The Effect of FDI on Foreign Trade: A Panel Analysis•

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Doğrudan Yabancı Sermaye Yatırımların Dış Ticaret Üzerindeki Etkisi: Panel Veri Analizi

Özet

Bu çalışmanın amacı gelen-giden Doğrudan Yabancı Sermaye Yatırımları (DYSY)'nın Dış Ticaret (DT) üzerindeki etkisinin panel regresyon tekniği ile belirlenmesidir. Bu amaçla, kişi başına milli gelir kıstasına göre 5 farklı gelişmişlik grubuna ayrılan 143 ülkenin 1980–2009 arasındaki DYSY ve DT verileri kullanılarak 4 grup analiz yapılmıştır. Bu analizler neticesinde farklı gelişmişlik düzeyine sahip ülke gruplarında gelen ve giden DYSY ihracat ve ithalat miktarlarını farklı oranlarda etkilemektedir. Ancak az gelişmiş ülkelerin ithalat ve ihracatları DYSY'lere çok daha fazla duyarlı olduğu görülmektedir.

Anahtar Kelimeler: DYSY, dış ticaret, panel data.

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Abstract

The purpose of this paper is to determine the effect of inward and outward foreign direct investments (FDI) on foreign trade (FT) using panel regression analysis. To this end, 143 countries, which were classified into 5 different development groups according per capita income, were subject to 4 separate analyses using FDI and FT data between the years 1980 and 2009. This study concludes that inward and outward FDI affects trade volume at different rates according to a country's development level. However, imports and exports appear to be more sensitive to FDI in less developed countries.

***Keywords**: FDI, foreign trade, panel data.*

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1. Introduction

Foreign savings can be used to finance investments in countries in which savings are inadequate, which can be done either by using foreign savings or by attracting investments from abroad. In the literature, these processes are known as *external debt* and *foreign direct investment* (FDI), respectively. Both methods have unique features with respect to the profits that the target country obtains. To address disadvantages in the savings-investment balance, countries must decide between FDI and external debt according to the net benefits associated with these economic developments.

In practice, countries use both of these options together because it is difficult to enhance economic development with exclusive investments in either foreign debt or FDI. Therefore, these two methods are not alternatives but rather complementary approaches. However, FDI may become more appropriate when the interest rate for foreign debt is high similarly, foreign debt may heavily be used if a country aims to protect its economic stability and thus avoid any decrease in economic development should FDI decrease. Today, the demand for foreign debt (both public and private) to finance investments seems to have increased in some developed and developing countries because the cost of borrowing is lower in these countries.

External debt and FDI affect micro- and macro-level economic variables in different ways. The effect of FDI appears in real markets (i.e., in terms of employment, production, export and so on), while the direct effect of foreign debt emerges in financial markets (i.e., in terms of interest rate, exchange rate, borrowing costs and so on). The effects of external debt and FDI might be negative or positive. Thus, countries have to increase the positive economic contributions of these approaches. If this is not achieved, economic development could be undermined.

One of the effects of FDI on real markets can be observed with respect to foreign trade. As such, FDI affects both domestic and foreign markets. Similarly, raw materials and intermediate goods, which are used for production, are provided by foreign and domestic suppliers. The key factor in detecting the effect of FDI on foreign trade is the balance between imported raw materials that are used for production and exported goods. However, if a country's supply of raw materials and intermediate goods are exclusively used, then production made possible by FDI might be directed primarily at domestic markets; in this case, these goods might be consumed in domestic markets. In this situation if these productions were being exported, then the foreign trade (FT) will be affected positively.

Noting that FDI may have a negative or positive effect on FT for those countries affected by FDI, the purpose of this study was to determine and test these effects

using panel regression. To achieve this goal, 143 countries were divided into 5 different groups under the assumption that that the effect of FDI on FT differs by development level. This study used FDI and FT data on 143 countries between 1980-2009. Countries with missing data in this period were not included in the analysis, nor were countries included in a list published by OECD in August 2009 that designated certain countries as "*tax havens*"[8] (OECD, 2009a). The most important contribution of this study is that it evaluates the relationship between FDI and FT at a macro level based on the development level of 143 countries. This study differs from the previous, studies in that both the period reviewed are longer and there are more countries.

The remainder of this study consists of 4 parts. In the first section, the development of FDI and FT over 1980-2009 is discussed. The second section discusses the interaction between FDI and FT, and in the third section, an econometric analysis of the effect of FDI on FT is presented. The conclusion evaluates the analytical findings.

2. Foreign Direct Investments and Foreign Trade: A General Review

FDI, which is defined as transferring capital or a business in order to obtain permanent benefits (OECD, 1996), is an option preferred by countries in which domestic savings are insufficient to finance investments. This preference is due to the outstanding ability of FDI, for example, to transform capital into investment, encourage competition, enhance technological transfer and so on (OECD, 2002) for the host countries as compared to foreign debt. Moreover, competition between countries increases continuously because of the increasing volume of FDI globally.

Capital owners prefer to invest abroad instead of at home because of their intentions to multiply their income and expand their activities. This is why they prefer undertaking productive activities in areas that are close to markets; as such, they can find a cheap labor force and raw materials. In this way, capital owners gain significant advantage against their rivals in the same market.

Another factor that plays an important role in the increasing movement of international capital is the rapid spread of privatization around the world, which is the result of the supplyside economic policies adopted in the 1980s. As a result of these policies, increasing privatization and the expansion of production within the private sector have increased foreign capital investments to other countries. The

[8] For more information about the tax havens see OECD (1998).

development of market economies by the countries that formed after the dissolution of the Soviet Union and the economic changes in the People's Republic of China are other important developments that encourage the increasing movement of international capital.

There are primarily three reasons why FDI has quickly expanded throughout the world (Fontagne, 1999):

Developments in communication technologies, the sharing of knowledge and enhanced transportation have strengthened the organizational structure of enterprises and thus made them more productive.

Changes in competition conditions, the privatization of central sectors such as telecommunication and other initiatives undertaken within Europe have encouraged FDI to expand in underdeveloped countries.

Developing countries quickly implemented FDI policies to attract more foreign capital.

Multinational corporations moved their new investments towards different countries so as not to lose their advantageous positions with respect to profit and competitive advantage. Some of these companies even moved their production facilities to economically promising countries during this period. All of these movements (i.e., total inward) increased FDI dramatically. In this context, FDI throughout the world (total inward) reached $54.076 million in 1980 and reached $207.697 million in 1990. In 2007, these investments reached their highest point in history at $2.099.973 million. The economic crisis that began in 2008 and continued in 2009 affected (inward) FDI negatively, which dropped by 37% to $1.114.189 million in 2009 (Table-1).

Table 1: Inward and Outward FDI Flows and Stock, 1980–2009 ($ Million)

Years	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Inward FDI Flows	54.076	69.567	58.059	50.268	56.839	55.832	86.316	136.576	163.913	197.369
Inward FDI Stock	700.277	750.499	791.099	843.589	873.009	994.732	1.143.486	1.344.348	1.529.142	1.838.477
Outward FDI Flows	51.550	51.503	27.310	37.381	50.120	61.963	96.801	141.995	182.443	234.040
Outward FDI Stock	548.933	586.800	597.824	678.376	698.986	898.859	1.155.705	1.374.739	1.606.687	1.928.231
Years	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Inward FDI Flows	207.697	154.009	165.973	223.454	256.112	342.544	388.998	486.476	707.185	1.087.500
Inward FDI Stock	2.081.782	2.347.366	2.429.159	2.631.511	2.844.455	3.381.329	3.873.724	4.452.998	5.547.221	6.757.556
Outward FDI Flows	241.474	198.036	202.716	242.573	286.889	362.585	396.457	476.083	682.285	1.076.822
Outward FDI Stock	2.086.818	2.342.354	2.382.994	2.777.384	3.103.388	3.606.556	4.089.866	4.709.384	5.587.758	6.761.225
Years	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Inward FDI Flows	1.401.466	825.280	628.114	565.739	732.397	985.796	1.459.133	2.099.973	1.770.873	1.114.189
Inward FDI Stock	7.442.548	7.468.968	7.519.080	9.372.829	11.055.515	11.524.869	14.275.734	17.990.069	15.491.182	17.743.408
Outward FDI Flows	1.232.888	753.077	537.095	565.732	920.253	893.093	1.410.574	2.267.547	1.928.799	1.100.993
Outward FDI Stock	7.967.460	7.684.655	7.764.291	9.866.859	11.639.506	12.416.839	15.661.006	19.313.981	16.206.795	18.982.118

Source: *UNCTAD Stat*

Historically, foreign capital has mostly flowed toward developed countries. But over time, the share of FDI that developing countries (as also known as emerging markets) have received has increased. Nevertheless, although this share has a higher value, it still is less than FDI for developed countries in absolute terms (Table-2).

Table 2: Distribution of Inward FDI, 1980–2009 (%)

Years	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Emerging Economies	13,83	34,56	45,43	34,95	30,98	25,36	18,25	15,9	18,67	15,7	16,93	25,55	31,89	34,57	40,38
Transition Economies	0,04	0,02	0	0,04	-0,01	0,03	-0,03	0,01	0,01	0,01	0,03	0,09	0,92	1,38	0,77
Developed Economies	86,13	65,42	54,57	65,01	69,03	74,61	81,78	84,1	81,32	84,29	83,04	74,36	67,19	64,05	58,85
	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Years	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Emerging Economies	34	37,67	39,26	27,04	21,15	18,59	26,26	27,94	32,56	39,52	33,83	29,69	26,75	36,57	38,98
Transition Economies	1,19	1,51	2,13	1,14	0,79	0,51	1,19	1,79	3,52	4,12	3,18	3,73	4,59	6,74	6,65
Developed Economies	64,81	60,82	58,61	71,82	78,06	80,9	72,56	70,27	63,92	56,36	62,99	66,58	68,66	56,69	54,37
	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: *Calculated using data from the UNCTAD Stat.*

Under the Agreement WTO Members have committed themselves to remove the quotas by January 2005 by integrating the sector fully into the General Agreement on Tariffs and Trade (GATT) rules. This practice encourages the liberalization of trade, the participation of new actors (e.g., China and India), increased competition in international trade and changes in the external trade balances of countries. As such, countries have started to look for new ways to improve exports that have outstanding contributions to maintain stable economic growth and continue to expand foreign currency inflows. These methods include accessing new markets, discriminating among potential investments, improving productivity, and paying special attention to mechanisms such as FDI and tourism, which provide foreign currency income by increasing exports.

It might be said that. FT showed more stable development according to the FDI. During the 1980s, total exports were amounted to $2,424,340 million, which nearly doubled in the 1990s. This increase continued over the next years, and in 2008, it reached the highest level in history at $19,988,410 million. However, the economic crisis affected exports, which declined to $15,833,636 million in 2009. Generally, an important part of total exports is based on exported goods. Nevertheless, we see similar developments in imports, which are the other important component of foreign trade. This dynamic can easily be seen in the 2009 figures as well. Overall, the foreign trade balance, which is defined as the difference between exports and imports, has favored imports in the periods examined in this paper. However, when we look at the same sub-components of this balance (i.e., goods and services), last year's figures showed differences in favor of exports in the balance of service and FT (Table-3). This situation may cause a decrease in which large differences in favor of imports in the overall balance are accrued.

Table 3: Foreign Trade and the Foreign Trade Balance, 1980–2009 ($ Million)

Years	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Total Exports	2.424.340	2.415.083	2.277.685	2.229.924	2.349.554	2.376.818	2.626.221	3.096.305	3.510.889	3.785.473
Exports of Goods	2.035.542	2.015.160	1.884.488	1.847.639	1.959.038	1.972.579	2.149.734	2.531.820	2.878.228	3.096.540
Services Export	389.025	400.158	393.421	382.503	390.770	404.492	476.540	564.555	632.703	688.968
Total Imports	2.521.931	2.535.529	2.395.219	2.324.669	2.456.632	2.474.290	2.718.689	3.175.095	3.629.741	3.923.731
Imports of Goods	2.078.123	2.075.052	1.952.237	1.894.962	2.018.405	2.035.858	2.225.540	2.594.332	2.968.273	3.197.901
Services Imports	443.808	460.477	442.982	429.707	438.227	438.432	493.149	580.763	661.468	725.830
General Foreign Trade Balance	-97.592	-120.446	-117.534	-94.745	-107.078	-97.472	-92.469	-78.790	-118.851	-138.258
Trade Balance of Goods	-42.581	-59.892	-67.748	-47.323	-59.367	-63.278	-75.806	-62.512	-90.045	-101.361
Services Foreign Trade Balance	-54.783	-60.319	-49.561	-47.204	-47.457	-33.940	-16.609	-16.209	-28.765	-36.862
Years	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Total Exports	4.310.648	4.378.975	4.748.253	4.777.690	5.402.466	6.412.550	6.732.902	6.963.041	6.909.804	7.160.165
Exports of Goods	3.484.312	3.508.734	3.764.895	3.780.008	4.319.819	5.178.972	5.406.955	5.588.419	5.504.159	5.719.998
Services Export	826.422	870.330	983.460	997.780	1.082.738	1.233.577	1.325.947	1.374.622	1.405.645	1.440.167
Total Imports	4.469.437	4.541.183	4.893.059	4.864.124	5.478.608	6.506.295	6.836.577	7.061.241	7.034.073	7.310.660
Imports of Goods	3.596.056	3.624.982	3.876.872	3.844.171	4.381.395	5.239.816	5.498.214	5.683.701	5.635.719	5.866.204
Services Imports	873.382	916.200	1.016.187	1.019.953	1.097.213	1.266.479	1.338.364	1.377.540	1.398.354	1.444.456
General Foreign Trade Balance	-158.790	-162.207	-144.806	-86.434	-76.142	-93.745	-103.676	-98.200	-124.269	-150.495
Trade Balance of Goods	-111.744	-116.249	-111.977	-64.163	-61.576	-60.843	-91.259	-95.281	-131.559	-146.207
Services Foreign Trade Balance	-46.960	-45.870	-32.727	-22.174	-14.476	-32.902	-12.417	-2.919	7.291	-4.288
Years	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Total Exports	7.975.506	7.721.785	8.124.709	9.440.296	11.479.820	13.064.807	15.027.115	17.452.019	19.988.410	15.833.636
Exports of Goods	6.448.493	6.189.669	6.480.670	7.545.343	9.189.472	10.504.579	12.128.596	13.986.001	16.099.612	12.419.054
Services Export	1.527.013	1.532.116	1.644.039	1.894.953	2.290.348	2.560.228	2.898.519	3.466.018	3.888.798	3.414.581
Total Imports	8.194.511	7.982.205	8.301.088	9.643.420	11.692.292	13.255.333	15.119.367	17.476.705	20.117.992	15.842.865
Imports of Goods	6.658.891	6.425.900	6.665.853	7.773.170	9.472.356	10.792.228	12.374.816	14.242.525	16.451.142	12.590.408
Services Imports	1.535.621	1.556.305	1.635.236	1.870.250	2.219.936	2.463.105	2.744.551	3.234.180	3.666.851	3.252.457
General Foreign Trade Balance	-219.006	-260.421	-176.379	-203.124	-212.472	-190.526	-92.252	-24.686	-129.583	-9.229
Trade Balance of Goods	-210.398	-236.231	-185.183	-227.827	-282.885	-287.649	-246.220	-256.524	-351.530	-171.353
Services Foreign Trade Balance	-8.608	-24.189	8.803	24.703	70.412	97.123	153.968	231.839	221.947	162.124

Source: *UNCTAD Stat*

When we consider the distribution of foreign trade, it is obvious that the important parts of both imports and exports are performed by developed countries. Nevertheless, a significant increase in the share of foreign trade of developing countries has been seen during the period analyzed. However, the same increase was not observed in transition economies (Table-4). In other words, an important portion of the FT of developed countries has involved taking possession of developing countries. China, which is a developing country, has a major effect in driving these results.

Table 4: Foreign Trade Distribution on Economies, 1980–2009 (%)

Years	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Export	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Developed Economies	68,62	68,07	68,97	69,63	69,88	71,33	75,01	74,45	74,40	73,57	73,99	74,74	73,99	72,36	71,34
Emerging Economies	27,67	27,99	26,56	25,69	25,65	24,41	20,74	21,56	21,95	23,04	23,11	23,82	24,38	25,94	26,54
Transition Economies	3,71	3,93	4,47	4,68	4,47	4,26	4,25	4,00	3,65	3,39	2,90	1,44	1,63	1,70	2,12
Import	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Developed Economies	71,20	67,90	68,05	68,83	70,43	71,72	74,19	75,07	74,20	73,71	74,07	73,84	72,62	70,18	69,94
Emerging Economies	25,24	28,35	27,86	26,98	25,60	24,24	21,90	21,28	22,27	22,74	22,43	24,73	25,80	28,17	28,00
Transition Economies	3,56	3,75	4,09	4,19	3,96	4,04	3,91	3,64	3,53	3,55	3,50	1,43	1,57	1,65	2,06
Years	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Export	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Developed Economies	71,11	70,23	69,41	71,32	70,41	67,63	68,24	67,58	67,12	65,36	62,86	61,46	61,00	59,32	59,69
Emerging Economies	26,70	27,42	28,28	26,63	27,69	30,14	29,42	30,01	30,27	31,75	33,92	35,04	35,34	36,42	36,70
Transition Economies	2,18	2,36	2,31	2,05	1,90	2,23	2,34	2,40	2,61	2,89	3,22	3,50	3,66	4,26	3,61
Import	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Developed Economies	69,40	68,80	67,91	70,85	71,35	69,87	69,71	69,34	69,20	67,70	66,31	65,23	63,91	61,87	60,83
Emerging Economies	28,42	28,89	29,70	27,06	27,06	28,52	28,33	28,54	28,53	29,88	31,12	31,94	32,81	34,44	35,93
Transition Economies	2,18	2,31	2,39	2,09	1,58	1,61	1,96	2,12	2,27	2,42	2,57	2,83	3,28	3,69	3,24

Source: *These data were calculated with the help of Stat UNCTAD.*

3. The Relation between FDI and Foreign Trade

The relation between FDI and FT is a result of globalization. Because the relation between these two variables is complex, it is difficult to develop a broadly acceptable theoretical argument regarding it (Fontagne, 1999).

Manufacturers have three options when entering foreign markets. They may export their products, they may ensure the inclusion of their products in the local market by giving permission to a local producer to produce the product, or they may produce and sell their products by investing in that country (Dunning, 1988). Without proper licensing, a company must either export or invest to sell its goods and services in other countries (Gast and Herrmann, 2008). Enterprises generally prefer trading (i.e., exports and imports) rather than investing on foreign markets because trading is easier and less risky for them. As such, they learn more about the economic, political and social status of the country with which they are trading and thus gain experience. Then, they invest in that country. As a result, a two-sided relation between foreign trade and FDI appears. Initially, foreign trade causes FDI, while at a later stage; FDI encourages foreign trade (Johanson and Wiedersheim, 1975; Liu, Wang and Wei, 2001 and Blonigen, 2005). This dynamic demonstrates the existence of strong interaction between FDI and FT.

Although FDI is not always accepted as a substitute for exporting, FDI is generally considered to be an effective means for encouraging foreign trade. FDI might be implemented to exploit natural sources, target local markets and/or increase efficiency (UNCTAD, 1998). Accordingly, FDI aimed at exploiting natural sources increases the exports of the host country, while FDI aimed at local markets increases the imports of the host country. Using FDI to enhance efficiency could increase host countries exports while also increasing home country imports. In contrast, investments with respect to local markets usually take the form of horizontally integrated FDI, while investments targeted at natural resources are vertically integrated FDI (Jensen, 2002)[9]. Horizontally integrated FDI serves as a substitute for exports; this type of FDI mostly emerges between developed and developing countries. Meanwhile, vertical integration complements exports and facilitates improvements in foreign trade. This type of FDI, moreover, mostly takes place between developed countries (Aizenman and Noy 2006; Tadesse and Ryan, 2004).

There are three types of countries that are implicated in a FDI-FT relation. These include the *home (investor) country*, from which investments and capital originate, the *host country*, where the investment is made, and *third countries* (Fontagne, 1999). We now note the following characteristics regarding the relationship between FDI and FT.

The relation between FDI and FT in terms of the *home country:*

If FDI is conducted as a substitute for the home country's exports, then exporting will be affected adversely. If the home country's exports to third countries are produced in the host countries, then the negative impact on the home country's exports will be even higher. However, if all or some of the inputs that are necessary for production in the host country (i.e., intermediate goods and raw materials) are imported from the home country, then the home country's input exportation will increase. If the final products made from these investments are imported by the host country, then imports will increase. Although it is difficult to make a generalization about the home country's trade balance when FDI substitutes for exports, it can be said that this result is highly related to the imports-exports difference between the home and host countries.

The relation between FDI and FT in terms of the *host country*:

The positive impact of FDI on the exports of the host country is highly related to the degree to which the host and home countries have differences in factor intensities. As such, multinational corporations might distribute some local production to subcontractors and then export products to the home country and/or third

[9] For more information on horizontal and vertical integration, see Kutan and Vuksic (2007).

countries. Similarly, given the low costs available in the host country, multinational corporations might export to third countries and to export markets used by the multinational corporations to service the home country (Kutan and Vuksic, 2007). In both cases, the country's exports would increase.

Due to cost advantages (e.g., labor or raw materials) in various countries, export oriented multinational corporations will move some or all of their production to these countries[10]. This situation extraordinarily increases the host country's exports. If this country follows an exchange rate policy that provides an advantage in terms of foreign trade[11], benefits earned by export-oriented enterprises would increase rapidly (UNCTAD, 1998). This type of FDI is called reverse import (Xing and Zhao, 2008), and as such, it may also increase a host country's imports.

Another dynamic between FDI and FT appears when multinational corporations choose to enter markets by investing in host countries instead of exporting their products due to high GATT. If a host country is a member of an economic union, then it can easily export to other union members[12] (Blonigen, 2005; Lahiri and Ono, 2003). This is known as tariff-jumping FDI (Kim and Kang, 1996); it decreases both the exports of the exporting country and imports of the host country with high tariffs. However, under tariff-jumping FDI, if the only target is the host country's market, then this type of FDI will not significantly contribute to the country's exports.

To take the advantage of the potential of FDI, some host countries encourage foreign investors to invest in their country. However, foreign investors must use a certain percentage of domestic inputs in their production process. As such, some developing countries have decided to increase employment and to accelerate technological developments rather than focus on exporting (Qiu and Tao, 2001). After a certain period of time, developing countries also benefit from export markets, and thus, FDI exports are encouraged. During this process, the host country's exports increase, while simultaneously contributing to the country's economy by increasing the use of local resources. However, the ability to require the use of local inputs depends on the foreign investor's investment alternatives versus his/her need to invest in that particular host country. In other words, the more a host country needs FDI to realize its economic growth, the more difficult it is to require investors to use domestic input. Accordingly, if foreign investors have the same production conditions in other countries without any local input require-

[10] Thailand, China, Malaysia and Mexico are examples. For more information, see UNCTAD (1998).
[11] Examples include fixed exchange rates or devaluation made at regular periods.
[12] For example, a large portion of exports of U.S. companies that invest in Ireland are intended for EU markets (i.e., more than 74%). For more information, see Barry and Bradley (1997).

ments, then they choose these investment alternatives to invest so there would not be any changes to the host country's FT.

Multinational corporations understand the characteristics of local markets because they operate in many countries. However, most local companies do not share this understanding. Multinational corporations can also be a source of another type of information that is not directly related to exporting, namely, new technologies and management techniques. Domestic firms can benefit from this type of information through imitation; for example, they may apply this information when contacting local clients and suppliers and training personnel and management staff (Greenaway, Sousa and Wakelin, 2004). In this way, multinational companies can make an indirect but significant contribution to the host country's exports. In addition, if export-oriented FDI includes inputs from local enterprises, then this positively affects the country's foreign trade balance (Zhang and Song, 2000).

The relation between FDI and FT in terms of *third countries*:

Multinational companies often develop businesses in third countries to provide input for the host country's FDI, thus increasing the exports of these third countries. This is because multinational companies will develop their businesses to take advantage of the best production conditions. Therefore, any increase in the trade volume of multinational companies causes an increase in imports to the host country (OECD, 2002). Another result of this relation is that multinational corporations have a strong influence[13] on global FT due to their strict trading relations with enterprises in other countries (Johnson, 2006).

4. An Econometric Analysis of the Effect of FDI on FT

4.1. Literature

There are many studies that analyzed the relationship between FDI and FT. In general, many focused on both FDI in developing countries and the relation between outward FDI and the home country's exports. One of the first studies on this topic was that of Horst (1972), which examined the relationship between FDI and US exports to Canada; Horst (1972) concluded that exports and foreign investments to the Canadian market can serve as an alternative for U.S. manufacturing companies. In addition, a leading study by Lipsey and Weiss (1984) found that multinational corporation sales in a host country increase exports in the home country.

[13] Approximately one-third of world exports are due to FDI according to UNCTAD reports from 2004, 2008 and 2010.

The studies that have focused on the effect of FDI on FT can be categorized into three groups[14] (Fontaigne, 1999) as follows:

Micro-Level Firm Studies: These studies usually examine how multinational corporation investments may affect FT in the host and home countries. The studies by Lipsey and Weiss (1981 and 1984) are an example of a micro-level research. These authors found that except for US investments into foreign markets, which had positive effects on US exports, there was a positive correlation between the exports of the host country and dependent companies with respect to domestic production. Using 40 countries and focusing on US bilateral trade, Sachs and Shatz (1994) found that if the trade volume between multinational corporations increased by 10%, then the trade between US and the respective countries increased up to 40%.

Macro-Level Economic Studies: These studies focus on general trends at the country or economy level. In these studies, the ways in which FDI affects FT (with respect to the host and/or home country) are examined. Zhang and Song (2000) and Goldberg and Klein (1999) tried to identify the direct and indirect effects of FDI on trade using panel data analysis at a macro-economic level. Goldberg and Klein (1999) studied the effects of US FDI on the manufacturing sector in Latin American countries with respect to the net exports of these countries; they found that the effect is statistically significant and increases the exports of these countries. Using least squares regression and cross-sectional data, Kim and Kang (1996) found that the relation between FDI and inward exports is statistically significant and economically meaningful for Korea and Japan. In addition, Eaton and Tamura (1994) developed a model that does not include the industrial sector to explain mutual exports and/or mutual FDI for the US, Japan and 100 other countries using data from 1985-1990. The dependent variables in that study included the per capita income, human capital, investment and integration of the "natural areas," the latter of which are identified using dummy variables. (These same variables are used in the present study.) Eaton and Tamura (1994) noted that some factors are necessary to explain the relationship between trade and FDI.

For example, according to Eaton and Tamura (1994), any increase in per capita income in partner country results in an increase in both FDI and trade. A similar study was conducted by Frortagne (1999) for 14 OECD members. Rubio and Munoz (2001) provided a causality analysis of the relation between FDI and exports for Spain using quarterly data from 1977-1998. Another example is Pain and

[14] However, many studies in this field are case studies. For a wider review of the literature, see Blonigen (2005), Johnson (2006) and Gast and Herman (2008).

Wakelin's (1998) study, in which the production locations and trade performances of 11 OECD countries were studied using panel data regression methods.

The key results in the literature on the effect of FDI on FT can be summarized as follows (Fontagne, 1999):

Empirical studies demonstrate that foreign or international trade had an effect on FDI until the mid-1980s. However, after this period, the causal relation was reversed, and FDI began to influence foreign trade.

Nevertheless, outward FDI positively affects the exports of the home country. In an analysis of 14 countries, every $1 of outward FDI increases the exports of the home country by almost $2.

Meanwhile, FDI increases the imports of the host country in the short term and increases exports in the long term.

However, the above-mentioned interactions vary for both the home and host country. For example, the effect of FDI on exports is clearer in the US than in Europe (e.g., for France or England). However, inward FDI has no effect on US exports, which might be explained by the huge size of the US domestic market. The US obtains inward FDI because of its very large domestic market.

4.2. Method

Panel data include both time series and cross-sectional data; the use of these data exhibited a rapid progress in the econometric literature over the last two decades. Panel data series have special advantages that time series or cross sectional series alone do not. For these reasons, panel data often have been preferred by authors, especially in cases in which some data are missing. Several benefits of using panel are the following (Baltagi, 2005):

Panel data show how individuals, firms, states or countries are heterogeneous.

Panel data provide more variability and less collinearity among the variables; as such, these data are more informative.

Parameters can be estimated, even if the time series is too short or the cross-sectional data are limited.

Panel data have many advantages as compared to cross-sectional or time series data. The most important advantage is that these data contain significantly more observations than either time series or cross-sectional data. Moreover, panel observations are not unidimensional, which not only increases both the degree of freedom and efficiency but also implies less collinearity among the variables.

The estimation method for panel regression slightly differs with respect to the parameters and the error term. In fixed effect models, parameters are constant across individuals and time, but the error term absorbs the differences along the individuals and time dimensions. In contrast to fixed effect models, under panel regression, it is assumed that the individual or time effect has some random effect. The basic hypothesis of the random effect is that $\mu_i \sim N\left(0, \sigma_\mu^2\right)$ for the individual effect and $\lambda_t \sim N\left(0, \sigma_\lambda^2\right)$ for the time effect. An excessive number of parameters in the fixed effects model may result in the loss of degrees of freedom, which can be avoided if μ_i μ and/or λ_t are assumed to be random.

The most commonly used method for panel data is the OLS method, which ignores differences across individual dimensions and time. However, in some cases, the number of parameters estimated may be greater than the number observed, making it impossible to estimate the model. To overcome this problem, different assumptions about the variability of the coefficients and the features of error terms can be made, which requires the use of different models. These models may either be the fixed effect model or the random effect model (Pazarlioglu and Gurler, 2007). In this case, it is called a one-way model. It is called a two-way model when these assumptions are made along both dimensions (Cetin and Ecevit, 2010). Thus, the fixed effect panel regression model can be written as $Y_{it} = \alpha + \sum_{k=1}^{K} \beta_k X_{kit} + u_{it}$ where Y_{it} is the ***i***th observation at time t for the explained variable, ***i*** denotes the *i*th country, ***t*** denotes the time, α is country specific factor, β_k is the parameter of *k*th variable and *k*th is the i th country's observation at time *t* for the *k*th explanatory variable.

4.3. The Data Set and Model

The effect of FDI (both outward and inward) on FT was analyzed for 143 countries, which were divided into 5 groups[15] according to per capita income using data from 1980-2009. There are 31 countries in the first group, 18 countries in the second group, 35 countries in the third group, 37 countries in the fourth group and 22 countries in the fifth group. Countries for which all the data are available for the period under analysis are used. The data are annual. As previously mentioned, countries with tax haven characteristics were not included.

[15] The first four groups were based on the per capita classification used by the World Bank; the fifth group was determined by the authors. Accordingly, using 2009 data on national income per capita, $0 to $935 denotes less developed countries, $936 to $3,705 denotes lower-middle countries, $3,706 to $11,455 denotes upper-middle countries, $11,456 to $23,999 denotes sub-top countries and $24,000 or higher denotes the most developed countries (World Bank, 2010).

Table 5: Country Classification

	Group 1	Group 2	Group 3	Group 4	Group 5
1	Luxembourg	Portugal	Uruguay	Tunisia	Lao People's
2	Norway	Malta	Libyan Arab Jamahiriya	Fiji	Kyrgyzstan
3	Qatar	Czech Republic	Chile	Jordan	Kenya
4	Switzerland	French Polynesia	Seychelles	China	Benin
5	Denmark	Equatorial Guinea	Russian Federation	Cape Verde	Cambodia
6	United Arab Emirates	Korea, Republic of	Turkey	El Salvador	Mali
7	Ireland	Oman	Mexico	Armenia	Ghana
8	Netherlands	Slovakia	Brazil	Morocco	Chad
9	Austria	Trinidad and Tobago	Argentina	Guatemala	Korea, Dem. People's Rep. Of
10	Australia	Croatia	Lebanon	Ukraine	Bangladesh
11	Finland	Saudi Arabia	Romania	Georgia	Tanzania
12	Belgium	Barbados	Gabon	Tonga	Burkina Faso
13	Sweden	Estonia	Malaysia	Swaziland	Guinea
14	United States	Hungary	Mauritius	Syrian Arab Republic	Mozambique
15	France	Venezuela	Kazakhstan	Indonesia	Madagascar
16	Germany	Latvia	Costa Rica	Congo	Togo
17	Japan	Lithuania	Bulgaria	Egypt	Sierra Leone
18	Canada	Poland	South Africa	Paraguay	Niger
19	New Caledonia		Cuba	Sri Lanka	Malawi
20	Kuwait		Botswana	Honduras	Zimbabwe
21	Iceland		Belarus	Bolivia	Guinea-Bissau
22	Singapore		Colombia	Philippines	Burundi
23	Italy		Serbia and Montenegro	Guyana	
24	United Kingdom		Azerbaijan	Angola	
25	Spain		Jamaica	Moldova	
26	Greece		Dominican Republic	Occupied Palestinian Territory	
27	Cyprus		Iran (Islamic Republic of)	Yemen	
28	Israel		Bosnia and Herzegovina	Nicaragua	
29	New Zealand		Peru	Nigeria	
30	Bahrain		Namibia	Papua New Guinea	
31	Slovenia		TFYR of Macedonia	Cameroon	
32			Ecuador	Côte d'Ivoire	
33			Algeria	Pakistan	
34			Thailand	Viet Nam	
35			Albania	India	
36				Mauritania	
37				Senegal	

In this study, the values for inward FDI, outward FDI, exports and imports were converted into USD millions. The data were scaled to detect whether there is an effect of the inward and outward FDI on exports and imports according to development level. Because some data are missing, the panel regression technique can provide economic analyses when incomplete data are used.

4.4. Empirical Findings

This study describes countries at 5 different development levels with respect to exports and imports (dependent variables) as well as inward and outward FDI (independent variables) at current and previous time periods.

The following equations are used to evaluate the degree to which inward and outward FDI affects exports and whether this effect differs according to development level.

$$Exp_{it} = \alpha + \beta_{1i} FDI_t + \beta_{2i} FDI_{t-1} + \varepsilon_{it}$$

$$IM_{it} = \alpha + \delta_{1i} FDI_t + \delta_{2i} FDI_{t-1} + \varepsilon_{it}$$

The series must be stationary; in other words, it cannot have a unit root. Panel unit root tests are used to test the stationarity of the series. It's been researched for a common unit root that would be in the individual in the panel unit root tests that have many advantages comparing to the standard unit root tests. The most widely used panel unit root tests include those developed by Im, Pesaran and Shin (IPS) and Levin, Li and Chu (LLC). In this work, the IPS test derived from the Dickey-Fuller (1979) unit root tests is used. The null hypothesis is that ρ =0 in the model $\Delta Y_{it} = \alpha + \beta T + \rho Y_{i,t-1} + \varepsilon_{it}$, where α is the fixed term, βT trend parameter and the trend and ρ autoregressive parameter. The trend term and the constant term are not necessary in every model. While H_0 indicates that the series has a unit root, the alternative indicates that the series has a unit root for some *i*. The results from the IPS unit root test for the series used in this study are shown below.

Table 6: Panel Unit Root Test Results[16]

		Import		Export		FDI Inward		FDI Outward	
		Level	First Diffrence	Level	First Diffrence	Level	First Diffrence	Level	First Diffrence
Group 1	Test stat.	-2.086**		-3.160*		-3.285**		-0.845	-9.306*
	Prob	0.018		0.0008		0.0005		0.1988	0.0000
Group 2	Test stat.	2.986	-4.458*	0.7364	-5.276*	-4.095**		0.6427	-6.338*
	Prob	0.998	0.000	0.7693	0.0000	0.0001		0.7398	0.0000
Group 3	Test stat.	0.862	-10.84*	3.0159	-10.71*	-0.392	-15.530*	0.7758	-11.585*
	Prob	0.805	0.000	0.9987	0.0000	0.3473	0.0000	0.7811	0.0000
Group 4	Test stat.	4.112	-12.03*	5.0844	-10.09*	-2.543**		-1.6431*	
	Prob	0.987	0.0000	0.9943	0.0000	0.0055		0.0402	
Group 5	Test stat.	2.723	-13.14*	9.2525	-8.594*	-1.677*		-5.9701*	
	Prob	0.996	0.000	0.9922	0.0000	0.0468		0.0000	

We see that export and import variables are stationary in levels for the first group, while for the other groups, the variables are stationary in first differences. Inward

[16] For the results of the unit root, * indicates stationary at the 1% significance level, and ** indicates stationary at the 5% significance level.

FDI is stationary in first differences for the third group, while for the other groups, it is stationary in levels. Outward FDI is stationary in levels for the fourth and fifth groups, while for the other groups, it is stationary in first differences. We take the first difference of the series, which is not stationary in levels. Thus, all of the series used in this analysis are stationary; therefore, the differences of the series from the first stage were subtracted and then added to the analysis. There are 4 different analyses in this study as follows:

The Effect of Inward FDI on Imports: This analysis allows us to determine how inward FDI affects imports of a host country. In other words, it shows whether FDI increases the input imports in the host country and, if so, whether this differs according to development level.

The Effect of Outward FDI on Imports*:* This analysis shows how outward FDI changes home country imports.

The Effect of Inward FDI on Exports: In this analysis, the effect of inward FDI on host country exports is determined.

The Effect of Outward FDI on Exports: Finally, this analysis examines how outward FDI changes home country exports.

As previously mentioned, this is a macro-level study. Therefore, the effect of outward FDI on exports and imports is considered in terms of the *home country*. If a change in exports and imports appears as capital flows abroad, then this can be attributed to FDI by econometric methods. Similarly, the effect of inward FDI on exports and imports reflects the conditions of the *host country*. However, a country can be both a capital exporter (i.e., outward FDI) and a capital importer (i.e., inward FDI) at the same time. Analyses with narrower scopes should be applied to determine which capital flow has a greater effect on FT. Small-scaled studies must be conducted to understand which kinds of capital flow effect FT. The results obtained from the econometric analysis to determine the effect of FDI on FT follow below.

Table 7: Imports-Inward FDI Regression [17]

	Constant	FDI Inward (t)	FDI Inward (t-1)	R^2
Group 1	69389*	3.98*	3.41*	0.64
Group 2	21899*	2.57*	2.45*	0.21
Group 3	10041*	4.07*	1.63*	0.62
Group 4	2229*	7.95*	1.81*	0.88
Group 5	934*	5.87*	5.44*	0.49

[17] The absence of (*) indicates significance at the 5% level; the presence of (**) indicates that parameters are significant at the 10% level.

The first analysis examined the effect of FDI on imports. According to this analysis, inward FDI (i.e., host country) increased imports, as expected. At present, FDI increases imports more so than in the past. When a country receives $1 million in FDI, imports increase by $3.98 million in the first group, $2.57 million in the second group, $4.07 million in the third group, $7.95 million in the fourth group and $5.87 million in the fifth group. Last year's FDI affects imports by a different percentage. If a country in a given group receives no FDI, then their imports decrease according to development level.

Table 8: Imports-Outward FDI Regression

	Constant	FDI Outward (t)	FDI Outward (t-1)	R^2
Group 1	57446*	3.55*	2.95*	0.71
Group 2	31180*	3.34*	2.67*	0.20
Group 3	18489*	4.35*	3.86*	0.50
Group 4	11713*	26.47*	1.45**	0.81
Group 5	1699*	42.66*	86.57*	0.10

Next, we examined the effect of outward FDI on imports. We find that outward FDI increased imports. Particularly in the fifth group in which per capita income is the lowest, outward FDI significantly increased imports, and this increase is negatively related to the country's development level.

Table 9: Exports-Inward FDI Regression

	Constant	FDI Inward (t)	FDI Inward (t-1)	R^2
Group 1	85597*	3.06*	2.88*	0.54
Group 2	21700*	3.29*	2.30*	0.24
Group 3	9627*	4.96*	2.19*	0.66
Group 4	1252*	8.86*	2.38*	0.87
Group 5	596*	13.79*	3.85*	0.47

The effect of inward FDI on exports was examined in the third analysis. We find that there is a positive relation between inward FDI and exports, as in the other models. According to these findings, inward FDI increased exports, while export capacity improved as the development level decreased. Assuming they receive FDI, countries with a low per capita national income should generate more export revenue as compared to developed countries.

Table 10: Exports-Outward FDI Regression

	Constant	FDI Outward (t)	FDI Outward (t-1)	R^2
Group 1	73550*	2.93*	2.54*	0.66
Group 2	32079*	3.39*	2.96*	0.20
Group 3	21340*	6.32*	4.94*	0.55
Group 4	10082*	32.72*	11.19**	0.81
Group 5	1136*	27.55*	68.09*	0.11

The fourth analysis examined the effect of FDI on outward exports, and we find that these investments increased home country exports. Each $1 million of outward FDI increased exports, though at different development levels. The highest increase was observed for the fourth group, followed by the fifth group. This effect becomes negative the following year, except for the fifth group.

5. Conclusion and Evaluation

Continuous competition among countries to receive more FDI has increased both the importance and the amount of these investments over time. Consequently, countries have removed the barriers that previously blocked them from receiving foreign investments. Previously, only developed countries could receive FDI, but now, developing countries have begun to receive a significant amount of FDI. However, the most important reason for this increase is that FDI has continuously expanded in China. Similar trends can be observed for FT as well. A large amount of FT consists in the export and import of goods, while the contribution of services to foreign trade is very low.

In the first analysis, the effects of FDI were examined. We find that these investments increased host country imports. This increase significantly slowed down for the second, third and the fourth groups, while no changes were observed for the first and the fifth groups. In other words, FDI in these host countries use a significant amount of imported inputs in production.

The second analysis examined the effect of outward FDI on FT. We find that outward FDI increased home country imports. The effects of outward FDI on imports increased as the development level decreased. In subsequent years, these effects decreased for all groups except the fifth group, where it doubled. So, we can say that the outward FDI increases the import less in the developed countries as compared to the other countries for the first year. However, in the second year, countries in the fourth group benefit the most from FDI.

The third analysis examined the effect of inward FDI on exports. We find that these investments have positive effects on host country exports. This effect is high in underdeveloped countries. Therefore, underdeveloped countries require more

foreign investments to increase their exports. The fourth analysis examined the effect of outward FDI on exports. We find that outward FDI increased home country exports. However, for subsequent years, these effects decreased for all groups except the fifth group. This result demonstrates that outward FDI provides a very significant contribution to the exports of underdeveloped countries.

As a conclusion the FDI effect different size both import and export of countries as countries classification. According to the results, for the country groups with higher degree of poverties, FDI affect foreign trade much positively.

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