

**IMPACT OF TRADE
FACILITATION ON
FOREIGN
DIRECT INVESTMENT**

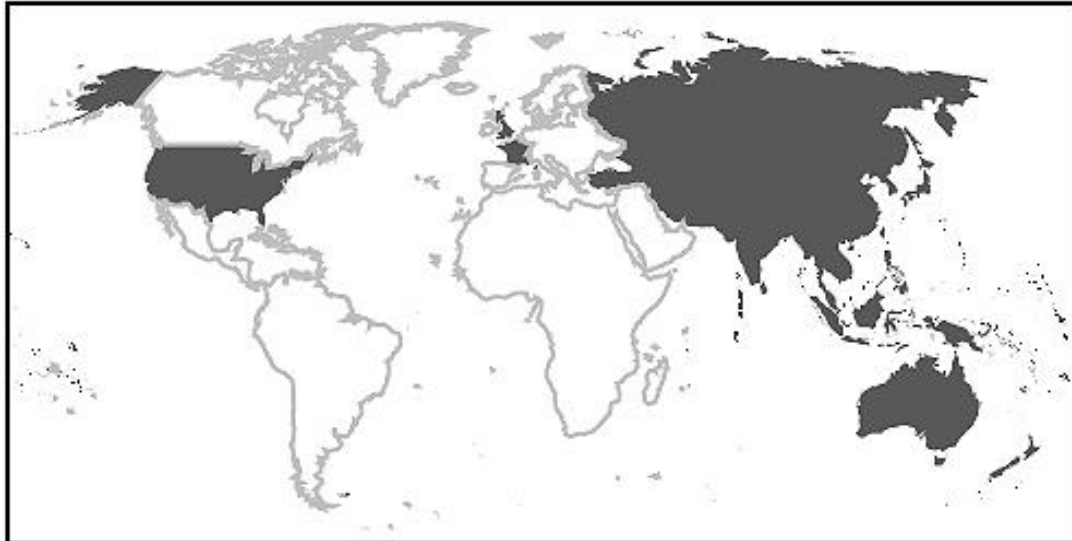


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Impact of Trade Facilitation on Foreign Direct Investment

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Abstract: Countries that implement trade facilitation reforms and enhance trade efficiency and connectivity are generally expected to attract more foreign direct investments. This paper is a first attempt to quantify the potential impact of trade facilitation on FDI flows. Using a unique bilateral dataset on FDI flows covering both OECD and developing economies in Asia and the Pacific, we estimate gravity models of FDI featuring relevant trade costs and trade facilitation indicators. A host country's quality of business regulatory environment generally matters most, but high trade costs also have a significant impact on FDI. A one percent reduction in comprehensive international trade costs (excluding tariff) between source and host country leads to a 0.8 percent increase in FDI inflows on average. Import tariffs of the host country are also found to have a significant but small negative on FDI inflows.

Focusing on the Asia-Pacific region, taking steps to reduce average tariff of high-tariff countries to the developing country average would result in a 6-7% increase in FDI inflows to the region, while reducing other types of trade costs in high-cost countries in Asia-Pacific to the developing country average can be expected to increase FDI flows by 20%. In turn, a moderate improvement in the quality of the domestic business environment in host countries, by just 10% on average across the region, would increase FDI flows by over 60%. Improving liner shipping connectivity of all lagging countries in the sample to the developing country average would also significantly increase FDI, but this would likely require massive investment in maritime infrastructure in many countries. Overall, the analysis fully support the notion that trade facilitation should be a core component of any foreign direct investment development strategy and provides further evidence of the benefits associated with enhancing trade efficiency.

JEL Classification: F1

Key words: foreign direct investment, FDI, trade costs, Asia and the Pacific, trade facilitation, maritime connectivity

Contents

Introduction	1
Literature Review: Trade and FDI	1
World FDI flows at a glance	4
Impact of Trade Facilitation on FDI: Data and methodology	8
A. Model Specification	8
B. Data and model estimation	11
Impact of Trade Facilitation on FDI: Gravity model results and counterfactual simulation ...	12
A. Overall findings	12
B. South-South FDI and Trade Facilitation	13
C. Impact of trade facilitation improvements on FDI: a counterfactual simulation.....	14
Conclusions	17
Bibliography	18
Appendix.....	21

List of Tables

Table 1: Selected Studies using Gravity Model of FDI

Table 2: FDI Outflows by Region: 1996-2011

Table 3: FDI Inflows by Region: 1996-2011

Table 4: Bilateral Flows among Countries and Regions

Table 6: Variable Descriptions, Data Sources and Expected Signs

Table 7: Counterfactual simulation of trade facilitation improvements in FDI Host Countries

Table A1: Summary of Source and Host Countries of FDI in 2006-2011 (based on M3)

Table A2: Summary of Statistics

Table A3: Correlation Matrix

Table A4: Regression – All countries

Table A5: Regression – South (host) – South (source)

Table 6: Variable Descriptions, Data Sources and Expected Signs

Table 7: Counterfactual simulation of trade facilitation improvements in FDI Host Countries

List of Figures

Figure 1: FDI flows among Developing Asia and the Pacific countries

Figure 2: Impact of trade cost improvements on FDI in selected Asia-Pacific Countries

Figure 3: Impact of tariff reduction and increase use trade facilitation and tariff in developing economies on their FDI flows, by host countries: ESCAP members

Introduction

Foreign direct investment (FDI) has long been known as an important source of financing for development in host (recipient) countries. UNCTAD (2012b) finds that FDI positively contributes to host economies, including through higher employment and wages, tax revenue increase, export generation and capital formation. Identifying factors that make a host country more attractive to FDI therefore remains an important policy issue.

Trade facilitation has often been promoted as a way to attract more FDI, in particular FDI related to international production networks and which typically require that low transaction costs be maintained between the members of the network (e.g., ADB/ESCAP, 2013 (page 7); UNECE, 2012¹; UNECE, 2003 (page 8)). However, little empirical evidence exists on the actual link between trade facilitation and FDI. This paper accordingly quantifies the impact of trade facilitation, defined here in its broadest sense, i.e., lower trade costs, on FDI.

The study uses bilateral FDI data from 2006 onward from both developed and developing countries to estimate FDI gravity models and examine the effect of various trade facilitation related indicators on FDI, including ESCAP-World Bank bilateral trade costs,² maritime connectivity, ease of doing business, and use of the internet. Changes in effects when considering only FDI flows between developing countries (South-South) are also presented.³

The next section reviews selected literature on foreign direct investment and linkages to trade facilitation, with particular emphasis on findings from FDI gravity models. Section 3 provides a brief overview of FDI flows in developing and developed economies, while the methodology and data used to assess the impact of trade facilitation and FDI are presented in section 4. Results from the gravity model estimation and a counterfactual simulation of trade facilitation improvements in developing countries are in Section 5, followed by concluding remarks and policy recommendations in Section 6.

Literature Review: Trade and FDI

The literature on FDI and trade is vast, ranging from studies of the relationship between FDI and trade as complements or substitutes (e.g., Swenson, 2004), to studies examining the factors affecting firms decision to engage in FDI rather than export (e.g., Helpman et al., 2004; Markusen and Venables, 2005).⁴ From a policymaker perspective, however, the identification of factors attracting FDI is particularly relevant.

Blonigen (2005), in its review of the FDI literature, identifies five common factors affecting FDI, i.e., exchange rates, domestic taxes, quality of institutions, trade protectionism and the substitution or complementarity effects between trade and FDI. Recent literature generally finds

¹ <http://fig.unece.org/contents/tf-introduction.htm>

² See Arvis, Duval, Shepherd and Utoktham (2013) for an introduction.

³ Horizontal FDI typically refers to the situation where firms duplicate the production activities they have at source in host countries, while vertical FDI refers to firms who locate different stages of production in different countries. Horizontal FDI is sometimes referred to as market-oriented or import-substituting investment, while vertical FDI is referred to export-platform investment (e.g., Markusen and Venables, 2005).

⁴ For example, Helpman, Melitz and Yeaple (2004) show that the most productive firms will engage in foreign market investment, while the less productive ones will export. Markusen and Venables (2005) also find that countries with moderate trade costs engage in market-oriented assembly, while those with lower trade costs engage in export-platform production.

that FDI and trade are complements, particularly since the emergence of regional and global value chains and distributed manufacturing. Evidence of tariff-jumping FDI as described by Carr, Markusen, and Maskus (2001) is limited and trade protectionism is generally found to have a negative effect on FDI (see, for example, Tekin-Koru, 2009; or WTO, 1996).

Gravity models of FDI flows are commonly used to identify determinants of FDI. Most FDI models feature both macroeconomic indicators as well as indicators more closely related to trade facilitation. Table 1 provides an overview of recent studies featuring gravity models of FDI.

Table 1: Selected Studies using Gravity Model of FDI

Study	Estimation Method	Country/Period Coverage	Source of FDI	Control Variables (excluding distance and GDP)	Main findings
Del Bo (2009)	OLS with fixed effect	1982-2005; cross countries with USA	OECD and Bureau of Economic Analysis	<ul style="list-style-type: none"> Exchange rate volatility Political risk Financial development Trade openness Energy use Labor education Quality of labor Common language 	Exchange rate variability and political instability have negative effect on FDI flows
Frankel, Funke, and Stadtmann (2004)	OLS with country fixed effect	1992-2000; G-5 flows to emerging economies	Eurostat	<ul style="list-style-type: none"> GDP growth Trade openness Inflation Dummy of fixed exchange rate Economic risk 	FDI flows are positively related to economic growth, trade openness and negatively related to country risk ; Effects of exchange rate on FDI are mixed; Inflation is not significant
Furceri and Borelli (2008)	GMM with fixed effect and random effect control	1995-2004; European economies	UNCTAD	<ul style="list-style-type: none"> GDP per capita Openness Barriers to trade Inflation Investment price Dummy of Asian crisis Dummy of Russian crisis Exchange rate volatility 	Relationship between FDI and exchange rate volatility depends on degree of openness and is negative in more open economies; Inflation and price of investment (proxied by investment deflator) have no significant impact on FDI
Gao (2004)	OLS/Tobit	1994-1997; 24 OECD economies to host countries	OECD and UNCTAD	<ul style="list-style-type: none"> GDP per capita Average GDP growth prior to 1994 Common language Contiguity Colonial link Free trade agreement 	GDP growth prior to 1994, GDP per capita, and common language are significant and positively related to FDI; FDI flows within Asia is less sensitive to host countries' income and are more affected by distance
Hattari and Rajan (2009)	Tobit	1990-2005; developing Asia	UNCTAD	<ul style="list-style-type: none"> Difference in real GDP per capita Real export Change in real exchange rate Market capitalization of listed companies 	Lag of exports, stock market capitalization, financial openness, political risk, legal origin of UK and free trade agreement dummy have positive effect on FDI;

Study	Estimation Method	Country/Period Coverage	Source of FDI	Control Variables (excluding distance and GDP)	Main findings
				<ul style="list-style-type: none"> • Political risk • Corporate tax rate • Trade agreement • Financial openness • Legal origin of UK • Free trade agreement • Common language 	Change in real exchange rate, distance and corporate tax have negative effect on FDI
Jeon, Tang and Zhu (2004)	OLS with country fixed effect	1980-1997; 27 OECD countries and 20 non-OECD countries	International Direct Investment Statistics Yearbook, OECD	<ul style="list-style-type: none"> • Product of tele/cell density • Trade openness • FDI openness • Interaction of tele/cell density and distance 	IT development in source and host countries encourages FDI significantly. Impact from G7 to OECD members are more prominent compared to non-OECD countries. In addition, the impact in 1990s is more significant than that of the 1980s.
Kleinart and Toubal (2010)	PPML	1986, 1990, 1994, 1998; cross countries	Affiliate sales from Braconier et al. (2005) excluding Swedish FDI	<ul style="list-style-type: none"> • Relative factor endowment • Sum of GDP • Contiguity • Trade protection index • Investment index (based on World Economic Forum survey) 	Differences are found between horizontal and vertical FDI with relative factor endowment and bilateral wealth (sum of GDP) significant in explaining FDI flows; Trade protection and investment index are not statistically significant
Petri (2012)	Tobit	1998-2003; Developing Asia	UNCTAD	<ul style="list-style-type: none"> • Population • GDP per capita • Common language • Waterway • Airport • Science and technology achievement index • Science and technology policy index • Regional blocs 	Asian FDI flows are correlated with high intellectual property right regime, and negatively correlated with low technology achievement.

Existing studies are often based on very limited and dated FDI data, with many recent studies (2008-2012) still using FDI data from 2005 or earlier. This is a concern in light of the changing nature of FDI associated with growing regional and global production networks. Second, trade costs and trade facilitation indicators are typically not included in the FDI models. Bilateral distance and indicators of trade openness found in most models indeed do not adequately capture or provide sufficient insight of the links between trade-related procedures, infrastructure and services and FDI.⁵

⁵ The examples provided in Carr, Markusen and Maskus (2001) clearly suggest the need to include distance, trade costs and investment costs as separate determinants of FDI.

While FDI gravity models are relatively common, the theoretical literature providing a microeconomic foundation for the gravity model of FDI is very limited - Gravity models of trade with micro foundation were introduced by Anderson and van Wincoop (2003). Kleinert and Toubal (2010) recently introduced an FDI gravity framework based on proximity-concentration models and factor-proportion theory using affiliate sales data. However, such data is typically not available between developing countries. Thus, the analysis presented in this paper rely on a standard gravity model of bilateral FDI flows with control variables based on those proposed in Blonigen (2005) and Braconier et al. (2005). The model is then extended to include relevant trade costs and trade facilitation factors (see section 4 for details).

World FDI flows at a glance

Data in Table 2 shows FDI from developed countries account for approximately 50 percent or more of World FDI during 2009-2011.⁶ While FDI still flows from developed countries to other developed countries, the situation is changing as a growing share of FDI goes to developing economies. As of 2011, FDI to developing and transition economies represented 51% of total FDI (see Table 3). The main FDI recipients in developing Asia and the Pacific are countries in East and North-East Asia, followed by South-East Asia.

Aggregate FDI flows as illustrated in table 2 and 3 only provide a very general overview of FDI trends and bilateral FDI data is essential to better understand FDI patterns. As the availability of such bilateral data is limited, the study combines 2 sources: OECD and UNCTAD. OECD database includes flows of OECD members as reporting countries to and from the rest of the world, i.e., it includes North-North and North-South flows. FDI flows among developing economies, i.e., South-South flows, are obtained from the UNCTAD database.⁷

Based on this bilateral FDI dataset, table 4 shows how FDI flows from both developed and developing countries or regions to host countries and their evolution from 1996 to 2010. Developed hosts receive FDI mainly from other developed economies. However, sources of FDI for developing Asia-Pacific as well as Latin America and the Caribbean regions are often from other developing countries. Europe also receives FDI from developing world regions most during the period considered, with significant increase in investment in all regions. Within Asia-Pacific, South and South West Asia is the region where FDI from developing countries appear to have grown the least. In contrast, East and North-East Asia as well as South-East Asia have attracted increasingly large flows.

⁶ See UNCTAD (2012b).

⁷ Data from UNCTAD provides only data among developing Asian countries upon request.

Table 2: FDI Outflows by Region: 1996-2011

	Outflows: USD Million				Outflows: % of world total			
	1996	2001	2006	2011	1996	2001	2006	2011
Developing Asia and the Pacific	49644.32	45478.64	145842.6	317503.4	12.48%	6.08%	10.31%	18.74%
East and North-East Asia	33316.14	20273.24	78003.47	167235.8	8.38%	2.71%	5.51%	9.87%
South-East Asia	14829.01	20749.84	28603.78	59889.77	3.73%	2.78%	2.02%	3.53%
South and South-West Asia	531.283	1926.702	15736.1	17697.65	0.13%	0.26%	1.11%	1.04%
North and Central Asia	926.7244	2517.283	23459.04	72569.91	0.23%	0.34%	1.66%	4.28%
Pacific Islands Economies	41.16453	11.57416	40.21324	110.3147	0.01%	0.00%	0.00%	0.01%
Other Developing Regions								
Africa	1813.343	-2644.31	8225.171	3512.398	0.46%	-0.35%	0.58%	0.21%
Latin America and the Caribbean	8395.072	36565.34	79670.23	99653.1	2.11%	4.89%	5.63%	5.88%
Developed Economies								
Asia and the Pacific	27329.97	50925.01	75856.01	137207.4	6.87%	6.81%	5.36%	8.10%
Australia	5142.191	13675.11	25409.46	19998.7	1.29%	1.83%	1.80%	1.18%
Japan	23426.4	38333.24	50264.4	114352.9	5.89%	5.13%	3.55%	6.75%
New Zealand	-1238.62	-1083.34	182.1493	2855.789	-0.31%	-0.14%	0.01%	0.17%
EU-5	128817.1	234415.5	463689.3	336066.8	32.38%	31.35%	32.77%	19.83%
France	30421	86767.01	110673	90146.03	7.65%	11.61%	7.82%	5.32%
Germany	50804.71	39683.64	118701	54368.4	12.77%	5.31%	8.39%	3.21%
Italy	6465.318	16003.34	43796.52	47210.35	1.63%	2.14%	3.09%	2.79%
Spain	7078.558	33106.36	104248	37255.62	1.78%	4.43%	7.37%	2.20%
United Kingdom	34047.47	58855.12	86270.69	107086.4	8.56%	7.87%	6.10%	6.32%
North America	97522.22	160901.8	270433.7	446224.9	24.52%	21.52%	19.11%	26.34%
Canada	13096.22	36028.82	46213.72	49568.94	3.29%	4.82%	3.27%	2.93%
United States	84426	124873	224220	396656	21.22%	16.70%	15.84%	23.41%
World	397769.7	747656.8	1415094	1694396	100.00%	100.00%	100.00%	100.00%
Developing economies	65406.24	83087.38	239336	383753.7	16.44%	11.11%	16.91%	22.65%
Transition economies	947.1836	2741.616	23724.31	73134.75	0.24%	0.37%	1.68%	4.32%
Developed economies	331416.3	661827.8	1152034	1237508	83.32%	88.52%	81.41%	73.04%

Source: Authors, based on UNCTAD (online database: <http://unctadstat.unctad.org>)

Note:

Composition of ESCAP regional members are as follows: East and North-East Asia consists of China, Democratic People's Republic of Korea, Hong Kong, Macao, Mongolia and Republic of Korea; South-East Asia consists of Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, and Viet Nam; South and South-West Asia consists of Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, Sri Lanka, and Turkey; North and Central Asia consists of Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Russian Federation, Tajikistan, Turkmenistan, and Uzbekistan; Pacific Islands Economies consists of American Samoa, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Micronesia, Nauru, New Caledonia, Niue, Northern Marina Islands, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

Table 3: FDI Inflows by Region: 1996-2011

	Inflows: USD Million				Inflows: share to the world			
	1996	2001	2006	2011	1996	2001	2006	2011
Developing Asia and the Pacific	96010.48	114385.6	276289	467960.8	24.56%	13.82%	18.88%	30.70%
East and North-East Asia	54221.52	74958.47	124405.4	220936.1	13.87%	9.06%	8.50%	14.49%
South-East Asia	32915.17	22094.77	64037.64	116559.2	8.42%	2.67%	4.38%	7.65%
South and South-West Asia	4101.97	10865.4	48103.56	54817.75	1.05%	1.31%	3.29%	3.60%
North and Central Asia	4642.053	6256.837	38444.21	74046.34	1.19%	0.76%	2.63%	4.86%
Pacific Islands Economies	129.766	210.1535	1298.154	1601.335	0.03%	0.03%	0.09%	0.11%
Other Developing Regions								
Africa	6038.584	19960.82	36782.88	42651.85	1.54%	2.41%	2.51%	2.80%
Latin America and the Caribbean	46265.34	80725.33	98175.35	216988.3	11.84%	9.75%	6.71%	14.23%
Developed Economies								
Asia and the Pacific	8807.52	17160.88	29069.01	42927.53	2.25%	2.07%	1.99%	2.82%
Australia	4660.917	11031.12	31049.65	41316.69	1.19%	1.33%	2.12%	2.71%
Japan	227.9852	6242.954	-6506.5	-1758.33	0.06%	0.75%	-0.44%	-0.12%
New Zealand	3918.617	-113.192	4525.871	3369.175	1.00%	-0.01%	0.31%	0.22%
EU-5	66151.79	172792.8	357043.3	193832.1	16.92%	20.88%	24.40%	12.72%
France	21961.46	50476.82	71848.02	40945.01	5.62%	6.10%	4.91%	2.69%
Germany	6572.646	26414.07	55626.11	40402.08	1.68%	3.19%	3.80%	2.65%
Italy	3535.094	14870.56	42580.92	29059.37	0.90%	1.80%	2.91%	1.91%
Spain	9647.285	28408.13	30802.38	29476.32	2.47%	3.43%	2.10%	1.93%
United Kingdom	24435.3	52623.24	156185.9	53949.35	6.25%	6.36%	10.67%	3.54%
North America	94093.76	187141.1	297429.9	267868.5	24.07%	22.61%	20.33%	17.57%
Canada	9633.764	27663.42	60293.91	40931.51	2.46%	3.34%	4.12%	2.69%
United States	84460	159477.6	237136	226937	21.61%	19.27%	16.20%	14.89%
World	390899.5	827617.3	1463351	1524422	100.00%	100.00%	100.00%	100.00%
Developing economies	148993.4	216865.1	427163.4	684399.3	38.12%	26.20%	29.19%	44.90%
Transition economies	5871.134	9511.127	54318.43	92162.89	1.50%	1.15%	3.71%	6.05%
Developed economies	236035	601241.1	981869.3	747860	60.38%	72.65%	67.10%	49.06%

Source: Authors, based on UNCTAD (online database: <http://unctadstat.unctad.org>)

Note:

Composition of ESCAP regional members are as follows: East and North-East Asia consists of China, Democratic People's Republic of Korea, Hong Kong, Macao, Mongolia and Republic of Korea; South-East Asia consists of Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, and Viet Nam; South and South-West Asia consists of Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, Sri Lanka, and Turkey; North and Central Asia consists of Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Russian Federation, Tajikistan, Turkmenistan, and Uzbekistan; Pacific Islands Economies consists of American Samoa, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Micronesia, Nauru, New Caledonia, Niue, NorthernMarinalands, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

Table 4: Bilateral Flows among Countries and Regions

Host \ Source	year	Africa	AUS-NZL	Caribbean	Central America	East and North-East Asia	European Union	Japan	North America	Pacific Islands Economies	South America	South and South-West Asia	South-East Asia
AUS-NZL	1996	68.1	N/A	N/A	N/A	65.0	3398.7	189.0	3659.0	N/A	N/A	N/A	510.8
	2001	7.8	N/A	N/A	N/A	N/A	N/A	553.0	2016.0	N/A	32.0	0.5	509.0
	2006	N/A	1890.0	27.9	N/A	822.0	4013.8	2340.0	6460.0	700.8	169.0	N/A	431.1
	2010	318.0	965.0	73.0	177.0	3661.0	N/A	5730.0	18280.0	33.0	874.7	450.0	5235.8
East and North-East Asia	1996	N/A	N/A	N/A	N/A	23117.1	N/A	N/A	N/A	0.9	N/A	100.8	837.0
	2001	N/A	N/A	N/A	N/A	24426.4	N/A	N/A	N/A	0.3	N/A	48.4	N/A
	2006	N/A	N/A	N/A	N/A	40641.9	N/A	N/A	N/A	N/A	N/A	208.8	1567.3
	2010	N/A	N/A	N/A	N/A	101166.0	N/A	N/A	N/A	N/A	N/A	665.9	3258.3
European Union	1996	419.3	1823.2	835.2	305.9	1421.2	48846.9	418.0	28401.8	1.3	1979.7	372.4	1679.4
	2001	1319.5	586.2	4520.4	389.2	418.3	204842.6	6368.9	56924.4	2.7	1465.0	162.8	698.2
	2006	4023.9	4248.0	32216.7	1686.9	3746.3	469979.2	14270.6	75210.2	613.4	5288.1	1771.7	6678.8
	2010	2888.3	N/A	8365.2	1777.6	22086.4	267754.3	N/A	108007.1	N/A	10572.4	1713.1	3772.4
Japan	1996	230.0	4.6	N/A	118.0	240.0	2099.4	N/A	2250.5	N/A	75.4	1.8	999.0
	2001	N/A	N/A	N/A	45.3	55.2	8492.0	N/A	5696.0	N/A	1410.0	118.0	729.8
	2006	443.8	35.2	260.5	10.3	N/A	N/A	N/A	N/A	126.3	1595.3	N/A	1102.9
	2010	36.5	N/A	566.8	N/A	1217.8	463.4	N/A	3223.6	1.3	N/A	4.2	1749.6
North America	1996	91.0	5324.0	N/A	N/A	230.0	55390.0	13958.0	15380.0	N/A	2433.0	393.0	1488.0
	2001	534.0	6562.0	N/A	N/A	1991.0	88549.0	N/A	34470.0	N/A	1361.0	336.0	890.0
	2006	819.0	2039.0	N/A	3867.0	3628.0	198818.0	18710.0	33900.0	N/A	N/A	482.0	3210.0
	2010	2039.0	8859.0	427.0	1295.0	2979.0	130030.0	22530.0	27300.0	1.0	3148.0	834.0	947.0
Pacific Islands Economies	1996	N/A	N/A	N/A	N/A	0.1	N/A	N/A	N/A	N/A	N/A	1.1	N/A
	2001	N/A	N/A	N/A	N/A	504.0	N/A	N/A	N/A	4.4	N/A	N/A	N/A
	2006	N/A	N/A	N/A	N/A	1657.0	N/A	N/A	N/A	N/A	N/A	0.2	31.6
	2010	N/A	N/A	N/A	N/A	2324.0	N/A	N/A	N/A	N/A	N/A	0.1	37.9
South and South-West Asia	1996	N/A	N/A	N/A	N/A	1.1	474.0	24.0	143.0	N/A	N/A	3.3	N/A
	2001	N/A	N/A	N/A	N/A	9.3	2845.0	139.0	280.0	1.2	N/A	2.8	21.3
	2006	9.0	108.0	27.0	N/A	19.0	14548.0	N/A	1036.0	N/A	N/A	46.6	N/A
	2010	N/A	9.0	N/A	N/A	82.9	5518.0	356.0	419.0	N/A	6.0	211.5	12.3
South-East Asia	1996	N/A	N/A	N/A	N/A	3258.7	N/A	N/A	N/A	51.6	N/A	0.6	2209.1
	2001	N/A	N/A	N/A	N/A	5328.8	N/A	N/A	N/A	N/A	N/A	56.1	1715.5
	2006	N/A	N/A	N/A	N/A	4445.0	N/A	N/A	N/A	N/A	N/A	700.7	5241.8
	2010	N/A	N/A	N/A	N/A	7935.3	N/A	N/A	N/A	N/A	N/A	2041.2	7947.5

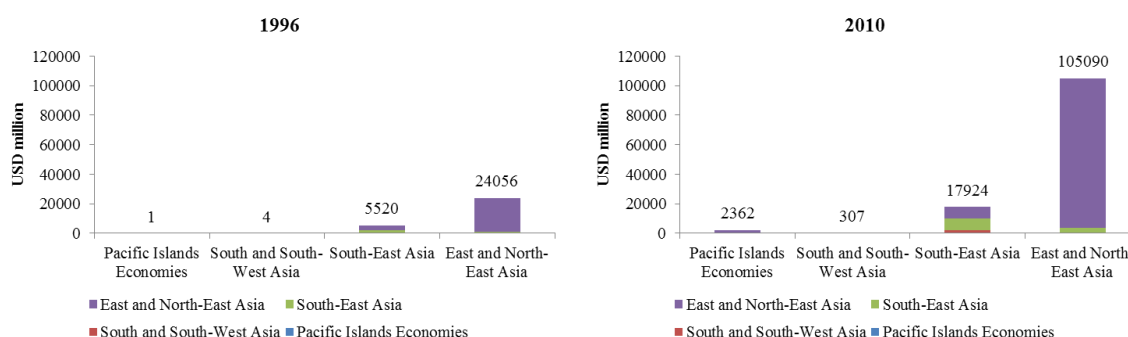
Source: Authors, based on OECD iLibrary (online database: based on inflows data) and UNCTAD based on FDI inflows (upon request); Unit is in USD million; Data reported only on positive flows

Note:

Composition of ESCAP regional members are as follows: East and North-East Asia consists of China, Hong Kong, Mongolia and Republic of Korea; South-East Asia consists of Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, and Viet Nam; South and South-West Asia consists of Bangladesh, Iran, Maldives, Nepal, Pakistan, Sri Lanka, and Turkey; North and Central Asia consists of Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, and Russian Federation; Pacific Islands Economies consists of Fiji, Papua New Guinea, and Vanuatu; Africa consists of Algeria, Botswana, Egypt, Eritrea, Guinea, Lesotho, Madagascar, Mauritius, Morocco, Namibia, South Africa, Zambia, and Zimbabwe; Latin America and the Caribbean consists of Central America: Belize, Costa Rica, El Salvador, Honduras, Mexico, Nicaragua, and Panama, South America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Uruguay, and Venezuela, Caribbean: Antigua and Barbuda, Bahamas, Dominica, Dominican Republic, Grenada, Jamaica, St. Lucia, and Trinidad and Tobago; AUS/NZL consists of Australia and New Zealand; European Union is EU-27; North America consists of Canada and United States.

Figure 1 provides an overview of FDI flows among Asia-Pacific developing economies. East and North-East Asia is the source and recipient of most of the FDI flows from the region. FDI flows to and from Pacific Islands and South and South West Asia, while they have grown since 1996, remain very small. Interestingly, South-East Asia FDI seems to be directed not only towards itself but also to East and North-East Asia as well as, increasingly, to South and South West Asia.

Figure 1: FDI flows among Developing Asia and the Pacific countries



Source: Authors, based on bilateral FDI inflows from UNCTAD.

Note: the figure shows how each Asia-Pacific subregion (x-axis) receives FDI flows from its own as well as other subregions. **East and North-East Asia** consists of China, Hong Kong, Mongolia and Republic of Korea; **South-East Asia** consists of Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, and Viet Nam; **South and South-West Asia** consists of Bangladesh, Iran, Maldives, Nepal, Pakistan, Sri Lanka, and Turkey; Pacific Islands Economies consists of Fiji, Papua New Guinea, and Vanuatu

Impact of Trade Facilitation on FDI: Data and methodology

In this section, we develop an empirical model of FDI to evaluate the significance of trade facilitation factors on FDI and to examine the importance of these factors.

A. Model Specification

Our baseline gravity model of FDI is as follows:

$$(M0): fdi_{ijt} = b_0 + b_1 \ln(gdp_{it}) + b_2 \ln(gdp_{jt}) + b_3 \ln(dist_{ij}) + b_4 (contig_{ij}) + b_5 (comlang_{ij}) + b_{16}(RFE_{ij}) + e_{ijt}$$

for host country i , source country j at year t where

fdi denotes FDI flows.

gdp denotes Gross Domestic Product

$dist$ denotes distance between 2 countries

$contig$ denotes existence of contiguity (common border) between 2 countries

$comlang$ denotes existence of common official language between 2 countries

RFE denotes relative factor endowment

RFE inclusion in the model follows Kleinert and Toubal (2010). RFE is defined as the ratio of skilled labor in country i to total skilled labor in both source and host countries over the unskilled labor country i to total unskilled labor in both source and host countries.⁸ The ratio is used to measure whether a host country has relatively more (or less) endowment in skilled rather than unskilled labor. Differences in labor endowments across countries are expected to significantly affect FDI flows, as firms develop international production networks (vertical FDI), breaking down the production process in different stages and moving production of intermediate goods requiring unskilled labor to countries where this type of labor is cheaper and more abundant.⁹

However, the viability of international production networks not only depends on whether cheaper factors of production can be accessed overseas, but also on how efficiently – cost effectively - intermediate goods can be moved in and out of the countries where they are being processed before being assembled into final goods. International trade transaction costs can therefore be expected to be crucial determinants of vertical FDI in this context. We therefore extend the above empirical model by incorporating various trade cost components, including tariff and trade facilitation related indicators.

Two different models are developed to account for trade costs and facilitation effects in FDI gravity models. The first model (Model M1) incorporates the non-tariff and tariff cost components of the ESCAP-World Bank international trade cost measure.¹⁰ Bilateral trade costs excluding tariff (NTC) between source and host country are included in the models, as well as the average NTCs between host country and the rest of the world, where the world is proxied by the 3 largest world importers.¹¹ Similarly, bilateral average tariffs between source and host countries are included in the model M1, as well as average tariff of host countries with the rest of the world. Finally, indicators of ease of doing business (i.e., Distance to Frontier from the World Bank Doing Business Database) in host countries are included in the model – capturing behind-the-border trade and investment facilitation, including domestic taxes and institutional factors highlighted by Blonigen (2005).

In model M2, all NTC variables are replaced by factors related to underlying international trade cost components, i.e., maritime transport connectivity of the host country with the source country as well as with the rest of the world, internet users per 100 people – as a proxy of ICT access and use-, and exchange rate volatility.¹²

Expected signs of all explanatory variables are shown in table 6. Income group and year fixed effects as well as source country fixed effects are included in models M1 and M2.

The specification of the 3 augmented gravity models of FDI is provided below:

⁸ Let S be skilled labor, L be unskilled labor. RFE_{ij} is defined as $RFE_{ij} = (S_i/(S_i+S_j))/(L_i/(L_i+L_j))$.

⁹ See Braconier et al. (2005) for more details.

¹⁰ Details on the decomposition of the ESCAP-World Bank international trade cost measure into a tariff and a non-tariff component is available in Duval and Utoktham (2011). The tariff cost component is the geometric average of the average import tariff rates imposed by country i and j on each other.

¹¹ As discussed in Arvis et al. (2013), using a small defined set of countries for which bilateral data are widely available is preferable to using a world simple average subject to composition effects. The largest world importers are China, Germany and the United States. They together account for approximately 30 percent of world imports.

¹² Tomlin (2000) uses both exchange rate growth and standard deviation in the model. Teneyro (2007) uses volatility. Volatility is defined as: $v_{ijt} = SD[\ln(e_{ijt,m}) - \ln(e_{ijt,m-1})]$, $m=1, 2, \dots, 12$, where SD stands for standard deviation, e denotes exchange rate between country i and j at year t .

$$(M0): fdi_{ijt} = b_0 + b_1 \ln(gdp_{it}) + b_2 \ln(gdp_{jt}) + b_3 \ln(dist_{ij}) + b_4 (contig_{ij}) + b_5 (comlang_{ij}) + b_6 (RFE_{ij}) + e_{ijt}$$

$$(M1): fdi_{ijt} = b_0 + b_1 \ln(gdp_{it}) + b_2 \ln(gdp_{jt}) + b_3 \ln(dist_{ij}) + b_4 (contig_{ij}) + b_5 (comlang_{ij}) + b_6 (RFE_{ij}) + b_7 \ln(\text{geometric_avg_tariff}_{ijt}) + \ln(\text{tariff}_{j\text{wt}}) + b_9 \ln(d2f_{jt}) + b_{10} \ln(ntc_{ijt}) + b_{11} \ln(ntc_{j\text{wt}}) + e_{ijt} \quad b_8$$

$$(M2): fdi_{ijt} = b_0 + b_1 \ln(gdp_{it}) + b_2 \ln(gdp_{jt}) + b_3 \ln(dist_{ij}) + b_4 (contig_{ij}) + b_5 (comlang_{ij}) + b_6 (RFE_{ij}) + b_7 \ln(\text{geometric_avg_tariff}_{ijt}) + \ln(\text{tariff}_{j\text{wt}}) + b_9 \ln(d2f_{jt}) + b_{11} \ln(\text{lsbci}_{ijt}) + b_{12} \ln(\text{lsbci}_{j\text{wt}}) + b_{13} \ln(\text{intusers}_{jt}) + b_{10} (\text{volatility}_{ijt}) + e_{ijt} \quad b_8$$

Table 6: Variable Descriptions, Data Sources and Expected Signs

Variable	Unit	Expected Signs	Source	Description
fdi_ij	US Dollar		OECD iLibrary/UNCTAD	Foreign direct investment flows from host country i to source country j
gdp_i	US Dollar	+	WB-WDI	Gross domestic product of host country i
gdp_j	US Dollar	+	WB-WDI	Gross domestic product of source country j
dist	Kilometer	-	CEPII	Distance between host country i and source country j
contig	-	+	CEPII	Dummy variable indicating 1 if 2 countries share common border, 0 otherwise
comlang_off	-	+	CEPII	Dummy variable indicating 1 if 2 countries share common official language, 0 otherwise
rfe_i	-	+	Author's calculation from ILO database	Relative factor endowment (see definition in main text)
ntc_ij	Percent	-	Author's calculation based on ESCAP-WB Trade Costs Database	Tariff-equivalent trade cost, excluding tariff. Based on Anderson and van Wincoop (2004), it is calculated by: $((1+\text{trade costs})/((1+\text{geometric_avg_tariff})-1)-1)*100$
ntc_iw	Percent	-	Author's calculation based on ESCAP-WB Trade Costs Database	Tariff-equivalent trade cost, excluding tariff of source country with 3 main importers (China, Germany, USA)
tariff_ij	0.0001+percent	-	Author's calculation based on TRAINS	Geometric average tariff of host country i charging on importation from source country j and tariff of host country j charging on importation from source country i
tariff_iw	0.0001+percent	-	TRAINS (accessed through WITS)	Simple average tariff of host country i charging on importation from the rest of the world
d2f_i	Score (0-100)	+	WB Doing Business	Ease of doing business index: distance to frontier of host country i
volatility_ij	-	+	Author's calculation based on IMF-IFS data	Exchange rate volatility (see definition in main text)
lsbci_ij	Index	+	UNCTAD's LSBICI-Version 1	Liner Shipping Bilateral Connectivity Index between host country i and source country j
intusers_i	Users/100 people	+	WB-WDI	internet users per 100 people of host country i

B. Data and model estimation

Data sources for all variables are provided in table 6. As explained earlier, bilateral FDI flows among OECD countries (North¹³-North) as well as between OECD countries to developing countries (North-South) is obtained from OECD iLibrary database, while bilateral data on FDI among developing Asian countries (South-South) is obtained from UNCTAD.¹⁴ Combined data includes 63 source countries and 152 host countries, resulting in an unbalanced FDI dataset of 20,000 bilateral FDI flows from 2006 to 2011.¹⁵ The study treats missing values as missing and zero and negative foreign investment data as zero. Indeed, while there is a possibility that missing value is either unreported FDI (non-zero values) or zero value,¹⁶ assuming that unreported FDI is zero might lead to biases in the estimation of the model. Negative bilateral investment data in turn indicate that no foreign investments from a given source country into a host country has taken place, making it sensible to treat the negative values as zero.

Labor data for constructing RFE, which is specific to the vertical FDI model, is obtained from International Labor Organization Statistics (<http://laborsta.ilo.org>). Labor data is defined under International Standard Classification of Occupations (ISCO) in this study. Skilled labor is defined as occupation group 0/1 (professional, technical and related workers) and group 2 (administrative and managerial workers) in ISCO-1968. When a country uses ISCO-88, occupational group 1 (legislators, senior officials and managers), group 2 (professionals) and group 3 (technicians and associate professionals) are used. This skilled/unskilled labor definition follows that of Braconier, Norbäck and Urban (2005).

GDP in current US dollar and internet users per 100 people are obtained from the World Bank's World Development Indicators. Geographical distance between most populated cities (in kilometers), contiguity and bilateral common language dummy variables are obtained from CEPII (<http://www.cepii.fr>). Data on exchange rate growth and volatility is obtained from International Financial Statistics, International Monetary Fund (IFS-IMF). Since the exchange rate from the source is in local currency per US dollar, the study transforms it to be bilateral exchange rate by dividing local currency per US dollar of source country by local currency of host country.

Tariff data is from UNCTAD's TRAINS database, downloaded through WITS: World Integrated Trade Solutions (<http://wits.worldbank.org>). Trade cost, excluding tariff indicator is based on the ESCAP-World Bank Trade cost database from Arvis, Duval, Shepherd and Utoktham (2013).¹⁷ Ease of doing business index (distance to frontier) is downloaded from Doing Business (<http://www.doingbusiness.org>). Cross-border proxy, liner shipping bilateral connectivity index (LSBCI), is from the UNCTAD database's LSBCI version 1, which is available upon request.

The models are estimated using pseudo-poisson maximum likelihood (PPML). This method, introduced by Silva and Tenreyro (2006), solves several problems related to estimation of

¹³ Republic of Korea is also a member of the United Nations and ESCAP, where it is listed among developing countries. Therefore, in this analysis, Republic of Korea is included in the "South" group of countries rather than the "North" group – which brings together all other OECD Members.

¹⁴ The data is available upon request.

¹⁵ An important feature of this dataset is that it does not include bilateral FDI flows from developing countries to developed countries (South-North). Data for 2007 is dropped due to missing data on liner shipping bilateral connectivity index in that particular year.

¹⁶ Zero and negative values of investment are approximately 50% of the non-missing data in FDI data from 1995-2010.

¹⁷ The data is available both on the World Bank website (<http://data.worldbank.org/data-catalog/trade-costs-dataset>) and the ESCAP website (<http://www.unescap.org/tid/artnet/trade-costs.asp>).

gravity models. In particular, it takes zero investment flows into account and is unbiased when heteroskedasticity exists. Because of limited availability of data for several explanatory variables and the need to focus on recent FDI flow patterns, all models are estimated using data from 2006 to 2011. Year and income group fixed effect based on GNI per capita (using World Bank Atlas method) are included in all the models.¹⁸ Summary of source and host countries and summary of statistics as well as correlation coefficients, and regression results are available in Appendix.

Impact of Trade Facilitation on FDI: Gravity model results and counterfactual simulation

A. Overall findings

This section starts by discussing the gravity model results when the full dataset of FDI flows from developing and developed countries is used. Results when model estimation is restricted to South-South FDI flows is presented next, followed by a simulation of the particular NTC in model (M1).¹⁹ The positive effect of a common language between partners on FDI inflows remain when the models are extended, highlighting the importance of “cultural distance” in attracting FDI.

Estimation results from Model (M1) suggest that, excluding tariffs, bilateral trade costs (NTC) between source and host countries have a significant effect on FDI. Tariffs are also found to have a negative effect on FDI, with results suggesting that a host country’s general openness to trade may be more important to foreign direct investors than receipt of bilateral preferential market access. More generally, it supports the finding of Tekin-Koru (2009) and others that there is no evidence of quid pro quo FDI (tariff-jumping FDI), i.e., trade and investment are generally complementary.

In both models (M1) and (M2), the host country domestic business environment has a strong positive effect on FDI. However, access and affordability of modern information and communication technologies (ICT) – proxied by the number of internet users per 100 people – is not found to be significant across the models. Exchange rate effect on FDI is also not found to be statistically significant (exchange rate volatility). The latter result may be explained by the fact that tools are increasingly available for international investors to hedge against exchange rate risks.²⁰

RFE is found to have a positive and generally significant effect on FDI inflows, except in model M2, where the RFE is positive but not statistically significant. These results provide some support for the growing importance of vertical FDI, where source countries with highly skilled labor invest in host countries with relatively more unskilled labor as part of development of international production networks.²¹

¹⁸ The groups are: low income, \$1,025 or less; lower middle income, \$1,026 - \$4,035; upper middle income, \$4,036 - \$12,475; and high income, \$12,476 or more. Since the data is unbalanced panel data for both source and host countries, income group is used instead of particular country’s fixed effect to at least capture more balanced variation within income group.

¹⁹ Correlation coefficients between trade costs (excluding tariff) and distance are less than 0.6.

²⁰ See Del Bo (2009).

²¹ RFE is significant in M0 and M1.

Bilateral cross-border trade connectivity, as proxied by UNCTAD bilateral LSCI, exhibits a very significant and positive relationship with FDI. This suggests the strong preference of foreign investors for locations that have good transport and logistics linkages to their (source) country.

Based on model (M1), we find that a 1 percent decrease in bilateral trade costs excluding tariff (NTC) lead to approximately 0.8 percent increase in FDI inflows. In model (M2), a 1 percent increase in bilateral LSCI results in a 0.6 percent increase in FDI flows. In contrast, a 1 percent improvement in the domestic business environment indicator of the host country increases FDI inflows by more than 4.3% in model M2. These results confirm the importance of trade costs and connectivity in general in attracting FDI, but also highlight the essentiality of a conducive business regulatory environment in the host country.

The results presented above are based on data from all developed and developing countries considered in this study - and for which data was available. It is interesting to impact of trade facilitation improvements on FDI.

As shown in table A4, the standard gravity variables in the baseline model (M0) exhibit expected signs. GDP (economy size) and sharing of a common language positively affects FDI, while distance has a negative effect on FDI. All variables in the baseline model are statistically significant, except for sharing of a common border (contiguity). The effect of distance on FDI loses its statistical significance when the model is extended. This may be explained by the fact that geographic distance between partners in (M0) was a proxy for other factors now included directly in the extended models, in examine how results change when only developing country investment flows are included in the estimation.

B. South-South FDI and Trade Facilitation

As shown in table A5, when only South-South FDI flows are considered (i.e., between developing Asian countries), significant differences emerge. Contiguity (common border between source and host country) and geographic distance are found to be much more important factors in the case of South-South FDI flows. The importance of liner shipping connectivity becomes more limited, but the quality of business environment remains important. Internet usage and exchange rate volatility remain insignificant.

The level of import tariff between source and host country is not significant. At the same time, the strong negative relationship between host countries import tariff on the rest of the world and FDI inflows remain. Excluding tariffs, the importance of low bilateral trade costs between host and developing country remain.²²

Together with the other findings, these results suggest that developing country investors, presumably from upper middle-income countries, are trying to gain or maintain a competitive

²² At the same time, however, the weakly significant positive relationship between FDI inflows and average trade costs of host country with the main world importers (China, Germany and the USA) in the context of South-South FDI, suggest that developing country investors may sometime prefer to invest in countries whose market are difficult to access for other investor and traders.

advantage by investing in neighboring countries with lower production (labor) costs and different endowments. While these investors attach importance to bilateral trade costs and the domestic business environment in the host country, convenience of proximity and cultural ties matter most.

C. Impact of trade facilitation improvements on FDI: a counterfactual simulation

To better understand how FDI flows would change as a result of reductions in trade costs or other trade facilitation related improvements, we conduct a counterfactual simulation in which the trade costs and other trade facilitation factors of below-average developing countries are brought to the developing country average. Average changes to trade costs and related trade facilitation indicators in developing countries implied in the simulation are reported table 7, along with impact on FDI flows.

Table 7: Counterfactual simulation of trade facilitation improvements in FDI Host Countries

Area of Improvement (in host countries)	All-country		Asia-Pacific	
	Implied average change in developing countries (percent)	Average impact on bilateral FDI flows (percent)	Implied average change in Asia-Pacific developing countries (percent)	Average impact on bilateral FDI flows (percent)
Bilateral trade costs between host and source country, excluding tariff	-12%	16%	-14%	20%
Bilateral tariff of host country on source country	-14%	1%	-20%	1%
Average tariff of host country on trade partners	-20%	4%	-28%	6%
Doing business score	7%	42%	10%	61%
Bilateral liner shipping connectivity index	122%	39%	61%	27%

Notes: the impacts from simulated improvements are based on models M1 for trade costs, and models M2 for tariffs, internet users, and bilateral LSCI (see table A4). Asia-Pacific refers to all the developing countries member of the UN Economic and Social Commission for Asia and the Pacific (ESCAP) for which data was available (see table A1).

As shown in table 7, the simulation does not imply very large changes in either tariff or other trade costs across developing countries. However, the 28% reduction in average tariff across the Asia-Pacific region only results in a 6% increase in FDI inflows. In contrast, the simulated 14%

average reduction in non-tariff trade costs across the region increases FDI flows to Asia-Pacific by 20%.

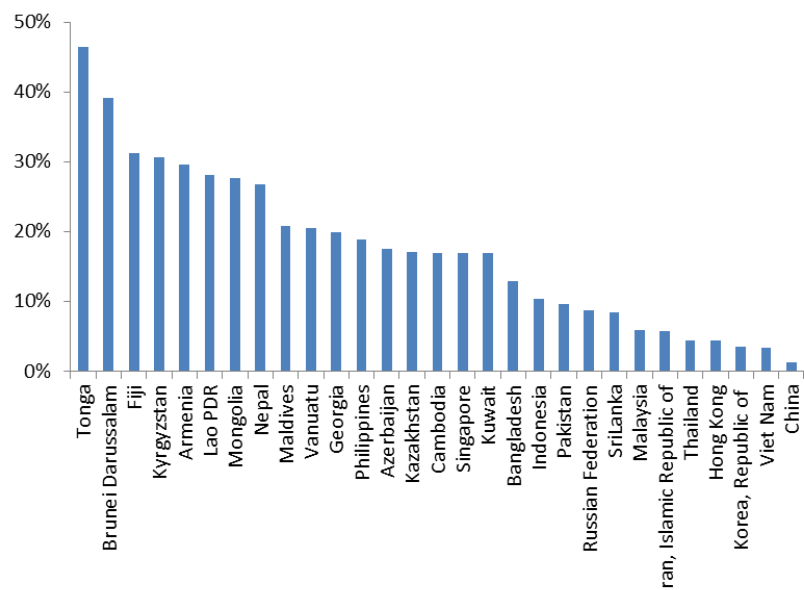
Not unexpectedly, improving quality of the business environment in the host country seem to be the most effective way to increase FDI inflows, with the simulated 10% average improvement in business environment in the Asia-Pacific region resulting in a 61% increase in FDI flows.

In contrast, increasing FDI by enhancing seaport connectivity seems to be less promising and certainly challenging. Gaps between developing countries in these 2 areas seem to be very wide, as evidenced by the large average changes in LSCI index implied by the simulation (122% up as shown in table 7). Closing the liner shipping connectivity gap is not feasible over a short-term horizon and without massive investment in hard infrastructure. Therefore, improving the quality of business environment and focusing on making administrative trade procedures simpler and more transparent would seem to provide higher return on investment in terms of attracting FDI.

It is important to look beyond regional or global averages, however, as countries are affected differently depending on how far they are from the global developing country average. Figure 2 and 3 show the impact on FDI in different host countries as a result of improving to the global developing country average. Figure 2 suggests that focusing on reducing bilateral trade costs with its source country may be a pertinent strategy for most developing host countries aiming at increasing FDI inflows.

Figure 3 in turn suggest that different countries have to set different priorities when reducing trade costs. For example, Cambodia may best focus on enhancing quality of business environment, while Vanuatu may focus on enhancing port connectivity.

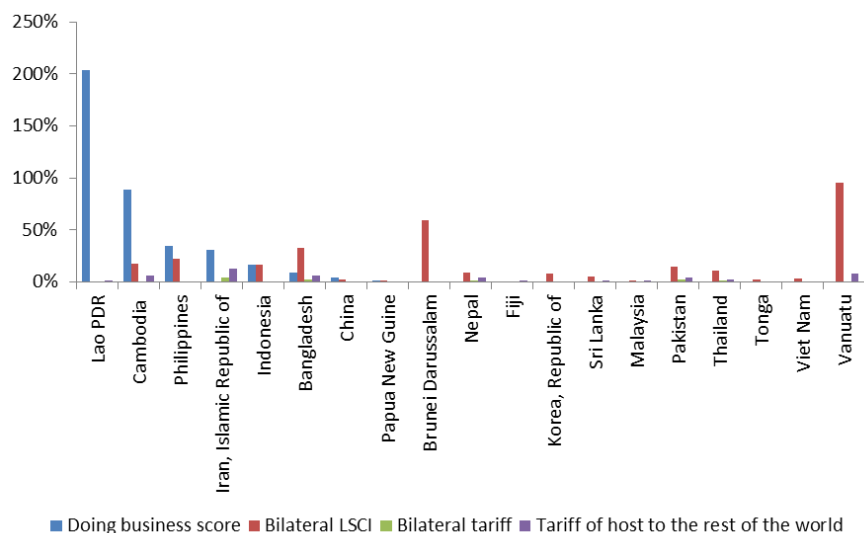
Figure 2: Impact of trade cost improvements on FDI in selected Asia-Pacific Countries



Note: this shows the percentage increase in FDI flows to a host country when that host country reduces its trade costs to the global developing country average. The impacts are calculated based on model M2.

Source: Authors

Figure 3: Impact of tariff reduction and increase use trade facilitation and tariff in developing economies on their FDI flows, by host countries: ESCAP members



Note: this shows the percentage increase in FDI flows to a host country when that host country reduces its trade costs to the global developing country average. The impacts are calculated based on model M3.

Source: Authors

Conclusions

This paper applied an augmented FDI gravity model framework to determine the effect of comprehensive international trade costs and related factors and components on FDI flows. The results showed that international trade costs of both a non-tariff and tariff nature are important determinants of FDI inflows. International trade costs and the various trade cost components and factors examined in this study were found to be negatively related to FDI inflows, confirming that FDI and trade may best be seen as complements rather than substitutes when designing investment policy frameworks.

Although, as often pointed out in advocacy material related to trade facilitation, the importance of reducing international trade costs was found to be important, the quality of the business environment in the host country was confirmed to be an essential driver of FDI inflows. This also generally held true for South-South FDI, although it appeared that proximity and cultural similarities were key factors for FDI between developing countries. Overall, the results provide further support for implementation of coordinated trade and investment policies, such as measures aimed at reducing the costs associated with importing and exporting intermediate goods and services linked to FDI in priority sectors identified in the national development strategy.²³

While the strong link between FDI and trade costs was found to be generally robust across the various models, data samples and estimation methods, used in the course of our analysis, further research would be useful to confirm the results and estimates on the impact of various trade costs component and factors on FDI. In particular, augmenting the bilateral FDI data used in this study and testing the significance of alternate indicators of connectivity and trade facilitation (e.g., the logistics performance index) may be pursued. Nonetheless, these findings provide evidence of a strong link between trade facilitation and FDI.

²³ See also, Anukoonwattaka (2011).

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Appendix

Table A1: Summary of Source and Host Countries of FDI in 2006-2011 (based on M3)

Host		Source			
Australia	Malaysia	Algeria	Eritrea	Lithuania	Slovakia
Bahrain	Mexico	Antigua and Barbados	Estonia	Macedonia	Slovenia
Bangladesh	Mongolia	Argentina	Fiji	Madagascar	South Africa
Belgium	Nepal	Armenia	Finland	Malaysia	Spain
Brunei Darussalam	Netherlands	Australia	France	Maldives	Sri Lanka
Cambodia	Norway	Azerbaijan	Georgia	Mauritius	St. Lucia
Canada	Oman	Bahamas, The	Germany	Mexico	Suriname
Chile	Pakistan	Bahrain	Greece	Moldova	Sweden
China	Papua New Guinea	Bangladesh	Grenada	Mongolia	Switzerland
Czech Republic	Philippines	Belgium	Guinea	Morocco	Syrian Arab Rep.
Denmark	Poland	Belize	Guyana	Namibia	Tanzania
Estonia	Portugal	Bolivia	Honduras	Nepal	Thailand
Fiji	Qatar	Botswana	Hong Kong	Netherlands	Tonga
Finland	Saudi Arabia	Brazil	Hungary	New Zealand	Trinidad and Tobago
France	Singapore	Brunei Darussalam	Iceland	Nicaragua	Turkey
Germany	Slovenia	Bulgaria	Indonesia	Norway	Uganda
Greece	Spain	Cambodia	Iran	Oman	Ukraine
Hong Kong	Sri Lanka	Canada	Iraq	Pakistan	United Arab Emirates
Hungary	Sweden	Chile	Ireland	Panama	United Kingdom
Iceland	Switzerland	China	Israel	Papua New Guinea	United States
Indonesia	Syrian Arab Rep.	Colombia	Italy	Paraguay	Uruguay
Iran	Thailand	Costa Rica	Jamaica	Peru	Vanuatu
Ireland	Tonga	Croatia	Japan	Philippines	Venezuela
Israel	Turkey	Cyprus	Kazakhstan	Poland	Viet Nam
Italy	United Arab Emirates	Czech Republic	Korea, Rep. of	Portugal	Yemen
Japan	United Kingdom	Denmark	Kuwait	Qatar	Zambia
Korea, Rep. of	United States	Dominica	Kyrgyzstan	Romania	Zimbabwe
Kuwait	Vanuatu	Dominican Republic	Latvia	Russian Federation	
Lao PDR	Vietnam	Egypt	Lebanon	Saudi Arabia	
Lebanon	Yemen	El Salvador	Lesotho	Singapore	

Table A2: Summary of Statistics

	No. of observation	Unit	Mean	Standard deviation	Minimum	Maximum
Time-variant bilateral data						
fdi_ij	20,540	US Dollar	270,853,550.00	2,325,928,651.00	0.00	108,598,362,112.00
rfe_i	87,786		1.40	2.10	0.01	97.00
ntc_ij	51,686	percent	241.00	138.00	6.20	1,368.00
tariff_ij	131,613	percent	8.30	11.00	0.00	1002.00
volatilityij	152,600		0.043	0.37	0	7.8
lsbci_ij	165,958	index	6.90	9.40	0.00	118.00
Time-invariant bilateral data						
dist	36,672	kilometer	8,238.00	4,600.00	60.00	19,904.00
contig	36,672		0.02	0.12	0.00	1.00
comlang_off	36,672		0.17	0.37	0.00	1.00
Country-specific data						
gdp_i/gdp_j	890	US Dollar	333,758,154,261.00	1,263,983,785,446.00	22,820,838.00	14,991,300,000,000.00
ntc_jw	571	percent	156.00	72.00	31.00	548.00
tariff_jw	852	percent	8.90	6.00	0.00	29.00
d2f_j	867	score (0-100)	58.00	13.00	27.00	92.00
intusers_j	903	users per 100 people	31.00	27.00	0.00	97.00
lsbci_jw	830	index	7.70	5.70	0.16	28.00

Table A3: Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) fdi_ij	1.0000														
(2) ln_gdp_i	0.1181	1.0000													
(3) ln_gdp_j	0.1931	-0.0923	1.0000												
(4) rfe_i	-0.0092	-0.2180	0.0628	1.0000											
(5) ln_ntc_ij	-0.2362	-0.1954	-0.5600	0.1290	1.0000										
(6) ln_ntc_iw	-0.0977	-0.6136	0.0905	0.0891	0.3015	1.0000									
(7) ln_tariff_ij	-0.0597	0.0568	0.0328	0.0101	0.2561	0.0624	1.0000								
(8) ln_tariff_iw	-0.0617	0.0044	-0.0045	-0.1655	0.1404	0.2161	0.4414	1.0000							
(9) volatilityij	-0.0533	-0.0786	-0.0287	0.1086	0.2860	0.1155	0.3096	0.1229	1.0000						
(10) ln_dist	-0.0958	0.1549	-0.1467	0.1595	0.5663	-0.0483	0.4769	0.1591	0.3064	1.0000					
(11) contig	0.1531	-0.0312	0.1119	-0.0579	-0.3154	0.0142	-0.0924	0.0192	-0.1276	-0.3624	1.0000				
(12) comlang_off	0.1277	0.1080	-0.0938	-0.0493	-0.1021	-0.0629	-0.0109	-0.0095	-0.0518	-0.0046	0.1279	1.0000			
(13) ln_d2f_i	0.0798	0.3208	-0.0796	0.1291	-0.0438	-0.3995	-0.0883	-0.2364	-0.0301	0.1261	-0.0972	0.1219	1.0000		
(14) ln_intusers_i	0.0372	0.1890	-0.0633	0.1772	-0.0437	-0.3356	-0.2153	-0.3833	0.0543	0.0387	-0.1213	-0.0225	0.7189	1.0000	
(15) ln_lsbcij	0.1914	0.3616	0.3980	-0.1543	-0.4953	-0.3379	-0.0526	-0.1190	-0.1124	-0.1414	0.1156	0.0966	-0.0796	-0.0698	1.0000

Table A4: Regression – All countries

VARIABLES	(M0) Classic Gravity	(M1) host's side NTC	(M2) host's TF subindicators
ln_gdp_i	0.486*** [5.628]	0.473*** [5.061]	0.441*** [6.997]
ln_gdp_j	0.614*** [12.30]	1.396*** [2.688]	1.316*** [3.082]
ln_dist	-0.437*** [-4.819]	0.0896 [0.832]	0.0816 [1.095]
contig	-0.115 [-0.305]	0.00868 [0.0324]	0.428** [2.292]
comlang_off	1.218*** [7.412]	0.743*** [3.811]	0.913*** [5.953]
ln_tariff_ij		0.000242 [0.00864]	-0.0508** [-2.567]
ln_tariff_iw		-0.223*** [-4.198]	-0.154*** [-3.644]
ln_d2f_i		1.417* [1.676]	4.303*** [5.440]
ln_lsbcij			0.603*** [5.261]
ln_intusers_i			-0.362 [-1.594]
volatilityij			1.403 [0.339]
rfe_i	0.199*** [6.401]	0.214*** [3.165]	0.0527 [0.821]
ln_ntc_ij		-0.819*** [-2.938]	
ln_ntc_iw		0.136 [0.383]	
Constant	-7.979*** [-3.545]	-38.83*** [-2.621]	-51.82*** [-4.681]
Observations	13,771	9,368	12,159
Source's income group FE	Yes	Yes	Yes
Host's Income group FE	Yes	Yes	Yes
Year	Yes	Yes	Yes
Source FE	No	Yes	Yes
Host FE	No	No	No
Clustered SE	Country pair	Country pair	Country pair
Pseudo R-squared	0.191	0.415	0.572

*** p<0.01, ** p<0.05
t-stat. in square brackets

Table A5: Regression – South (host) – South (source)

(M0) (M1) (M2)

VARIABLES	Classic Gravity	host's side NTC	host's TF subindicators
ln_gdp_i	0.858*** [3.767]	1.267*** [7.083]	0.957*** [6.356]
ln_gdp_j	0.873*** [6.301]	1.186** [2.303]	2.299** [2.179]
ln_dist	-0.345 [-1.199]	-0.653*** [-4.839]	-1.033*** [-4.771]
contig	2.287*** [5.658]	1.367*** [5.188]	0.858** [1.983]
comlang_off	1.311*** [2.649]	1.439*** [3.556]	1.374*** [3.279]
ln_tariff_ij		0.0399 [0.739]	0.0439 [0.673]
ln_tariff_iw		-0.116*** [-2.998]	-0.165*** [-3.186]
ln_d2f_i		4.742*** [2.850]	2.665 [1.381]
ln_lsbcij			0.183 [0.600]
ln_intusers_i			-0.0189 [-0.0677]
volatilityij			-14.70 [-1.171]
rfe_i	0.212*** [2.647]	0.107 [1.911]	0.140*** [2.669]
ln_ntc_ij		-0.843** [-2.105]	
ln_ntc_iw		1.342 [1.682]	
Constant	-27.10*** [-3.249]	-65.25*** [-3.776]	-71.58** [-2.208]
Observations	1,264	565	1,002
Source's income group FE	Yes	Yes	Yes
Host's Income group FE	Yes	Yes	Yes
Year	Yes	Yes	Yes
Source FE	No	Yes	Yes
Host FE	No	No	No
Clustered SE	Country pair	Country pair	Country pair
Pseudo R-squared	0.849	0.994	0.930

*** p<0.01, ** p<0.05
t-stat. in square brackets

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