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Imports, Exports and Foreign Direct Investment Interactions and Their Effects

By

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Executive Summary

Bi-directional effects between international trade and investment are investigated. Different aspects of international trade are considered in separate models to observe the linkages between trade and FDI inflows. International trade, either measured by exports or imports, is found to be complementary with FDI inflows.

Through trade, trade facilitation is identified as a key factor to induce FDI inflows to the host country from the home country. Bilateral FDI inflows are observed to have feedback effects with exports of not only the home and host countries but also on those of other trading partners. Similar linkages between bilateral FDI inflows and imports are also observed.

The relationships between international trade and investment identified suggest a crucial role for policy harmonization to further benefit from globalization. Thus, countries would need to not only liberalize trade and investment but to do it in a harmonized and cooperative manner, implying the need for more coordination within trade and investment agencies at home, and the need for plurilateral or multilateral agreements covering both trade and investment.

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I. Introduction

There is almost universal agreement that, under general assumptions, free trade will lead to welfare improvements for countries that engage in it. The importance of investment liberalization and its inextricable link with trade liberalization has also been increasingly recognized, such that many trade agreements now include investment provisions dealing not only with mode 3 supply of services (commercial presence) but also as flows of capital either in terms of foreign direct investment (FDI) or foreign portfolio investment (FPI). Current theoretical studies have shown that international trade and investment are complements rather than substitutes if trade between the two economies is based on comparative advantages. However, if the trade between the two countries is based on their absolute advantages, there may be substitution between trade and investment, as businesses decide to supply products and services through exports or FDI. The degree of complementary between trade and investment therefore remains an empirical question.

This study explores how international trade and investment flows affect each other, using data from OECD and 6 ASEAN countries[1], and examines whether trade and investment linkages are different between developed and developing economies, or between countries that participate actively in bilateral and/or regional trade agreements. After a brief overview of the literature and global trends in trade and investment flows in the next section, the methodology and data used in the study are presented in section B. Empirical results obtained and policy implications are discussed in section C, followed by concluding remarks in section D.

1.1 Trade and Investment Linkages: Literature Review and Global Trends

"The proximity-concentration hypothesis" (Krugman, 1983; Horstmann and Markusen, 1992; Brainard, 1993a) suggests that greater transaction costs resulting from higher trade barriers and transportation cost, lead to horizontal cross-border production expansion and thus, stimulate international investment. In this view, international trade is more or less a substitute for international investment. On the contrary, "the factor-proportion hypothesis" (Helpman, 1984; Markusen, 1984; Helpman and Krugman, 1985; Ethier and Horn, 1990) seems to predict that international trade and investment are complements as firms take advantage of factor price differences through cross-border vertical production integration.

According to Aizenman, Joshua and Ilan Noy (2005), it is common to expect bi-directional linkages between FDI and trade in goods. However, it is difficult to indicate whether inflows and outflows of FDI affect differently trade in different types of goods. They suggest that there is strong feedback type of relationship between FDI flows and trade especially in manufacturing goods. Applying Geweke (1982)'s decomposition method, they find the Granger-causality from FDI flows to trade openness is found to be stronger than that from trade to FDI flows.

Raff (2004) investigates the effect of FTA or customs unions on FDI location selection and its impacts on social welfare. The study shows that economic integration, through tariff reductions, will lead to greater FDI and hence, improve social welfare. However, the paper also

[1] ASEAN-6 includes Brunei Darusalem, Indonesia, Malaysia, Philippines, Singapore, and Thailand.

indicates that FDI inflows resulting from trade expansion are not necessary beneficial to the host and/or home countries. There are some evidence that increased FDI due to trade enhancement lead to less competition in the domestic market and inadequate technology transfers.

The hypothesis of complementarity between trade and investment stems from the facts that there are increasing trends in intra-industry trade in many regions of the world either they are participating intensively in trade liberalization agreements (mostly regional and bilateral trade agreements) or less intensively. Economic integration promises to raise international trade volume through trade creation. By engaging in bilateral as well as multilateral trade agreements, the country hope that the resulting trade creation will induce more FDI inflows. Gain from trade will be enhanced and pushed up to its potential via increasing country's competitiveness if trade and FDI are complementary. At the micro-level, interdependence between international trade and investment is magnified through intra-firm trade (trade among firm's foreign affiliates), outsourcing of raw material, intermediate goods, and output, and firm's vertical integration behavior particularly vertical FDI. Hence, the role of FDI inflows as the source of international capitalization is no longer the only concern for developing or least developed economies (LDC). It is extended to cover many other aspects as the linkage between international trade and investment becomes more intensified. As a host country, more FDI inflows do not necessary always lead to increasing country competitiveness and thus, sustainable economic development. The quality of FDI that flows into the countries should be investigated more carefully so that it can be assured that the benefits from FDI inflows to the host countries can be fully realized. Problems such as economic instability and income disparity that might resulted from trade and investment liberalization imbalance can be avoided.

Table 1 summarizes the figures of exports, import, and FDI inflows in different parts of the world. In the last 15 years, the world exports, imports, and FDI inflows have been growing constantly. Exports and imports grew from 3,720 and 3,832 billion U.S. $ to 7,656 and 7,940 billion U.S.$ on average from period 1 (1990-1994) to period 3 (2000-2005) respectively (an annual increase by 10.58% and 10.72%). Similar pattern was experienced for FDI inflows. The World's FDI inflows increased from 201 billion U.S. $ to 841 billion U.S. $ in the same time interval (an annual increase by 31.84%). An increase flows of FDI suggests a rising important of the roles of FDI in economic development.

Despite similar growth pattern for exports, imports, and FDI inflows in different parts of the world, there are parts of the world that received more FDI inflows than the other regions. Significant increases are found in regions like Asia, the European Union and developing countries. The average of FDI inflows to developing countries increase from 62,024 million U.S. $ in period 1 to more than US$ 235 billion in period 3. Along with the growth in FDI inflows in every region, the world also experienced growth in exports and imports. Asia also experienced significant increase in exports and imports during the last decade. During the same period, the region also illustrated an improvement in FDI inflows. FDI inflows to Asia accounted for 17.41% and 17.18% of the world FDI inflows on average during 1994-1999 and 2000-2005. This seems to suggest a positive link between international trade and investment in the region.

Table 1 also shows the increasing rate of exports, import, and FDI inflows in different part of the world. The rates are measured on a 5-year basis, i.e., from a 5-year period of 1990-1994 to a 5-year period of 1994-1999 and so on. The world's FDI inflows grew significantly during 1994-1999 at a growth rate of 201.93%. In every parts of the world, during 1994-1999, FDI inflows increased faster than exports and imports. Developing economies and Asia in particularly where exports and imports grew at the rate greater than 58%. The growth rates of exports were 62.33% and 68.03% for developing countries and Asia, and imports grew at 58.42%

and 58.54% respectively. Together with the growth in trade (exports and import) developing countries and Asia also experienced high growth rate in FDI inflows at 180.60% and 145.34% respectively. As a result of the growing of China and India economies, particularly as FDI destinations, FDI flows into Asia have accounted for a large share of the world FDI. Business activities (measured by exports, imports, and FDI inflows) have been concentrated in certain regions of the world although, in recent years, we have seen a better distribution. Exports, imports, and FDI inflows have increased significantly in several parts of the world other than in Europe and developed countries especially in Africa, Asia, and developing countries.

Table 1: Exports, imports, and FDI inflows (1990-2005; 5-year simple averages)

(Mil. U.S. $)

Regions	Exports, Import, and FDI inflows		
	1990-1994	1994-1999	2000-2005
World			
Exports	3,720,438	5,394,946	7,656,527
	-	(45.01%)*	(41.92%)*
Imports	3,832,498	5,494,774	7,940,450
	-	(43.37%)	(44.51%)
FDI inflows	201,002	606,884	840,742
	-	(201.93%)	(38.53%)
Africa			
Exports	80,464	98,306	162,431
	-	(22.17%)	(65.23%)
Imports	86,805	107,876	153,925
	-	(24.27%)	(42.69%)
FDI inflows	4,349	8,537	18,142
	-	(96.30%)	(112.51%)
Asia			
Exports	598,214	1,005,193	1,599,683
	-	(68.03%)	(59.14%)
Imports	621,757	985,703	1,515,290
	-	(58.54%)	(53.73%)
FDI inflows	43,065	105,654	144,448
	-	(145.34%)	(36.72%)
European Union			
Exports	1,567,640	2,208,076	3,042,750
	-	(40.85%)	(37.80%)
Imports	1,594,582	2,143,924	3,026,649
	-	(34.45%)	(41.17%)
FDI inflows	80,109	236,565	379,082
	-	(195.30%)	(60.24%)
Developing Countries			
Exports	1,111,090	1,803,654	2,989,967
	-	(62.33%)	(65.77%)
Imports	1,170,318	1,853,998	2,842,078
	-	(58.42%)	(53.29%)
FDI inflows	62,024	174,042	235,274

	-	(180.60%)	(35.18%)

*Per cent changes from one 5-year period to the next are shown in parenthesis

Despite the impressive growth in FDI inflows in every part of the world during 1994-1999, the growth rates of FDI inflows dropped significantly in 2000-2005 in almost every region except for Africa where FDI inflows grew at 112.51%. The world's FDI inflows growth decreased from 207.93% in period 2 (1994-1999) to 38.53% in period 3 (2000-2005). Part of the reason for the big drop in world FDI inflows is the drop in FDI inflows in Asia which could be explained by the financial crisis in Asia. Many countries, Thailand for example, was under the strict debt restructuring rules of the IMF during that period. Interest rates skyrocketed in those countries under both political and economic risks. In Asia, the data suggests that the decrease in FDI inflow growth rate in 2000-2005 is associated with small declines in the growth of exports and imports. FDI inflow seems to grow at the faster pace than exports and imports during the period of 1994-1999. In the period of 2000-2005, the growth rates of FDI inflows are in line with the growth of exports and imports except in some regions such as Africa and European Union. Growth in FDI inflows in European Union may be explained by the fact that the Union has expanded to Eastern European economies.

Table 2 illustrates the correlation matrix between exports, imports, and FDI inflows in selected regions. It is shown that FDI inflows and exports are highly correlated in Africa, Asia, and developing countries. The correlation coefficients between exports and FDI inflows are very high (around 0.9) in Africa, Asia, and developing countries respectively. The correlation of these regions is higher than the correlation of the European Union (0.49) and the world (0.62). This indicates the importance of FDI inflows to exports and vice versa in these regions. Same pattern of correlation is observed for the correlation between FDI inflows and imports. The correlation coefficients between imports and FDI inflows are greater than 0.85 in Africa, Asia, and developing countries (0.87, 0.89, 0.89). In addition, we also found a highly positive links between FDI inflows in different regions. For example, the correlation between FDI inflows to Asia and European Union is 0.76 and the correlation between FDI inflows to developing countries and FDI inflows to the European is 0.75. Similar pattern of correlation is discovered in different regions. It is suggested that there are complementarities between FDI inflows in different regions due to an increasing trend of outsourcing and the developing of global value chain.

This overview of trade and FDI inflows seems to point to the direction that there is a close link between international trade and investment. The closer the relationship between trade and investment, the better chance it is for the host country to realize the benefits from trade and investment liberalization in terms of welfare improvement. Since trade liberalization implies a freer (less costly) movement of goods and services while investment liberalization implies a better environment for movement of resources. Increasing international trade according to comparative advantages is the key condition for countries to realize gains from trade in terms of welfare improvement. If trade and investment are complementary, FDI inflows are supposed to enhance the gains from trade. In addition, FDI inflows to the host country may be expected to improve efficiency and productivity of factors of production, therefore enhancing the country's competitiveness.

Table 2: Correlation Matrix between exports, imports, and FDI inflows in selected regions

	EX-AF	EX-AS	EX-DC	EX-EU	EX-W	IM-AF	IM-AS	IM-DC	IM-EU	IM-W	FDI-AF	FDI-AS	FDI-DC	FDI-EU	FDI-W
EX-AF	1.0000	0.9638	0.9763	0.9508	0.9613	0.9748	0.9639	0.9673	0.9634	0.9650	0.8976	0.8205	0.8187	0.4654	0.5201
EX-AS	0.9638	1.0000	0.9983	0.9895	0.9981	0.9573	0.9953	0.9987	0.9861	0.9974	0.9145	0.9026	0.8971	0.5229	0.6015
EX-DC	0.9763	0.9983	1.0000	0.9889	0.9973	0.9648	0.9934	0.9980	0.9890	0.9977	0.9191	0.8919	0.8886	0.5196	0.5940
EX-EU	0.9508	0.9895	0.9889	1.0000	0.9949	0.9575	0.9812	0.9895	0.9971	0.9951	0.8994	0.8684	0.8753	0.4920	0.5772
EX-W	0.9613	0.9981	0.9973	0.9949	1.0000	0.9548	0.9911	0.9970	0.9924	0.9997	0.9120	0.9033	0.9029	0.5350	0.6160
IM-AF	0.9748	0.9573	0.9648	0.9575	0.9548	1.0000	0.9617	0.9655	0.9630	0.9567	0.8733	0.7784	0.7886	0.3456	0.4247
IM-AS	0.9639	0.9953	0.9934	0.9812	0.9911	0.9617	1.0000	0.9971	0.9762	0.9896	0.8949	0.8858	0.8745	0.4675	0.5513
IM-DC	0.9673	0.9987	0.9980	0.9895	0.9970	0.9655	0.9971	1.0000	0.9861	0.9963	0.9106	0.8917	0.8882	0.4897	0.5734
IM-EU	0.9634	0.9861	0.9890	0.9971	0.9924	0.9630	0.9762	0.9861	1.0000	0.9942	0.9012	0.8588	0.8686	0.5048	0.5826
IM-W	0.9650	0.9974	0.9977	0.9951	0.9997	0.9567	0.9896	0.9963	0.9942	1.0000	0.9149	0.8982	0.8990	0.5367	0.6153
FDI-AF	0.8976	0.9145	0.9191	0.8994	0.9120	0.8733	0.8949	0.9106	0.9012	0.9149	1.0000	0.8302	0.8406	0.5347	0.5794
FDI-AS	0.8205	0.9026	0.8919	0.8684	0.9033	0.7784	0.8858	0.8917	0.8588	0.8982	0.8302	1.0000	0.9899	0.7616	0.8432
FDI-DC	0.8187	0.8971	0.8886	0.8753	0.9029	0.7886	0.8745	0.8882	0.8686	0.8990	0.8406	0.9899	1.0000	0.7499	0.8434
FDI-EU	0.4654	0.5229	0.5196	0.4920	0.5350	0.3456	0.4675	0.4897	0.5048	0.5367	0.5347	0.7616	0.7499	1.0000	0.9775
FDI-W	0.5201	0.6015	0.5940	0.5772	0.6160	0.4247	0.5513	0.5734	0.5826	0.6153	0.5794	0.8432	0.8434	0.9775	1.0000

II. Methodology and Data

2.1 Methodology

In order to properly address the three main questions, i.e., 1) How are international trade and investment linked? Is it certain that greater trade leads to more FDI or vice versa? 2) Are trade and investment linkages different between economies with different characteristics? and 3) Is there a possibility of negative impacts from FDI inflows?, the study applies the gravity model approach to investigate the relationship between international trade and investment. Generally, countries with similar resource endowment produce similar products according to its comparative advantages are likely to substitute trade with investment. However, the existence of two-way trade in similar products and two-way investment among developed as well as developing economies indicates that there are rooms for trade and investment complementary. In this paper, both trade and investment are considered as endogenous variables. Thus, simultaneous equation estimation is a more appropriate approach and is used in order to capture the "feedback" effects between trade and investment In order to examine the relationships between trade and investment in different aspects so that we can identify the possibility of negative impacts from FDI inflows to the host economy. The possibility of improper technology transfer, economic dependency and transfer pricing is higher when there is a positive linkage between FDI inflow and import from the home country by the host country. The greater, as a percentage, the relationship between FDI inflows and the import from the home country compare to the relationship between FDI inflows and the import from other countries, the higher the possibility of economic dependency. Five systems of equations are considered, two on bilateral trade (both exports and imports) and the other on bilateral FDI, are estimated simultaneously as follows;

Model 1: Linkage between FDI inflows and trade

$$FDI_{ij} = f(GDP_i, GDP_j, GDPPC_i, GDPPC_j, TRD_{ij}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$$

$$TRD_{ij} = f(GDP_i, GDP_j, GDPPC_i, GDPPC_j, FDI_{ij}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$$

Where

TRD_{ij} = international trade (exports and imports) between country i and country j

FDI_{ij} = bilateral FDI from country i to j (FDI inflows where country i is the home country and country j is the host country)

GDP_i and GDP_j = gross domestic product for country i and j respectively

$GDPPC_i$ and $GDPP_j$ = per capital GDP for country i and country j respectively

$DIST_{ij}$ = distance between the two economies, i and j

$RURAL_i$ = percentage of population in the rural area in country i

$RURAL_j$ = percentage of population in the rural area in country j

RTA = number of regional trade agreements that both country i and j participated in which is the variable representing the involvement of country in regional trade agreement

GSP = dummy variable represents the GSP receiving country

REGIONAL = dummy variable of trading partners that belong to the same region

EX_{iw} and EX_{jw} = exports of country i and country j to the world respectively

IM_{iw} and IM_{jw} = imports of country i and country j to the world respectively

$TRDO_i$ = trade openness of country i , i.e., $(EX_{iw}+IM_{iw})/GDP_i$
$TRDO_j$ = trade openness of country i , i.e., $(EX_{jw}+IM_{jw})/GDP_j$

Model 2: Linkage between FDI inflows and exports of the trading partners

$$FDI_{ij} = f(GDP_i, GDP_j, GDPPC_i, GDPPC_j, EX_{ij}, EX_{ji}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$$
$$EX_{ij} = f(GDP_i , GDP_j, GDPPC_i, GDPPC_j, FDI_{ij}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$$
$$EX_{ji} = f(GDP_i , GDP_j, GDPPC_i, GDPPC_j, FDI_{ij}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$$

Where

EX_{ij} = country i's exports to country j
EX_{ji} = country j's exports to country i

Model 3: Linkage between FDI inflows and imports of the trading partners

$$FDI_{ij} = f(GDP_i, GDP_j, GDPPC_i, GDPPC_j, IM_{ij}, IM_{ji}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$$
$$IM_{ij} = f(GDP_i , GDP_j, GDPPC_i, GDPPC_j, FDI_{ij}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$$
$$IM_{ji} = f(GDP_i , GDP_j, GDPPC_i, GDPPC_j, FDI_{ij}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$$

Where

IM_{ij} = country i's imports from country j
IM_{ji} = country j's imports from country i

Model 4: Linkage between FDI inflows and exports to other trading partners

$$FDI_{ij} = f(GDP_i, GDP_j, GDPPC_i, GDPPC_j, EX_{io}, EX_{jo}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$$
$$EX_{io} = f(GDP_i , GDP_j, GDPPC_i, GDPPC_j, FDI_{ij}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$$
$$EX_{jo} = f(GDP_i , GDP_j, GDPPC_i, GDPPC_j, FDI_{ij}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$$

Where

EX_{io} = country i's exports to the world except for country j $(EX_{iw} – EX_{ij})$
EX_{jo} = country j's exports to the world except for country i $(EX_{jw} – EX_{ji})$

Model 5: Linkage between FDI inflows and imports from other trading partners

$$FDI_{ij} = f(GDP_i, GDP_j, GDPPC_i, GDPPC_j, IM_{io}, IM_{jo}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$$
$$IM_{io} = f(GDP_i , GDP_j, GDPPC_i, GDPPC_j, FDI_{ij}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$$

$IM_{jo} = f(GDP_i , GDP_j, GDPPC_i, GDPPC_j, FDI_{ij}, DIST_{ij}, RURAL_i, RURAL_j, RTA, GSP, REGIONAL, TRDO_i, TRDO_j)$

Where

IM_{io} = country i's imports from the world except for country j ($IM_{iw} – IM_{ij}$)
IM_{jo} = country j's imports from the world except for country i ($IM_{jw} – IM_{ji}$)

2. Data

The data on bilateral trade are collected from the WITS, COMTRADE, and several other international trade databases. The data on trade and GDP are adjusted so that they are all presented in current U.S. dollar. Due to the limitation on the bilateral foreign portfolio investment (FPI) data, the study only includes bilateral FDI data obtained from the International Direct Investment Statistics Yearbook and the monthly ASEAN Statistical Indicator. Therefore, the bilateral annual FDI flows for all 29 OECD and 6 ASEAN countries from 1980 to 2004 are included in the data set for the study. The so call "new ASEAN countries", i.e., CLMV countries; Cambodia, Lao PDR, Myanmar, and Vietnam are not included in the data set since the data on bilateral FDI are not available. Then, the observations with missing information are subtracted from the data set.

III. Empirical Results

An overall positive relationship between international trade and investment was expected, i.e., the greater the international trade between countries, the higher level of FDI it generates and vice versa. In order for a country to better enjoy the gains from trade liberalization, investment has a significant role as a complement to trade.

Results of the estimation of Model 1 show a positive and statistically significant relationship between trade and investment, wich is consistent with expectations. Stronger correlation is found from trade to FDI inflows compares to the correlation from FDI inflows to trade. A one percentage increases in trade can lead to 1.21% increase in FDI inflows. The feedback effect investigation also suggests that there exist a bi-directional relationship between international trade and investment. The empirical results obtained suggest that if trade creation results from economic integration, regionally or bilaterally, there will be an increase in FDI inflows between the trading partners.

Table 4 and 5 show the parameters estimated in Model 2 and 3 to investigate the linkages between FDI inflows, exports, and imports of the trading partners. The results in Table 4 and 5 suggest that FDI inflow is complementary with exports and imports of the trading partners. An increase in exports from country i (home country) to country j (host country) will lead to greater flows of FDI into the host country from the home country. A closer look up the relationships between FDI inflows and export from the home country to the host country also indicates that they are complementary. An increase in exports between the trading partners leads to an increase in FDI inflows from the host country and vice versa. The magnitude of the impacts seems to be larger from export to FDI inflows than the other way around. In addition, an increase in exports from the host country to the home country also generates more FDI inflows to the host country.

Table 3: Linkages between FDI inflows and trade
(Model 1's parameters estimated)

Independent Variables	Dependent Variables	
	$Ln(FDI_{ij})$	$Ln(TRD_{ij})$
Constant	-20.9195 (-34.4624)*	16.9449 (13.9957)
$Ln(FDI_{ij})$		0.8129 (20.9386)*
$Ln(TRD_{ij})$	1.2078 (30.0999)*	
$Ln(GDP_i)$	-0.1748 (-4.2136)*	0.1575 (4.0809)*
$Ln(GDP_j)$	-0.2098 (-5.0036)*	0.1873 (4.9488)*
$Ln(GDPPC_i)$	1.8207 (49.0074)*	-1.4892 (-22.6349)*
$Ln(GDPPC_j)$	-0.0380 (-1.2577)	0.0298 (1.2138)
Ln(DIST)	0.3285 (9.2587)*	-0.2804 (-10.4359)*
$RURAL_i$	-0.0005 (-0.5412)	
$RURAL_j$	-0.0123 (-8.4574)*	0.0100 (7.8263)*
RTA	0.1573 (6.2255)*	-0.1250 (-5.2829)*
GSP	-0.3287 (-7.6329)*	0.2685 (7.5112)*
REGIONAL	-0.1501 (-2.3278)**	0.1207 (2.2997)**
$TRDO_i$	0.3031 (4.5078)*	-1.0954 (-10.7332)*
$TRDO_j$	1.3416 (12.5162)*	-0.2332 (-3.5892)*
Number of Observations	10320	10320
Adjusted R^2	0.5244	0.3471

Note: *, **, and *** represent that the parameters estimated are significant at the 1%, 5%, and 10% respectively. The numbers in parentheses are t-statistics.

Table 4: Linkages between FDI inflows and exports of the trading partners (Model 2's parameters estimated)

Independent Variables	Dependent Variables		
	$Ln(FDI_{ij})$	$Ln(EX_{ij})$	$Ln(EX_{ji})$
Constant	-14.9117 (-23.1065)*	6.1713 (12.0886)*	4.0973 (5.9119)*
$Ln(FDI_{ij})$		0.4649 (29.4629)*	0.4418 (20.0017)*
$Ln(EX_{ij})$	1.4831 (24.9095)*		
$Ln(EX_{ji})$	0.3636 (8.8150)*		
$Ln(GDP_i)$	-0.7638 (-14.9052)*	0.4668 (30.0466)*	0.5340 (25.6266)*
$Ln(GDP_j)$	-0.8246 (-16.6472)*	0.4817 (34.1273)*	0.5834 (31.3296)*
$Ln(GDPPC_i)$	1.8556 (50.6168)*	-0.8421 (-27.9850)*	-1.0201 (-25.3075)*
$Ln(GDPPC_j)$	0.0531 (1.8258)***	-0.0551 (-3.9394)*	0.1055 (6.2710)*
Ln(DIST)	0.9483 (20.2704)*	-0.5453 (-46.5047)*	-0.5749 (-38.2419)*
$RURAL_j$	-0.0067 (-4.5188)*	0.0017 (2.3200)**	0.0074 (8.3613)*
RTA	-0.0033 (-0.1479)	0.0311 (2.8235)*	0.0159 (1.1591)
GSP	-0.4358 (-9.9300)*	0.2269 (10.6013)*	0.2020 (7.8343)*
$TRDO_i$	1.2923 (13.1626)*	-0.5776 (-10.9499)*	-0.6418 (-9.8460)*
$TRDO_j$	-0.1299 (-1.9329)***	0.0436 (1.3913)	0.5073 (13.1166)*
Number of Observations	10320	10320	10320
Adjusted R^2	0.4192	0.6977	0.6966

Note: *, **, and *** represent that the parameters estimated are significant at the 1%, 5%, and 10% respectively. The numbers in parentheses are t-statistics.

Table 5: Linkages between FDI inflows and imports of the trading partners (Model 3's parameters estimated)

Independent Variables	Dependent Variables		
	$Ln(FDI_{ij})$	$Ln(IM_{ij})$	$Ln(IM_{ji})$
Constant	-16.2736 (-29.3338)	12.9782 (17.9160)*	8.7197 (16.7830)*
$Ln(FDI_{ij})$		0.7202 (33.3095)*	0.5797 (39.7280)*
$Ln(IM_{ij})$	0.5652 (38.6927)*		
$Ln(IM_{ji})$	1.0205 (42.2784)*		
$Ln(GDP_i)$	-0.5190 (-17.3549)*	0.2841 (12.4683)*	0.3525 (21.1999)*
$Ln(GDP_j)$	-0.6358 (-21.0391)*	0.3710 (17.7024)*	0.4185 (26.7514)*
$Ln(GDPPC_i)$	1.8504 (50.4393)*	-1.5120 (-35.1412)*	-0.9737 (-30.8308)*
$Ln(GDPPC_j)$	0.0286 (0.9610)	0.0586 (2.6291)*	-0.0604 (-3.3235)*
Ln(DIST)	0.6577 (23.7483)*	-0.3590 (-20.2120)*	-0.4463 (-32.5422)*
$RURAL_j$	-0.0103 (-6.7864)*	0.0119 (10.2917)*	0.0035 (3.6979)*
RTA	0.0638 (3.0175)*	-0.1018 (-6.0116)*	-0.0057 (-0.4265)
GSP	-0.3355 (-7.4595)*	0.2287 (6.7414)*	0.2018 (7.3119)*
$TRDO_i$	1.5374 (15.0364)*	-1.1244 (-13.6487)*	-0.8819 (-13.4122)*
$TRDO_j$	-0.0847 (-1.3524)	0.0852 (1.7446)***	0.0370 (0.9475)
Number of Observations	10320	10320	10320
Adjusted R^2	0.4605	0.4648	0.5966

Note: *, **, and *** represent that the parameters estimated are significant at the 1%, 5%, and 10% respectively. The numbers in parentheses are t-statistics.

Table 6: Linkages between FDI inflows and exports to other trading partners (Model 4's parameters estimated)

Independent Variables	Dependent Variables		
	$Ln(FDI_{ij})$	$Ln(EX_{io})$	$Ln(EX_{jo})$
Constant	-25.4799 (-48.9753)*	-7.0922 (-22.9887)*	-20.6836 (-44.1966)*
$Ln(FDI_{ij})$		-0.1748 (-17.7770)*	-0.6428 (-46.1655)*
$Ln(EX_{io})$	0.7102 (13.8300)*		
$Ln(EX_{jo})$	0.0380 (0.9507)		
$Ln(GDP_i)$	0.0637 (1.4973)	1.0624 (119.6773)*	0.4781 (35.1760)*
$Ln(GDP_j)$	0.5719 (14.3996)*	0.0350 (4.4708)*	1.3221 (103.4506)*
$Ln(GDPPC_i)$	1.4596 (34.6741)*	0.3047 (18.0068)*	0.9796 (37.5792)*
$Ln(GDPPC_j)$	0.1507 (4.7538)*	0.0202 (3.1952)*	0.0895 (7.4624)*
Ln(DIST)	-0.3657 (-9.1826)*	0.0637 (7.5806)*	-0.0917 (-5.9056)*
$RURAL_j$	-0.0068 (-4.0121)*	0.0009 (2.6987)*	-0.0025 (-3.9122)*
RTA	0.2376 (4.0496)*	-0.2201 (-18.5647)*	-0.1661 (-7.3552)*
GSP	-0.1438 (-2.9506)*	-0.0032 (-0.3209)	-0.2318 (-12.4018)*
$TRDO_i$	0.0249 (3.3001)*	2.1794 (82.4915)*	1.1524 (25.8652)*
$TRDO_j$	0.0028 (0.3224)	0.0584 (3.7942)*	1.8647 (66.6274)*
REGIONAL	0.6227 (2.5179)*	1.1372 (22.6956)*	1.5723 (16.6324)*
Number of Observations	10320	10320	10320
Adjusted R^2	0.4664	0.8460	0.1635

Note: *, **, and *** represent that the parameters estimated are significant at the 1%, 5%, and 10% respectively. The numbers in parentheses are t-statistics.

Table 7: Linkages between FDI inflows and imports from other trading partners (Model 5's parameters estimated)

Independent Variables	Dependent Variables		
	$Ln(FDI_{ij})$	$Ln(IM_{io})$	$Ln(IM_{jo})$
Constant	-33.9655	8.4564	1.7156
	(-67.0877)*	(52.8860)*	(7.6332)*
$Ln(FDI_{ij})$		0.2529	0.0981
		(52.5638)*	(13.3271)*
$Ln(IM_{io})$	2.5273		
	(39.2666)*		
$Ln(IM_{jo})$	0.7850		
	(16.4975)*		
$Ln(GDP_i)$	-1.2846	0.6628	-0.1350
	(-34.5861)*	(134.8737)*	(-19.8609)*
$Ln(GDP_j)$	0.1056	-0.2093	0.8743
	(3.2401)*	(-42.0496)*	(143.2491)*
$Ln(GDPPC_i)$	1.7946	-0.4938	-0.1462
	(45.4987)*	(-48.2526)*	(-11.2785)*
$Ln(GDPPC_j)$	0.1225	-0.0341	0.0330
	(3.8459)*	(-6.0299)*	(6.4662)*
Ln(DIST)	-0.3631	0.1096	0.0201
	(-16.5491)*	(23.0007)*	(3.9461)*
$RURAL_j$	-0.0086	0.0019	0.0042
	(-5.5191)*	(6.3213)*	(15.6514)*
RTA	0.4552	-0.1475	-0.0571
	(17.2297)*	(-27.9995)*	(-11.2250)*
GSP	-0.1729	0.0710	-0.0111
	(-3.7250)*	(8.1487)*	(-1.4191)
$TRDO_i$	0.0303	0.7861	-0.3290
	(3.9610)*	(50.2910)*	(-17.2489)*
$TRDO_j$	-0.0048	-0.2731	1.2874
	(-0.5307)	(-24.2995)*	(109.4603)*
REGIONAL	-0.4194	0.1717	0.1093
	(-5.8278)*	(13.2197)*	(9.4284)*
Number of Observations	10320	10320	10320
Adjusted R^2	0.4078	0.8358	0.9286

Note: *, **, and *** represent that the parameters estimated are significant at the 1%, 5%, and 10% respectively. The numbers in parentheses are t-statistics.

In parallel with Table 4, Table 5 reports the linkages between FDI inflows and imports of the home country (country i) from the host country (country j). Positive relationships are found between the two variables. An increase in FDI inflows by 1 per cent can lead to 0.72 per cent increase in imports of the home country from the host country. The complementarity between FDI inflows and import of the host country from the home country are also discovered. A 1 per cent increase in imports of the host country from the home country induces an increase in FDI inflow from the home country of the same proportion. Reverse causality suggests that an increase in FDI inflows from the home country will lead to an increase in imports of the host country from the home country. These relationships express a possibility of economic dependency as a result of FDI inflows. As more investment flows in, the host country's economy becomes more and more dependent on the home country's production technology. FDI hosting country will have to import more inputs and intermediate goods from the FDI home country – This might in turn constrained the development of the domestic industry.

Model 4 describes the effects of exports of the home country to "all countries but the host country" and exports of the host country to "all countries but the home country" on its FDI inflows. The results show that FDI inflows and exports of the home country to other trading partners are positively linked. An increase of export of the home country to other trading partners induces more outward investment, which further confirms that trade can act as a catalyst to attract foreign investment. In contrast, an increase in export of the home country to other trading partners does not appear to be a major factor in attacting FDI inflows to the host country. Investment decisions seems therefore to be biased toward the expansion of home countries' exports, and it is not clear whether the host country can gain competitiveness from FDI inflows. Indeed, a negative effect of FDI inflows on exports of the host country to other trading partners is observed. Consequently, it raises a question of whether developing country should compete for FDI by offering investment incentives to foreign investors.
A significant negative effect of FDI on export of the home country to other trading partners is also discovered in this model. These evidences suggest that there is a possibility that an increase in FDI inflows from the home country to the host country could results in reductions of exports of the home and host country to the rest of the world. FDI inflows between the two countries while generating exports between them, crowd out export to the rest of the world (increase export to the home and host country but decrease export to other trading partners).

The linkages between FDI inflows and imports from other trading partners of the home and host country are examined in Model 5. Table 7 illustrates positive and significant effects of imports of the home and host countries from other trading partners on FDI inflows. An increase in FDI inflows will stimulate more imports of the home and host country from the rest of the world. For example, by investing in the host country, the home country receives returns from its international investments which raise the country's income and hence, stimulate more imports from the rest of the world, i.e., positive income elasticity for imports is recognized. However, FDI inflows will generate more imports of the home country from other trading partners than imports of the host country from the rest of the world. Thus, FDI inflows from the home country act as a stimulus for import of the host country from its other trading partners (the rest of the world). This finding is consistent with the increasing development of global value chains through outsourcing and vertical as well as horizontal integration that span entire regions or the world, rather than only the home and host countries.

All the models included the trade openness index, as measured by the ratio of trade to GDP for both the home and host country, as a proxy for a country's level of trade liberalization and facilitation. The results indicate that by improving their trade openness, FDI inflows from the

home country to the host country will be stimulated. At the same time, the negative relationship found between trade openness indices and bilateral trade between the home and the host country is rather contradictory with the results obtained in other studies. Trade openness of a country is affected by a number of factors – including country size – and may therefore not be a reliable indicator of a country's degree of trade liberalization and facilitation.

IV. Conclusions

General conclusion drawn from the empirical study using gravity models suggests that there are bi-directional effects between international trade and investment. Different aspects of international trade are considered in separate models to observe the linkages between trade and FDI inflows. International trade, either measured by exports or imports, is found to be complementary with FDI inflows. In addition, FDI inflows are observed to have feedback effects with exports of the trading partners and of the other trading partners. Similar linkages between FDI inflows and import of the trading partners and of the other trading partners are also discovered.

Table 8: Summary of trade and investment relationships

	Effect of FDI inflow from home into host country (FDI_{ij}) on Trade	**Effect of trade on FDI inflow from home country to host country (FDI_{ij})**
Total trade between home and host country	++	+++
Exports from home to host country (EX_{ij})	+	+++
Exports from host to home country (EX_{ji})	+	+
Imports of home from host (IM_{ij})	++	++
Imports of host from home country (IM_{ji})	++	+++
Exports from home country to ROW (EX_{io})	-	++
Exports of host country to ROW (EX_{jo})	--	+
Imports of home country from ROW (IM_{io})	+	+++
Imports of host country from ROW (IM_{jo})	+	++

Note: + and – signs represent the directions of the relationships.
+ or - indicates the absolute value of the coefficient between 0 – 0.5
++ or -- indicates the absolute value of the coefficient between 0.51 – 1.0
+++ or --- indicates the absolute value of the coefficient greater than 1.0

The empirical evidences of relationships between international trade and investment suggest a crucial role of policy harmonization to further benefit, in terms of social welfare improvement, from globalization. The positive correlation between trade and investment found in the study suggests that they are complements. Since trade liberalization is welfare improving, FDI induced by trade expansion would also improve social welfare. It is important for public sector as well as the private sector to realize the complementary between trade and investment, and respond accordingly. The on-going process of bilateral trade agreements seem to focus solely on trade liberalization, by reducing trade barriers both tariff and non-tariff, and leave investment liberalization for later consideration. The creation of the Early Harvest Scheme (EHS) in many bilateral or regional trade negotiations are good examples of this. Furthermore, the mushrooming of bilateral trade agreements/negotiations also raise issues on the consistency of different agreements one country committed. Failure to provide consistency among trade agreements a country is involved in could result in higher transaction costs, particularly administrative costs, and possibilities for trade diversion.

Furthermore, not only consistency among trade agreements a country involves but also consistency between trade liberalization and investment liberalization should be considered. There are evidences pointing to the role of harmonization between trade and investment policy. Flows and speed of the flows of FDI or FPI in and out of the country, the movement of firms from one country to the other as their production bases, firms switching from one supply chain to the other, are only some examples observed. It is vitally important to developing country; especially for economies rely so much on the international sector, both in the aspects of growth and stability. Thus, to further and ensure benefits of the host country (where developing countries are the majority) from globalization, which depend on efficiency and productivity improvements, the country will need to not only liberalize trade and investment but also liberalize trade and investment in a coordinated and cooperative manner.

V. Limitations of the study

In this study, the linkages between international trade and investment needed to be narrowed down to just the relationship between foreign direct investment and trade due to the unavailability of the data particularly on portfolio investment. Additionally, the variable used, in this study, to address the role of trade facilitation are trade openness index (measured by the percentages of trade to GDP) of the home and host country. Assuming that the more open the country to trade, the higher level of trade facilitation the country experiences. And thus, we expect to see a positive relationship between trade and trade openness and between investment and trade openness. By doing so, the study is limited to a rather aggregate view of the role of trade facilitation on trade and investment. Unfortunately, mix results are found in the study. As the home or host country becomes more open to trade, the trade between the two trading partners might be increased or decreased. This seems to support the possibility of trade creation and trade diversion resulting from a growing number of bilateral trade agreements.

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