
	Mexico	Uganda		
	Malaysia	Ukraine		
	Panama	Yemen, Rep.		
	Peru	Congo, Dem. Rep.		
	Philippines	Zimbabwe		
	Poland			
	Paraguay			
	Romania			
	Russian Federation			
	El Salvador			

Note: Middle Income group can be discomposed into Upper Middle Income group and Low Middle Income group.

Appendix 3.6: List of Studies Using Level of FDI Inflows as Dependent Variable

The FDI researchers apply the level of FDI inflows as dependent variable include Scaperlanda (1967, 1968), Bandera and White (1968), Wallis (1968), Scaperlanda and Mauer (1969,1971), Goldberg (1972), Boatwright and Renton (1975), Ray (1977), Lunn (1980,1983), Culem (1988), Tsai (1991), Lucas (1993), Eaton and Tamura (1994), Kudrle (1995), Summary and Summary (1995), Tu and Schive (1995), Lee and Mansfield (1996), Milner and Pentecost (1996), UNCTAD (1998), UN (1998), Sarno and Tauylor (1999), Lipsey (2000a), Morisset (2000), Love and Lage-Hidalgo (2000), Wei (2000), Baek and Okawa (2001), Dunning et al. (2001), Balasubramanyam et al. (2002), Bandelj (2002), Fung et al. (2002), Habib and Zurawicki (2002), Harms and Ursprung (2002), Quiroga and Miguel (2002), Ramirez (2002), Sun et al. (2002), Janicki and Wunnava (2004), and Carstensen and Toubal (2004), etc.

Appendix 3.7: List of Studies on FDI Inflows in current US$

FDI can be in current US$, in real term (adjusted by GDP deflator), or normalized by GDP. The studies on FDI in current US$ are as follows: Scaperlanda (1967, 1968), Bandera and White (1968), Wallis (1968), Scaperlanda and Mauer (1969,1971), Goldberg (1972), Boatwright and Renton (1975), Ray (1977), Lunn (1980,1983), Culem (1988), Tsai (1991), Lucas (1993), Eaton and Tamura (1994), Kudrle (1995), Summary and Summary (1995), Tu and Schive (1995), Lee and Mansfield (1996), Milner and Pentecost (1996), UNCTAD (1998), UN (1998), Sarno and Tauylor (1999), Lipsey (2000a), Morisset (2000), Love and Lage-Hidalgo (2000), Wei (2000), Baek and Okawa (2001), Dunning et al. (2001), Balasubramanyam et al. (2002), Bandelj (2002), Fung et al. (2002), Habib and Zurawicki (2002), Harms and Ursprung (2002), Quiroga and Miguel (2002), Sun et al. (2002), Janicki and Wunnava (2004), and Carstensen and Toubal (2004), etc.

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