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Terrorism and FDI Flows : Cross-Country Dynamic Panel Estimation

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The huge cost associated with terrorist incidents and the related significant redistribution of economic resources motivate a better understanding of the economic consequences of terrorism. By using cross-country panel data on FDI flows and terrorism for 1980-2000, this paper examines the effect of terrorism as well as some economic and institution factors on the FDI flows. In order to allow for possible endogeneity of terrorism, we use dynamic panel system GMM estimation. The estimation results confirm our hypothesis that terrorism deters FDI inflows. Depending on definition of terrorism variables, an increase of terrorism decreases FDI stock by 0.3~0.6%. It is shown that the FDI determinants of economic and institution factors play significant role as well.

Keywords : Terrorism, Panel System GMM

JEL Classifications : C3, F2

I . Introduction

After the September 11 terrorist attacks, the economic impacts of terrorist

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activities have attracted wide attention from policy makers and academics. Through the risks of possible future terrorist incidents, the huge cost associated with terrorist incidents and the related significant redistribution of economic resources motivated a better understanding of the economic consequences of terrorism.

Terrorism might aggravate economic performance through increases of costs, which include an increase in insurance premium, the disruptions of the transportation system, the severe tightening of border controls, and increase of public spending on homeland security and military operations. Even with the measurement problems such as aggregation issues, the definition of damage, and the causality of the indirect effects etc., OECD estimated costs resulting from the terror attacks of September 11 to be 14 billion USD for the private sector, 1.5 billion USD for state and local government enterprises, 0.7 billion USD for the US federal government, and 11 billion USD for the rescue and clean-up operations (Lenain et al., 2002). An increase of transaction costs may affect the flows of commodity trade as well as financial capitals. While the impact of terrorism on trade and capital flows may vary across time and place, terrorism generally implies additional costs for transactions so that, if anything, we would expect a negative association between terrorist activity and the volume of trade and capital flows.

The policy responses to prevent and detect terrorism are enacted on borders and include closer inspections on people, vehicles and goods as well as more restrictive immigration regulations. And there is the risk of a direct destruction of traded goods. Studying the empirical effects of terrorism on international trade, Nitsch and Schumacher (2004) find that conflicts, broadly defined, have significant effects on bilateral trade flows; a doubling in the number of terrorist incidents is associated with a decrease in bilateral trade by about 4%.

Furthermore, the shrinkage of terrorism-related insurance coverage stemming from the perception of greater risks, and higher transaction costs may have a detrimental impact on investment, as lenders become wary of greater potential risks, although there is no strong evidence yet of such a pattern.

This paper is to investigate the impact of terrorism on the flow of foreign

direct investment (FDI) which is one of the recent features of the world economy. Most of developing countries consider FDI inflows as one of the most important channels for economic development.

One of the important questions raised by FDI literature is what attracts multinational enterprise. Potential determinants of FDI location have been extensively studied (Coughlin et al., 1991; Friedman et al., 1992, 1996; Wheeler and Mody, 1992; Head et al., 1995; Chen, 1996; Barrel, 1999; Cheng and Kwan, 2000). Main determinants of FDI location suggested by these studies can be summarized by four categories: agglomeration effects, institution effects, production cost effect and market access effects.

For the estimation of the effects of terrorism on FDI, one possible problem is a potential endogeneity of the terrorist activities. For example, Li and Schaub (2004) test the effect of economic globalization on the number of transnational incidents. Their empirical results show that trade, FDI, and portfolio investment have no direct effects on transnational incidents within countries, and the economic development of a country and its top trading partners reduce the number of terrorist incidents inside the counties. And supporting the findings of several related issues of Hess and Orphanides (1995, 2001) and Blomberg and Hess (2002), Blomberg et al. (2004) explore the links between the incidence of terrorism and the state of the country's economy. They find that economic activity and terrorism are not independent, showing that high income and democratic countries appear to have a higher incidence of terrorism and a lower incidence of economic contractions. Furthermore, terrorism appears to be related to the economic business cycle : periods of economic weakness increase the likelihood of terrorist activities.

In order to consider possible issues in estimation, this paper uses Panel System GMM estimation (Holtz-Eakin et al., 1988; Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998). The estimation results show that terrorism and other economic activities play significant roles in attracting FDI. They are economic freedom, average tariff rate, income per capita and exports.

The paper is organized as follows. Section 2 describes several indicators

of terrorism. Section 3 and 4 present the estimation methodology and the results and Section 5 concludes.

Ⅱ. Trends of Terrorism and Determinants of FDI Location

The data of terrorist activities are from the latest update of the International Terrorism: Attributes of Terrorists Events (ITERATE) data set from Mickolous et al. (2003). The ITERATE data set which provides a detailed chronology of terrorist events around the world since 1968 attempts to standardize and quantify characteristics, activities, and impacts of international terrorist groups. The types of incidents included in the data are: kidnapping, barricade and hostage seizure, occupation of facilities without hostage seizure, letter or parceling bombing, incendiary bombing, arson, Molotov cocktail, explosive bombing, armed attack employing missiles, armed attack-other including mortars and bazookas, aerial hijacking, takeover of non-aerial means of transportation, assassination or murder, sabotage not involving explosives or arson, deliberate pollution, nuclear weapons threat, theft or break-in threat, conspiracy, hoax, sniping, shout-out with police, arms smuggling, car bombing and suicide bombing.

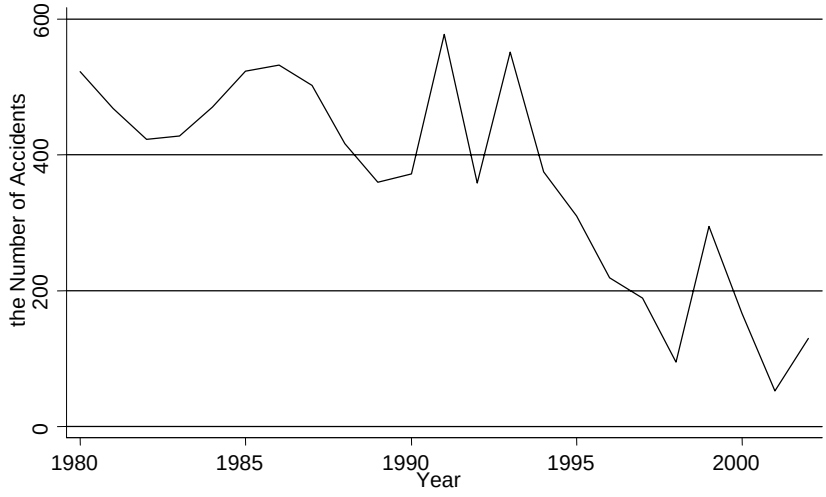
The raw data consists of 5 categories. First, there are incident characteristics of each event (timing, type of accident, location start etc.). Second, there are the terrorist characteristics which include the number of terrorists, their nationality etc. Third, victim characteristics describe the number, nationalities, and types of victims. Fourth, the life and property losses are recorded. They are the total number of individuals wounded and killed, and amount of damage etc. Finally, terrorist logistical success or failure is recorded.

Since there is no consistent definition of terrorism, we use several measures of terrorism: the number of terrorists in attack force (Terrorists), the number of incidents (Incidents), the number of victims (Victims), and the number of victims per accidents (Victims per accident). Next question is on the flow or

stock of terrorism definition. For example, the variable which might affect FDI amount is the number of individuals wounded last year or the total accumulated number of individuals wounded until year preceding FDI decision.

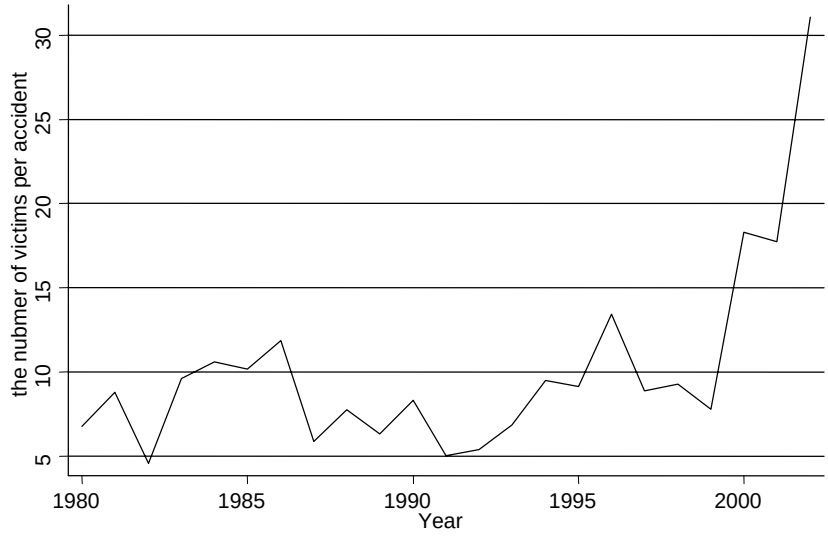
<Figure 1>~<Figure 4> depicts the number of each variable over years. All aggregate variables, the number of terrorists, accidents and victims, tend

〈Figure 1〉 Annual Trend of the Number of Terrorists : 1980~2002



〈Figure 2〉 Annual Trend of the Number of Accidents:1980~2002

〈Figure 3〉 Annual Trend of Victims : 1980~2002



〈Figure 4〉 Annual Trend of Victims per Accidents per year : 1980~2002

to decrease over time. However, <Figure 4> indicates that the degree of terrorist attack severity became more intensified since the number of victims per accidents tends to increase over time.

<Table 1> describes summary statistics of terrorism variables with

standard deviation in parentheses which are used in the estimation.

Traditional studies on FDI decision show four main factors : agglomeration effects, institution effects, production cost effect and market access effects.

〈Table 1〉 Summary Statistics of Terrorism Variables

	1980-84	1985-89	1990-94	1995-99	2000-02	Total
Terrorists	474.5 (854.8)	444.9 (816.5)	467.6 (1143.2)	291.3 (650.1)	179.7 (260.3)	406.7 (867.4)
Accidents	6.4 (10.8)	6.1 (10.3)	5.8 (12.5)	3.6 (6.9)	2.8 (2.9)	5.4 (10.2)
Victims	52.1 (142.8)	52.1 (161.7)	40.0 (96.7)	35.5 (77.8)	64.6 (148.3)	47.0 (128.5)
Victims per accident	10.5 (25.5)	9.1 (25.5)	9.0 (23.6)	14.3 (51.3)	23.4 (56.3)	11.5 (32.3)

First, agglomeration effects might be due to positive linkages among projects. One of incentives is the spillover effects created by research and development. The second is confidence and the possibility that firms cluster. For example, firms are not sure as to whether a particular country (region) is a good location for FDI and thus take the success of one firm as a signal of underlying national (regional) characteristics. A third incentive arises from the supply of, and demand for, intermediate goods (see Fujita et al., 1999 for a general overview).

Second, most countries have tried to attract FDI through favorable economic policies, which are called institution effects. They include various institutional reforms, an establishment of special economic zones and construction of new roads. For China, Chen (1996) and Cheng and Kwan (2000) show that special economic zones and infrastructure (road) lead to lower setup cost of new local establishments in host countries and thus promote FDI.

Third, lower production costs may contribute to attracting multinationals. Switching from direct exports to local production will bring cost savings through lower factor cost, lower transport costs and no trade barrier. Obviously local production can save through avoiding transport cost and trade barriers

such as tariff and other nontrade barriers. Furthermore, for example, local production with collaboration with local firms through joint ventures can decrease the cost to deal with foreign regulation, tax, and administration. Theoretical modeling based on distinct firms with increasing returns to scale predicts that FDI is more likely to replace exports the larger is the market because the plant-specific fixed cost may be spread over more units of output as the market size increases.[2] In addition, a significant part of multinational activity tends to take the forms of firms shifting a state of their production process to low-cost locations. The economic analysis of this shift based on the idea that different parts of the production process have different input requirement. For example, it may be profitable to move production of labor-intensive goods to labor-abundant countries while the headquarter services are left in home country (Helpman, 1984, 1985; Helpman and Krugman, 1985).

Four, there is market access effect. Larger markets in terms of per capita income will tend to have more local firms, and consequently more intense competition than smaller markets. This will lead to a lower price and will be particularly damaging to the profitability of exporting, tipping the firm's decision in favor of local production (Horstmann and Markusen 1987; Markusen and Venables, 1999).

Ⅲ. Model Specification

Assume the following FDI determination equation in country i in year t.

2) Conventional neoclassical models of MNEs view exports and FDI as substitutes, particularly in the manufacturing sector. In addition, if FDI is directed to industries in whichhome countryhas comparative advantages, then imports and FDI are likely to be positively related. In particular, new products require specific skills and knowledge so that effective maintenance and support can be provided. Thehome countrymay also find quality supervision more effective if it directly controls the network. Hence, whether exports and FDI are substitutes or complements neds to be resolved empirically

$$f_{it} = \alpha_1 + (\alpha_2 - 1)F_{it-1} + \beta' X_{it} + \eta_i + \omega_t + \nu_{it}, \quad (1)$$

where f_{it} is FDI flows into a country i in year t and F_{it-1} represents accumulated stock of FDI flows until year $t-1$, which reflects accumulation effect. X_{it} represents a vector of other independent variables and α_1, α_2, and β' are the parameters to be estimated. ω_t is the time-specific effect, as fixed, unknown constant, which is equivalent to putting time dummies in the regression. η_i reflects country-specific effect and ν_{it} is well-defined stochastic error-term.

Since FDI flows f_{it} can be rewritten as $F_{it} - F_{it-1}$ equation (1) can be rewritten as a dynamic panel regression form

$$\begin{aligned} F_{it} &= \alpha_1 + \alpha_2 F_{it-1} + \beta' X_{it} + u_{it}, \\ U_{it} &= \eta_i + \omega_t + \nu_{it},\ i = 1, 2, \cdots, N, t = 1, 2, \cdots T. \end{aligned} \quad (2)$$

This equation is a dynamic panel regression with a lagged dependent variable on the right hand side.

It is important to ascertain the serial correlation property of the disturbances in our dynamic model, which is crucial for formulating an appropriate estimation procedure. And, the issue of reverse causality should be addressed. We have to deal with the potential endogeneity issue of both the lagged dependent variable and the explanatory variables arising from the feedback effects of FDI on control variables that are lagged accumulated stock of FDI and other economic and institutional factors in our study. These econometric issues should be properly considered for a model specification and its estimation.

Following Holtz-Eakin et al. (1988), Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998), the above-mentioned econometric issues under a Generalized Method of Moments (GMM) framework are considered.

The GMM approach starts with the first-differenced version of equation (2).

$$\Delta F_{it} = \alpha_2 \Delta F_{it-1} + \beta' \Delta X_{it} + \Delta u_{it},\ i = 1, 2, \cdots, N,\ t = 1, 2, \cdots, T, \quad (3)$$

The country-specific effects are eliminated by the difference and Δ represents the first difference of each variable.

Under the assumption of serially uncorrelated level residuals, values of F lagged two periods or more qualify as instruments in the first-differenced system, implying the following moment conditions :

$$E[F_{it-s}\,\Delta u_{it}] = 0 \;for\; t = 3,\cdots,T \text{ and } s \geq 2. \tag{4}$$

In addition, we make use of the explanatory variables as additional instruments as follows.

Here the issue of endogeneity due to reverse causality becomes critical. For strictly exogenous explanatory variables, both past and future ΔX are valid instruments :

$$E[\Delta X_{it-s}\,\Delta u_{it}] = 0 \;for\; t = 3,\cdots,T \text{ and all } s \geq 2. \tag{5}$$

But using conditions (5) for $S < 2$ will lead to inconsistent estimates if reverse causality exists in the sense that $E[X_{is}\,u_{it}] \neq 0$ for $s \geq t$ Instead, one may assume X to be weakly exogenous, i.e., $E[X_{is}\,u_{it}] = 0$ for $s < t$ which implies the following subset of conditions (5):

$$E[\Delta X_{it-s}\,\Delta u = 0 \; t = 3,\cdots,\; T \text{ and } s \geq 2. \tag{6}$$

Equations (4) - Equations (6) imply a set of linear moment conditions to which the standard GMM methodology applies. The consistency of the GMM estimator hinges on the validity of these moment conditions, which in turn depends on maintained hypotheses on the level residuals being serially uncorrelated and the strictly or weakly exogeneity of the explanatory variables. It is therefore essential to ensure that these assumptions are justified by conducting specification tests (Arellano and Bond, 1991).

It should be noted that the first-differencing operation not only eliminates unobserved country-specific effects but also time-invariant explanatory

variables for which only cross-sectional information is available. In addition, under a random-effect model, the first-differenced GMM estimator can suffer from serious efficiency loss, for there are potentially informative moment conditions that are ignored in the first-difference equation (Blundell and Bond, 1998). Thus additional moment conditions that make use of information in the level equation (1) can be useful information.

Following Blundell and Bond (1998), we augment the first-differenced moment conditions Equations (4) - Equations (6) by the level moment conditions.

$$E[u_{it}\,\Delta F_{it-1}] = 0 \quad t = 3, \cdots, T, \tag{7}$$

which amounts to using lagged differences of F as instruments in the level equation (1).

In addition, for strictly exogenous explanatory variables, the appropriate level moment conditions would be

$$E[u_{it}\,\Delta X_{it-s}] = 0 \quad t = 3, \cdots, T, \text{ and all } s. \tag{8}$$

For weakly exogenous explanatory variables, the level moment conditions are.

$$E[u_{it}\,\Delta X_{it-s}] = 0 \quad t = 3, \cdots, T, \text{ and all } s \geq 1. \tag{9}$$

The dynamic panel system GMM estimator is obtained by imposing both the set of moment conditions Equations (7)-Equations (9) and Equations (4)-Equations(6). By exploiting more moment conditions, the system GMM estimator is more efficient than the first-differenced GMM estimator that uses only a subset Equations (4)-Equations (6).

The overall validity of the moment conditions is checked by the Sargan overidentification test. The null hypothesis of no misspecification is rejected if the minimized GMM criterion function registers a large value compared with a chi-squared distribution with the degree of freedom equal to the difference between the number of moment conditions and number of parameters. In

addition, to check the serial correlation property of the level residuals, we rely on the Blundell-Bond m_1 and m_2 statistics. If the level residuals were indeed serially uncorrelated, then, by construction, the first-differenced residuals in equation (3) would follow a MA (1) process which implies that autocorrelations of the first-order are non-zero but the second or higher-order ones are zero. In our system GMM specification, there should be an evidence of significant negative first-order serial correlation in differenced residuals and no evidence of second order serial correlation in the differenced residuals. Therefore the null hypothesis of no AR(1) should be accepted while the null hypothesis of no A(m) for m>1 should be rejected.

Ⅳ. Data and Estimation Results

FDI indicators are drawn from UNCTAD website and other independent variables are from the World Bank : per capita GDP, exports, and mean tariff. The choice of control variables is based on the list of determinants on FDI location that are reviewed in related literature (see reference thereafter).

The lagged value of accumulated FDI reflects agglomeration effects. The institutional environment that reflects institution effect plays an important role in attracting FDI. As an institutional environment variable, Economic Freedom Indices, constructed by the Fraser Institute, are used. The summary index is based on 23 components designed to identify the consistency of institutional arrangements and policies with economic freedom in seven major areas and the data are released on a scale of 1 to 10 in five-year periods from 1970 to 1995, and annually thereafter.[3] The core ingredients are freedom to choose, legal protection of property rights, freedom of exchange, reliance on markets, use of money, and market allocation of capital. Individuals have economic freedom when : (a) the property they have acquired without the use of force, fraud, or theft is protected from physical invasions by others and (b) they

3) The missing data of other years are generated by the linear interpolaio method.

are not forced to use, exchange, or give their property to other people as long as their actions do not violate the identical rights of others. And to see the effect of trade barrier, mean tariff rate is used as an indicator, which is from a component of Economic Freedom index.

Per capita GDP reflects market access effects and other two control variables, exports and tariff, reflect trade-off relation between FDI and direct exports. As explained in Section 2, switching from direct exports to local production brings cost savings by avoiding transport costs, trade barrier such as tariff and nontrade barriers.

<Table 2> presents the estimation results by fixed- and random-effect panel model while <Table 3> shows those of dynamic panel system GMM estimation of equation (2).

Economic variables are shown to be significant independently of the estimation methods although the size of coefficients is different.

First, accumulated stock of FDI is positive and significant, implying positive linkages among projects: spillover effects, cluster confidence and uses of intermediate goods. Second, the institution variable which reflects government policies favorable to multinationals appears to be significant and positive.

Third, there is a negative correlation between per capita income and FDI even though some results are not significant at 5% significance level. This result seems to be inconsistent with our expectation. However, this is not surprising because per capita income implies two conflicting factor : market potential as demand and labor productivity as supply side. If this variable is interpreted as labor productivity, higher value of labor productivity of home countries result in low incentives to invest from multinational companie's point of view. One of the main incentives to go abroad is technology advantage in terms of productivity, marketing, and international networks etc. Thus multinational companies have less incentives to invest in the countries with relatively higher level of technology. In other words, as technology level approaches the level of multinationals, multinationals have less advantage with their higher level of technology.

Fourth, exports show a positive coefficient and thus the conventional view

of the trade-off relation between FDI and exports is not supported empirically. Some companies establish their subsidiaries that can produce the same products as their parent company. This production results in lower transport cost that direct exports from the parent country, no tariff, and the seller can more easily adapt to host country's tastes, customs, and legal requirement. Thus establishment might result in lower export directly from parent country and thus there is substitute between local production and exports. However, there are several reasons to be complements (see Caves et al. (2002) for more discussion). Graham and Krugman (1993) argue that, for some industries, foreign investment is likely to be complementary with trade. Baldwin (1990) suggests that downstream services are typically associated with the level of export sales from the parent country to the host country. Some of these facilities can be set up by locals, although parent country involvement may be beneficial.

Fifth, the tariff level that reflects trade barrier shows positive and significant effects. This implies that multinationals tend to invest more in the countries with higher tariff rate because they can avoid trade barrier.

Sixth, institution environment effect is shown to be positive and significant throughout the whole model specifications (<Table 2> and <Table 3>). This justify the view that better institution, i.e., the favorable environment to foreign multinationals, plays a significant role in promoting FDI.

Finally terrorism variables that are the most important variables throughout this study present different results between panel estimation and panel system GMM estimation. Except for the number of terrorists in <Table 2>, other terrorist variables do not show negative and significant coefficients. However, all other variables show negative ones even though they are not significant. Considering possible endogeneity of independent variables, <Table 3> shows the estimation results of panel system GMM estimation. All variables show coherent estimation results with those of <Table 2>. In particular, all terrorist variables play negative roles in attracting FDI in all model specifications. Furthermore all model specifications satisfy specification tests and AR test. In all specifications, we assume that lagged FDI stock, GDP per capita and

exports are endogenous variables, and economic freedom index, average tariff rate and terrorist variables are strictly exogenous ones.

〈Table 2〉 Panel Estimation

	Model 1		Model 2		Model 3		Model 4	
	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random
Log(terrorists)	-0.047	-0.052						
	(2.16)*	(2.53)*						
Log(incidents)			-0.045	-0.064				
			(0.80)	(1.24)				
Log(victims)					-0.024	-0.02		
					(1.08)	(0.94)		
Log(victims per terror)							-0.022	-0.013
							(0.77)	(0.46)
Lagged FDI stock	0.434	0.541	0.427	0.538	0.428	0.542	0.432	0.543
	(5.25)**	(8.90)**	(5.10)**	(8.75)**	(5.13)**	(8.88)**	(5.18)**	(8.89)**
Log(per capita gdp)	-0.604	-0.318	-0.584	-0.321	-0.567	-0.333	-0.562	-0.334
	(1.42)	(3.89)**	(1.37)	(3.84)**	(1.33)	(4.01)**	(1.32)	(3.98)**
Log(exports)	1.156	0.573	1.186	0.586	1.19	0.587	1.19	0.586
	(5.56)**	(6.11)**	(5.68)**	(6.20)**	(5.69)**	(6.20)**	(5.69)**	(6.20)**
Economic Freedom	0.323	0.347	0.323	0.351	0.329	0.362	0.333	0.366
	(4.19)**	(5.56)**	(4.14)**	(5.52)**	(4.27)**	(5.79)**	(4.31)**	(5.80)**
Log(mean tariff)	0.064	0.17	0.059	0.166	0.065	0.173	0.063	0.172
	(0.66)	(2.07)*	(0.6)	(2.00)*	(0.66)	(2.10)*	(0.64)	(2.09)*
Constant	-21.623	-11.389	-22.583	-11.814	-22.886	-11.887	-22.988	-11.912
	(5.93)**	(7.48)**	(6.27)**	(7.74)**	(6.39)**	(7.79)**	(6.42)**	(7.81)**
Observations	811	811	811	811	811	811	811	811
Number of Countries	83	83	83	83	83	83	83	83
Overall R-squared	0.74	0.77	0.74	0.77	0.74	0.77	0.74	0.77
Sigma_u	1.303	0.767	1.331	0.779	1.348	0.778	1.355	0.784
Sigma_e	0.856	0.856	0.858	0.858	0.858	0.858	0.858	0.858
Rho	0.699	0.446	0.706	0.452	0.712	0.451	0.714	0.455
Hausman statistics (p-value)	23.55(0.001)		27.82(0.0001)		3.34(0.765)		25.84(0.0002)	

Note : Robust z statistics in parentheses ; significant at 5% ; ** significant at 1%.

〈Table 3〉 Dynamic Panel System GMM Estimation

	Model 1	Model 2	Model 3	Model 4
Log(Lagged FDI stock)	0.909	0.909	0.907	0.908
	(522.05)**	(488.91)**	(304.59)**	(491.02)**
Log(per capita gdp)	-0.053	-0.053	-0.055	-0.056
	(16.88)**	(14.88)**	(20.08)**	(22.56)**
Log(exports)	0.114	0.114	0.117	0.116
	(48.48)**	(42.55)**	(25.18)**	(53.20)**
Economic Freedom	0.026	0.026	0.025	0.026
	(39.78)**	(29.58)**	(14.24)**	(17.92)**
Log(mean tariff)	0.04	0.039	0.041	0.043
	(16.25)**	(10.58)**	(16.53)**	(19.87)**
Log(terrorists)	-0.003			
	(14.47)**			
Log(incidents)		-0.003		
		(3.75)**		
Log(victims)			-0.004	
			(10.84)**	
Log(victims per terror)				-0.006
				(17.13)**
Constant	-1.576	-1.584	-1.628	-1.603
	(49.84)**	(45.93)**	(21.46)**	(55.39)**
Observations	870	870	870	870
Number of countries	83	83	83	83
GMM Overiden. Test	77.89(0.9)	78.14(0.9)	76.66(0.9)	77.04(0.9)
AR(1)	-1.95(0.05)	-1.95(0.05)	-1.95(0.05)	-1.95(0.05)
AR(2)	-0.71(0.48)	-0.68(0.50)	-0.67(0.50)	-0.72(0.47)

V. Conclusion

By using FDI and terrorist data between 1980 and 2002, this paper investigates the role of terrorism on FDI.

The positive and significant coefficient for the lagged FDI stock supports a strong agglomeration effect which implies that the countries with more FDI stock a year ago tend to attract more FDI during the current year. Income per capita shows a negative and significant coefficient showing that the countries with lower income per capita tend to attract more FDI flows. The countries with larger exports and lower tariff rate have higher FDI flows, which shows that trade is positively related with FDI flows. And economic freedom index has positive correlation with FDI flows. Thus FDI flows more to countries with higher economic freedom, i.e., better property rights, good legal protection etc.

Consistently with our hypothesis, the estimation results show that terrorism is negatively and significantly related with FDI flows. The specifications allowing for possible endogeneity of control variables strengthen the significant role of terrorism variables. Furthermore other control variables which are shown to be important factors in previous studies are shown to be significant in this study as well.

Finally, it should be noted that more exploration of moment conditions used throughout model specifications (moment conditions Equations (4) – Equations (6) and Equations (7) – Equations (9)) are needed and left for future research to obtain more robust estimates.

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[Abstract]

테러와 외국인 직접투자 : 국가가 동학적 패널 추정

강성진 · 이홍식

테러의 발생으로 인하여 나타나는 중요한 경제 자원의 재분배로 막대한 비용이 발생하게 되는데, 이는 테러의 경제적 효과가 어느 정도 되겠는가 하는 연구의 동기가 되고 있다. 1980~2000년 기간의 국가별 외국인 직접투자와 테러의 정도에 대한 패널자료를 이용하여 본 연구는 전통적인 결정 변수들로 알려진 경제적 변수 외에 테러와 관련된 변수들이 외국인 직접투자에 대하여 얼마나 심각한 영향을 미치는지를 실증분석하고 있다. 테러 관련 변수들이 역으로 경제변수들의 영향을 받을 가능성이 있어 내생성의 가능성을 고려한 동학적 패널 시스템 GMM 추정방법을 사용하였다. 추정결과를 보면 테러발생이 외국인 직접투자의 유입을 저해하는 것으로 나타나는데 테러의 증가는 정의변수에 따라 0.3~0.6% 정도의 외국인 직접투자의 저량이 감소하는 것으로 나타났다. 그 외에 전통적으로 외국인 직접투자의 결정요인으로 알려진 경제 및 제도 변수들도 중요한 결정요인으로 나타났다.

핵심용어 : 테러, 동학적 패널 GMM