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The impact of Inward Foreign Direct Investment on international trade in Cambodia

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1. Introduction

Linkages between foreign direct investment (FDI) and trade have recently received much attention in the literature. FDI and trade are often considered as important factors enhancing economic growth and promoting economic integration with the outside world.

After the first-ever national election in 1993, sponsored by the United Nations, Cambodia started to open its economy more widely to the rest of the world by adopting market-oriented economy. Since then, foreign firms have launched value-adding projects through FDI in the country, and Cambodia's external trade has also noticeably increased. The gradual inflows of FDI and trade increase may partly be attributed to the fact that Cambodia has enjoyed political and macroeconomic stability as well as favourable economic growth. With the increased inflows of FDI and the marked expansion of international trade after the country's opening of the economy to the world, it is crucially imperative to investigate whether these are related so that policy implications can be drawn and recommendations can be formulated accordingly to promote these two business activities.

In a series of World Investment Reports, the United Nations Centre for Transnational Corporations (UNCTC, 1991)/the United Nations Conference on Trade and Development (UNCTAD, 1996), and United Nations (1993) indicated that foreign production through FDI and international trade are very likely to be related by comparing the global pattern of foreign direct investment with international trade patterns. An FDI-trade nexus is suggested by some foreign invested firms importing intermediate inputs for final production in the host country and exporting finished goods back to FDI-home country or to the third country markets. Some foreign direct investment projects may be specifically designed to take advantage of host country production conditions such as cheap low-skilled labour and the availability of cheaper resources in relative terms in order to export to home country markets.

FDI may tend to be concentrated in the industries with high trade intensity, and especially in the industries in which the recipient country has a comparative advantage in production. Wei and Liu (2001) examined for China whether or not intense FDI partners are also intense partners in trade and found that they were interrelated, and that FDI intensity made more substantial contributions to the relative level of China's exports than to China's imports. Min (2003) showed that there were positive effects of FDI on Malaysia's exports, using industry-specific and FDI-investing country data.

From the above it follows that foreign direct investment and international trade may well be closely related and interrelated. However, little, if any, is known about the interrelationship between FDI and international trade in Cambodia. However, a good understanding of this relationship is crucially important for FDI and trade promotion policy.

The remainder of this paper is organized as follows. Section 2 discusses the existing literature review on the theoretical linkages between FDI and trade. Section 3 provides evidence for FDI-trade linkages. Section 4 provides some basic relationship between FDI and trade in Cambodia.

2. Theoretical linkages between Foreign Direct Investment and International

Firms can service foreign markets by either launching international production via foreign direct investment or by exporting. Wei and Liu (2001) argued that international production-exports substitution might be reflected by separate theories explaining the patterns of FDI and international trade, respectively. In the recent literature, however, it was shown that FDI and trade are interrelated (UNCTC, 1991; UNCTAD, 1996; Dunning, 1998; Wei and Liu, 2001). with the discussion mainly focusing on whether FDI and trade are substitutes or complements for each other. Since Cambodia has become an FDI destination for more than ten years, an interactive relationship between the two business activities is investigated in this paper.

Neoclassical international trade theory explains international trade between countries using assumptions such as identical levels of technology, constant returns to scale, perfect competition, perfect mobility of production factors between sectors, absence of international mobility of production factors, and no transportation costs between trading countries. Initially developed by Heckscher (1919) and Ohlin (1933) with the above-mentioned assumptions, the so-called Heckscher-Ohlin (hereafter H-O) model suggests that a country has a comparative advantage in producing the product that uses relatively intensely its relatively abundant factors of production. It can be understood from this theory that a country tends to export the products that use relatively intensely the production factor the country is relatively well endowed with and tends to import the products that use relatively intensely the relative scarce factor. Usually goods have different factor requirements in their production, and countries may have different production factor abundance, such that a country will produce and export the products for which it possesses a comparative advantage and import the products for which it has a comparative disadvantage. Small countries, such as Cambodia, are more likely to be specialized and to depend more heavily on international trade, being not self-sufficient. Therefore, the volume of trade relative as a ratio of gross domestic product (GDP) is expected to be higher in small open economies than in larger ones.

The neoclassical assumptions of constant returns to scale, perfect competition, absence of transportation costs, identical levels of technology and perfect factor mobility in each country are likely to be violated seriously in the real world. With these strict assumptions, the H-O model is clearly not a good model to explain international trade flows in a world of imperfect competition, scale economies in production, and technological improvement/technology differences in production processes among different countries. Assuming scale economies and product differentiation, Krugman (1980) indicated that when two imperfectly competitive countries trade with each other, increasing returns to scale would provide them economies of scale, and that they benefit from trade even if the two economies have identical tastes, technology, and factor endowments. Gains from trade occur because the 'world' of these two economies produces greater varieties of goods than a country alone can. Moreover, the presence of economies of scale encourages large-scale production which is giving countries incentives to specialize and trade with one another. Helpman and Krugman (2002) showed that international specialization and trade would persist even though countries have identical relative factor endowments. When each country specializes in producing one or a few varieties of goods, larger-scale production may take place, giving rise to

specialization as a result of the use of more specialized labour and other inputs. This will lead to an increase in factor productivity and in trade in each country.

Trade can be classified into two main types: inter-industry trade (trade that exchanges products of one industry for the products of another) and intra-industry trade (two-way trade in similar products) (Krugman and Obstfeld, 2006). Therefore, international trade patterns, explained by H-O theorem, clearly belong to the former category. On the other hand, with economies of scale and imperfect competition, countries will produce differentiated products giving rise to intra-industry trade. This implies that the greater the differences in factor endowments among countries, the larger the inter-industry trade, and that intra-industry trade appears to be larger among countries of similar size and factor endowments (Wei and Liu, 2001).

The standard H-O theory discussed above is concerned with static comparative advantages, and it follows that the changes in the supplies of goods are driven by the changes in production factor endowments and other comparative static results (Dixit and Norman, 2000). Vernon (1966), on the other hand, developed the product-cycle theory, explaining dynamic comparative advantage. A new product-innovating country (e.g. the United States) initially has comparative advantage in producing the new product and will service foreign markets by exporting. Once production becomes routine, the innovating country is no longer a good location for production. Therefore, the innovating firm will move production to low-wage foreign affiliates via foreign direct investment to take advantage of its specific assets such as superior knowledge of producing and marketing its products. This paradigm subsequently describes the path of the innovating firm in becoming a multinational firm, which first begins as a local producer of its new products, then becomes exporter and finally is an investor in foreign countries. As a result, the product-cycle theory appears to explain the relationship between foreign direct investment and international trade.

As indicated above, the assumption of no transportation costs of transferring goods from one location to another in the H-O model appears to be violated in real life. Transportation costs directly influences international trade patterns by affecting the prices of goods in both exporting and importing countries, and indirectly by affecting international production location and industry (Savatore, 2004). Savatore (2004) argues that transportation costs are negatively related to international trade in that they reduce the level of specialization, the volume of trade as well as the gains obtained from international trade. Similarly, transaction costs may affect international trade by influencing the locational advantage. For instance, resource-seeking industries are likely to locate near the source of inputs to avoid transportation costs. This evidently suggests that transportation costs and international trade are inversely related and that the opposite holds for transportation costs and resource-seeking FDI.

In a series of publications, Dunning (1981, 1988, and 1998) developed the well-known OLI theory (Ownership advantage, Location advantage and Internalization advantage) to explain a firm's decision to become a multinational. According to the OLI theory, a firm undertakes international production via foreign direct investment if the three above conditions are satisfied. For instance, a firm will engage in

international production when it is beneficial to internalize the use of its specific advantages through an extension of its own production activity abroad rather than to sell these advantages through licensing or contracts with other independent firms.

UNCTD (1996) and Wei and Liu (2001) indicated, since substantial amounts of international trade and FDI are taking place among countries with similar factor endowments, international trade flows explained by comparative advantage and relative factor endowments in the H-O model seems to have weaker explanatory power. But, FDI activities may reflect the factor endowments in home and host countries.

Nachum, Dunning and Jones (2000) have provided a detailed overview of various relationships between FDI and comparative advantage. When firms can invest abroad to gain access to resources that are not available, or available in less favourable terms in the home country, they steer away from their home countries activities which require immobile resources in which the country is comparatively disadvantaged, but can be performed competitively in other countries, using their firm-specific advantages. This motivation implies that FDI takes place in industries in which the home country of the investing firms is comparatively disadvantaged. In other words, outward FDI will take place in industries in which the home country is comparatively disadvantaged, and inward FDI will be concentrated in industries in which the host country is relative well endowed with the industry-specific resources.

For instance, export-oriented FDI may seek to move production facilities to another location as the relative costs of production factors in home countries increases. Market-seeking investment is undertaken to service foreign markets previously served by exports. The motivation behind this type of investment may partly be due to high trade costs such as tariff rates and transportation costs, and to the preferences of firms to be close to their clients in order to serve them more effectively. Efficiency-oriented FDI seeks to exploit the advantages of internationally integrated production, and is less influenced by factor endowments. Strategic asset-seeking FDI is taking place to exploit the benefits of producing in several foreign countries and to advance the company's overall strategic position in international markets (Dunning, 1998). Therefore, the relationship between FDI and the comparative advantage is clear-cut.

Petri (1994) argues that both FDI and trade flows are affected by common determinants such as market size, income, and international transaction costs that are positively correlated with distance. However, some of the international transaction costs may affect FDI and trade flows differently as both flows involve different types of transaction costs (Wei and Liu, 2001). For instance, trade flows are more likely to rise as cross-border transportation cost is reduced, while FDI flows are induced by the relative ease of operations in the host country (Petri, 1994). However, some of the most important costs facing investors and traders are similar: both need familiarity with foreign economic institutions and business practices.

Based on the overview above, FDI and international trade can be either substitutes or complements. Pontes (2004) shows that the FDI-trade relationship depends on trade costs. FDI and trade are complements if trade costs are high, and they are substitutes if trade costs are low. When trade costs are high, it may be beneficial for MNC to set up production subsidiaries abroad and import the necessary

inputs. However, when trade costs are reasonably low, it pays to service foreign markets by exporting to avoid the fixed costs of setting up a foreign subsidiary.

International trade flows are expected to be correlated with the degree of international specialization, which in turn is positively related to relative production factor endowments among countries, as the Heckscher-Ohlin model predicts (see e.g., Helpman and Krugman, 2002). If there are no substantial differences in factor endowments, a more capital-rich country will locally produce capital-intensive differentiated goods, and will trade them for labour-intensive goods from a foreign country that is more endowed with labour. But if differences in factor endowments are large, the capital-rich country tends to export headquarters services, such as production techniques; to labour-abundant countries in return for varieties of finished differentiated and labour-intensive goods rather than simply export differentiated goods (Wei and Liu, 2001). In this case, FDI is a complement to trade. Parent firms may also export intermediate inputs to their vertically-integrated subsidiaries abroad, which in turn export resource-based products to the home country.

Assuming similarity about market size, production technologies and factor endowments, Brainard (1993) and Markusen and Venables (1996) have proposed a model that distinguishes between economies of scale at plant and firm levels, and allows for trade barriers such as tariffs and transportation costs. They have shown that locational choice by MNCs depends mainly on the trade-off between proximity advantages and economies of scale brought about by concentrating production in a single location. With proximity advantages, firms may have an incentive to engage in production abroad in order to bypass trade barriers imposed by a host country. If the proximity advantages exceed concentration advantages from producing in only one location, firms will choose to supply foreign markets by setting up a production subsidiary rather than to export finished goods. This implies that FDI is a substitute for trade. However, if firms have multiple stages of production and concentration advantages dominate in upstream production activities, while proximity advantages dominate in downstream production, the activities of MNCs are complementary to trade (Brainard, 1993).

Moving beyond Brainard (1993). Markusen and Venables (1998) and Markusen (1998, 2002) have introduced a model with an emphasis on asymmetries among countries in explaining the firms' choice between international trade and FDI. Normally firms have an incentive to be located in the advantaged countries rather than the disadvantaged ones. But when the disadvantaged countries improve in terms of local market size, factor endowments and technological capability, firms previously located in the advantaged country will tend to establish subsidiaries in the disadvantaged countries with prospects of economic development. Brainard (1997) indicated that MNC activities are more likely to take place when home and host country markets are more similar. This implies that trade and FDI are substitutes.

As several factors such as size of markets and relative factor endowments are believed to affect both FDI and international trade, Wei and Liu (2001) argue that it may be difficult to predict the relationship between the two business activities when the host country grows in terms of GDP towards the level of the FDI-home country. Trade will tend to increase as a result of the larger size of the markets of home and

host countries. Therefore, world trade is likely to be higher even if some increased amount of trade is partly offset by FDI producing for host country markets.

The overview of the literature so far implies that the interactive relationships between trade and FDI are mixed in the sense that it is very difficult to predict whether FDI and international trade are substitutes or complements. To sum up, linkages between FDI and international trade depend on the type of FDI and trade, and on the conditions under which each of these two business activities occurs. Petri (1994) suggested that the sign of the relationship between FDI and international trade varies with the objective that motivates FDI. Market-oriented investments are attracted by the site-specific advantages of a market that may derive from buyer's characteristics such as wealth, or from natural or policy barriers which protect local producers. Production-oriented investments are attracted to a low-cost production country, which is endowed with plentiful resource, low-wage costs, etc. Trade-facilitating investments are motivated by the need to provide services, e.g. after-sales services, to exporting activities. It thus appears that market-oriented FDI is likely to substitute for trade, whereas production-oriented and trade facilitating FDI tends to increase trade. Yet, some authors indicate that market-seeking production affiliates can displace international trade and efficiency-seeking affiliates will increase the volume of trade (see Gray 1998).

3. Empirical evidence of FDI-International Trade linkages

In a number of empirical studies the relationship between foreign direct investment and international trade has been investigated. The results of these studies are not clear-cut: some studies have shown positive linkages between FDI and trade while others found the opposite. The different empirical results obtained from these studies may be partly due to the nature of available data (cross-section versus panel data) and partly to different econometric estimation methods. Using cross-sectional, firm-level data, Lipsey and Weiss (1981, 1984) found a positive relationship between output of U.S. firms in foreign subsidiaries and the firms' exports from the United States to these subsidiaries. In other words, a higher level of output by a U.S. firm leads to the higher firms' exports from the United States.

A similar result was obtained by Blomström, Lipsey and Kulchysky (1987) who estimated trade equations by OLS and 2SLS methods, using cross-sectional data from U.S. and Swedish firms, and found that the relationship between FDI and export sales was complementary. Put it differently, a higher level of Swedish affiliate production abroad was positively correlated with a higher level of Swedish exports to foreign subsidiaries. Pfaffermayr (1996) estimated a simultaneous equations model using time-series and cross-section industry-level data over a time period of 13 years from Austrian manufacturing, and also detected a complementarity relationship. Using panel data at provincial level, Chen (1999) and Zhang and Song (2000) showed that FDI had a positive impact on export performance in China. Wei and Lui (2001) used three-equation regression by taking into account the possible endogeneity problem to investigate whether intensive FDI partners are also intensive trading partners, and found that FDI intensity reinforces the intensities of imports and exports. Their findings were that trade intensity had a stronger impact on China's exports and imports, implying that FDI has significantly contributed to the improvement of the balance of trade in China.

Liu et al. (2001) examined the causal relationship between inward FDI and international trade using bilateral panel data for China and 19 home countries or regions during 1984-1998, and showed that China's import growth led to inward FDI growth from a home country/region, which in turn increased Chinese exports to the home country/region, and the export growth causing import growth.

Neak (2005) was probably the first to empirically study the links between FDI and international trade in Cambodia. Using bilateral trade (imports plus exports) as dependent variable and FDI stocks (cumulative FDI), along with other variables as explanatory variables, Neak concluded that FDI and international trade are complements in Cambodia as the coefficient of the FDI stock variable was statistically significant. However, the findings by Neak are grossly misleading, due to possible statistical and methodological shortcomings. Just to mention a few, firstly pooled OLS was employed, implicitly assuming that individual-country effects do not differ. This is a very strong assumption and is very unlikely to hold in real life. If these individual effects do in fact differ (which is likely), pooled OLS is by no means BLUE. Secondly, given correct estimation methods, the positive impact of FDI on total trade might not provide sufficient evidence about FDI-trade complementarity because even if FDI has no impact on exports but it has on imports, regression of total trade on FDI and other control variables may give a statistically significant coefficient for FDI. Thirdly, it does not seem to be appropriate to define the dependent variable (international trade) in current US dollars (which varies hand-in-hand with prices) while explanatory variables are in real terms, except the FDI stock variable.

Bayoumi and Lipworth (1997) used bilateral data on FDI outflows from Japan to twenty major trading partners during 1983-1995 to examine the relationship between FDI outflows and the patterns of Japan's international trade. Their findings suggested that FDI had only temporary impact on Japanese exports because new Japanese subsidiaries abroad imported capital goods from Japan, but that it permanently affected imports from overseas affiliates. The simulation results of this study showed that outward FDI may have increased merchandise imports by about 10 percent by 1995.

Pain and Wakelin (1998) explored the relationship between the location of production and the international trade performance of eleven OECD countries by using a panel data set at national level for 1971-1992. They found that outward FDI generally had a negative impact on international trade shares, while inward FDI had a positive impact. Using a panel data set on foreign activities (exports and foreign sales) of the U.S. processed food industry for ten developed countries over the 1982-1994 period, Gopinath, Pick and Vasavada (1999) found a substitution relationship between foreign affiliate sales and exports in the industry under investigation.

The above overview of their empirical literature seems to suggest that, on balance, FDI and international trade are more likely to have net complementary relationships. Using product-level data on trade and FDI for Japanese products in the United States for automobile parts and automobiles, Blonigen (2001) sorted out the complementary nature of trade between intermediate goods and affiliate sales on the one hand and the substitutability between exports of finished goods and FDI on the other, and found that exports of

intermediate goods and sales of affiliates are complements, while exports and the sales of finished goods are substitutes.

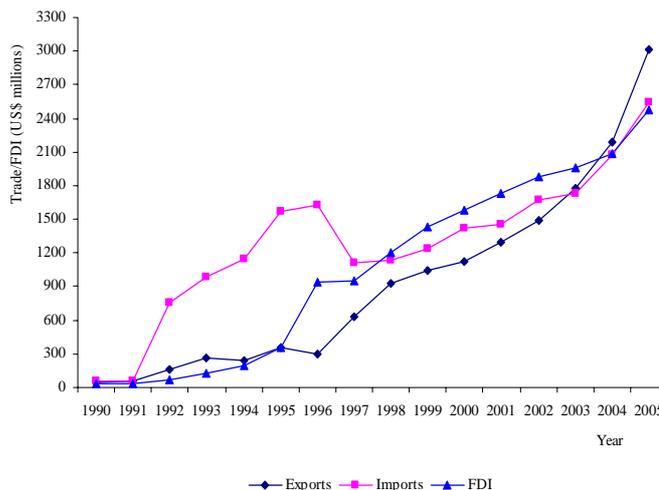
4. Stationarity tests, causality tests and estimation results

After the January 1979 Vietnamese-backed overthrow of the infamous genocidal Pol Pot regime, during which almost two million Cambodian people were killed, Cambodia was still at civil wars and even worse, was invaded by Vietnam, whose troops refused to leave Cambodia for a decade (Ear, 1995).⁵ The country's then-trading partners were mainly Vietnam and the former Soviet Union.

The first-ever national election in 1993 brought Cambodia peace and more political stability, in addition to regaining national confidence and recognitions from the international community. The Kingdom also started to undertake economic reforms with technical assistance from international institutions such as the World Bank and the International Monetary Fund, and opened her economy more widely to the rest of the world in terms of investment and trade. As a result, Cambodia became a destination of FDI, and the country's international trade also substantially expanded.

Figure 1 depicts Cambodia's pattern of international trade (imports and exports) and cumulative inward FDI during 1990-2005. In 1990, the country's exports, imports, and inward FDI were estimated at about 42, 56 and 38 million U.S. dollars, respectively. They increased sharply in 1994, and respectively reached about 3.01, 2.55, and 2.47 billion US\$ for exports, imports and inward FDI in 2005. Cambodia's rapid expansion of international trade and FDI is likely to be attributed to its adoption of liberalization policies with respect to these two economic activities. The positive growth of the country's international trade and inward FDI from the outside world may suggest that they are related (Figure 1).

Figure 1: Cambodia's total Exports, Imports and inward FDI during 1994-2005.



Source: Trade data are from IMF's Direction of Trade Statistics 2007, and FDI data are from the Cambodian Investment Board (CIB).

⁵ The Vietnamese occupation of Cambodia did not end until 1989.

To gain some insight into the linkages between bilateral trade and FDI in Cambodia and FDI-investing countries, international trade (import and export) and FDI intensities are constructed. Bilateral trade measures between countries or groups of countries were introduced by Brown (1949) and later appeared in Kojima (1964). Petri (1994). Wei and Liu (2001). Wu and Zhou (2006). among others. Petri (1994) has extended it to measure bilateral investment between two countries or between groups of countries. These indices are later employed by a number of authors (Wei and Liu, 2001, Wu and Zhou, 2006). Following Wu and Zhou (2006). export intensity and import intensity indices are defined as follows:

$$EXI = \frac{X_{cj} / X_{cw}}{M_{jw} / (M_w - M_{cw})} \quad (1)$$

and

$$IMI = \frac{M_{cj} / M_{cw}}{X_{jw} / (X_w - X_{cw})} \quad (2)$$

where:

EXI	=	Cambodia's export intensity index
IMI	=	Cambodia's import intensity index
X_{cj}	=	Cambodia's exports to country j
X_{cw}	=	Cambodia's total exports to the world
M_{cj}	=	Cambodia's imports from country j
M_{cw}	=	Cambodia's total imports from the world
M_{jw}	=	Country j 's total imports from the world
X_{jw}	=	Country j 's total exports to the world
M_w	=	World total imports
X_w	=	World total exports

Export intensity and import intensity (see equations 1 and 2) are the ratio of the share of Cambodia's trade with country j relative to the share of world trade destined for country j . A trade intensity of more (or less) than unity would indicate that trade between Cambodia and country j is more (or less) intensive than trade between other countries. Total trade (exports plus imports) intensity is defined in a similar way.

Similar to trade intensity, FDI intensity is defined as the ratio of the share of partner b in the investment of country a , to the share of country b in total world investment, excluding country a (Petri, 1994). Algebraically, the intensity of country a 's foreign direct investment in Cambodia is computed as:

$$FDII = \frac{I_{ac} / I_{aw}}{I_{wc} / (I_w - I_{wa})} \quad (3)$$

where:

$FDII =$	FDI intensity of country a in Cambodia
$I_{ac} =$	Country a 's FDI in Cambodia
$I_{aw} =$	World total outward FDI of country a
$I_{wc} =$	Total inward FDI of Cambodia from the world
$I_w =$	World total inward FDI
$I_{wa} =$	Total inward FDI of country a from the world

The numerator of equation (3) is the share of country a 's investment in Cambodia in total outward FDI of country a , and the denominator represents the share of total foreign investment in Cambodia in total world FDI. An FDI intensity index of more than unity indicates that Cambodia is relatively important to country a 's FDI.

Table 1: Average Trade and FDI Intensities over 1998-2005 between Cambodia and its Partners

Country	IMI	EXI	TI	FDII
Australia	0.63	0.11	0.41	0.76
Canada	0.04	0.41	0.22	0.07
China	1.95	0.70	1.42	16.06
France	0.66	0.48	0.58	1.96
Hong Kong	4.41	1.06	2.78	1.17
Indonesia	4.00	0.34	2.88	12.40
Japan	0.65	0.24	0.51	0.06
Korea	2.06	0.09	1.25	4.32
Malaysia	2.16	0.97	1.68	83.78
Singapore	5.78	3.41	5.11	8.80
Switzerland	1.17	0.17	0.81	0.15
Taiwan	4.09	0.61	2.56	9.99
Thailand	16.74	7.00	12.11	156.57
United Kingdom	0.16	1.29	0.67	0.36
United States	0.16	2.30	1.44	0.36

Notes: IMI, EXI, TI and FDII denote import, export, total trade intensity (imports plus exports), and FDI intensities, respectively. FDI data are from National Bank of Cambodia and trade data are from IMF's International Financial Statistics and Direction of Trade Statistics.

Source: Authors' own calculations.

Table 1 presents the average import, export, trade (import and export) and FDI intensity indices during 1995-2005. As indicated in Cuyvers et al. (2006, 2008), a lion's share of Cambodia's FDI came from

ASEAN member nations and other Asian countries, particularly Malaysia, Taiwan, China, Korea, Singapore, Hong Kong, and Thailand. Based on Table 1, trade (import plus export) intensity indices between Cambodia and these countries are much larger than unity, implying that Cambodia traded more intensively with these countries than with other countries over 1995-2005. When decomposing trade intensity into import and export intensities, it can be seen that the import intensities of Cambodia from each FDI-investing country are consistently higher than the export intensities during the same period.

Turning to FDI intensity presented in column 4 of Table 1, the above-mentioned countries that traded intensively with Cambodia also invested more intensively in the country than in other countries during the 1995-2005 period, as shown by FDI intensities larger than unity. On the other hand, Table 1 shows that FDI from the United States and Canada in Cambodia is low relatively to these two countries' FDI in other countries, as shown by FDI intensities of 0.36 for the United States and Canada, but Cambodia's export intensity to the two countries exceeds unity, indicating that the United States and Canada are important destinations for Cambodia's exports. The explanation for this phenomenon is that some Asian countries, such as China, under export or import quota constraints, e.g. in garment exports, imposed by the United States and other developed countries, launched FDI in Cambodia to benefit from the country's quota-free access to these protected lucrative markets (Cuyvers et al, 2006, 2008). The above suggests that international trade and foreign direct investment in Cambodia may be related to some extent, but that the relationship differs according to type of partner country and the motive for FDI.

5. Empirical model, data and variables

Our discussion in section 4 indicates a possible relationship between FDI activity and international trade in Cambodia. The recent literature suggests that FDI can be a substitute or a complement of trade. FDI and international trade may share common determinants such as market size, income and international transaction costs (Wei and Liu). Taking into account a possible endogenous relationship between FDI and international trade, the following gravity models are used to examine the linkages between FDI and international trade (import and export) in Cambodia.⁶

$$\begin{aligned} LEXP_{it} = & \beta_0 + \beta_1 LRGDP_{it} + \beta_2 LRPCGDP_{it} + \beta_3 LFDI_{it} + \beta_4 LRER_{it} \\ & + \beta_5 LDIST_i + \beta_6 GSP + \beta_7 CHINA + u_{it} \end{aligned} \quad (4)$$

$$\begin{aligned} LIMP_{it} = & \lambda_0 + \lambda_1 LRGDP_{it} + \lambda_2 LRPCGDP_{it} + \lambda_3 LFDI_{it} + \lambda_4 LRER_{it} \\ & + \lambda_5 LDIST_i + \lambda_6 GSP + \lambda_7 CHINA + \varepsilon_{it} \end{aligned} \quad (5)$$

$$\begin{aligned} LFDI_{it} = & \alpha_0 + \alpha_1 LRGDP_{it} + \alpha_2 LRPCGDP_{it} + \alpha_3 LDIST_i + \alpha_4 LIMP_{it} \\ & + \alpha_5 LEXP_{it} + \alpha_6 LRPOLRISK_{it} + \alpha_7 LRER_{it} + \alpha_8 GSP + \alpha_9 CHINA + \omega_{it} \end{aligned} \quad (6)$$

$$i = 1, 2, 3, \dots, N \quad \text{and} \quad t = 1, 2, 3, \dots, T$$

where L denotes natural logarithms, IMP is Cambodia's imports from each partner; EXP is exports; FDI is cumulative FDI of each country in Cambodia; $RGDP$ is the product of Cambodia's and the

⁶ Initially, attempt was made to model the FDI-international trade relationship, using intensity indices rather than the observed values of FDI and trade. However, FDI intensities for Malaysia and Thailand are extremely high (Table 1). compared with those for other countries in the sample. These extreme values point to possible outliers, which adversely affect estimation results.

partner's real GDP, following Frankel (1997). Rose (2004) and Sohn (2005). *RPCGDP* is the product of Cambodia's and the partner's real per-capita GDP, following Frankel (1997). Rose (2004) and Sohn (2005); *DIST* is geographic distance between Cambodia and the partner country; *RER* is the ratio of the real exchange rate of the U.S. dollar to the partner's currency; *GSP* stands for the existence of a preferential trade agreement with the partner country (GSP, Generalized System of Preferences); *CHINA* stands for the time period of China's membership of the World Trade Organization (WTO); and u , ε , and ω are disturbance terms for equations 4, 5, and 6, respectively.

Building on the theoretical and empirical literature, the econometric specifications in equations 4-6 share common explanatory variables: market size, income, exchange rate and geographic distance. Therefore, the volume of FDI and trade flows are jointly influenced by market size, income, geographic distance, and the exchange rate.

The product of GDP is used as a proxy for market size of Cambodia and its partner as well as production capacity. Large countries with greater production capacities are more likely to realize economies of scale and consequently trade more with each other according to each country's comparative advantage (Sohn, 2005). The product of country-pair GDPs also contains larger market size, created by the country-pairs, which are believed to be able to absorb more imports. Thus, a larger product of the GDPs is expected to go together with larger trade flows between the countries involved. Therefore, it is expected to find a positive slope parameter estimate of the product of the GDPs.

Similarly, the product of Per-capita GDPs is employed to capture the income level or purchasing power of both exporting and importing countries. The inclusion of this variable is motivated by Bergstrand (1989)'s theoretical foundation of the gravity model, which predicts that exports of a particular good are dependent both on participating countries' income but also on their per-capita income. Therefore, trade flows are anticipated to be positively associated with per-capita income whose coefficient estimate is expected to be positive.

The geographic distance variable is used to capture the effect of transportation costs and transaction costs on FDI and international trade. These costs consist of information costs of doing business abroad, unfamiliarity of cultural, political, legal and institutional factors, etc., which can reasonably be assumed to be rising with distance. Therefore, FDI and international trade are expected to be negatively related to geographical distance. The exchange rate is used to capture the effects of relative prices for the trade and FDI equations. A depreciation of the host country currency makes goods produced and denominated in the host country currency cheaper. This will make exports of the host country more competitive, leading to an increase in exports. The opposite will take place with the host country imports from its partners.

The exchange rate affects FDI in the following ways. An appreciation of the home country's currency against the host country's currency translates into an increase in the investment value if the investment is denominated in the host country's currency. This effect of the exchange rate on FDI is often referred to as the 'wealth effect'. From the perspective of the home country's investors, investment in the host country

becomes cheaper, which in turn gives rise to higher profits of the foreign subsidiary. A higher return on investment consequently encourages even more inward FDI in the host country. The host country's currency-denominated wealth of a foreign firm also increases as a result of the depreciation of the host country currency since the production inputs now become less expensive for foreign firms, which in turn gives an incentive to purchase more host country assets, leading to a further increase in foreign direct investment. Therefore, the exchange rate variable *RER* is expected to be positively related with exports and FDI, but negatively associated with imports in Cambodia.

This paper uses detailed, unpublished FDI data, provided by the Cambodian Investment Board (CIB). The data cover the period 1995-2005. As far as could be verified, no official figures about realized FDI in Cambodia have been made available for Cambodia yet. Therefore, the realized FDI data from CIB, which were classified as "active" and "former active" by the Project Monitoring Department (PMD) of CIB are used. PMD visited the approved investment projects and labeled these as "active", "former active", "non-active" or "deleted".⁷ As for approved FDI, a few missing values for some home countries were replaced with data from NBC for realized FDI.

Since some countries had only a few observations for realized FDI between 1995 and 2005, they were dropped from the analysis. Consequently, the number of home countries is reduced to fifteen in our analysis.⁸ Yet, they account for almost 99 percent of the total estimated realized FDI in the country during that period. The data on gross domestic product (GDP), per-capita GDP, exchange rates, total exports, total imports, and political risk for each country in the sample are from IMF's *International Financial Statistics*, *Direction of Trade Statistics*, and *World Economic Outlook database*, the World Bank's *World Development Indicators*, and *Euromoney*. The definitions of the variables, data descriptions and their sources are presented in the appendix.

6. Estimation Methodology

The models presented in section 5 are the augmented gravity models which are used extensively in empirical international economics (Rose, 2004; Eichengreen et al., 2007).

Due to the inappropriateness and inefficiency of estimations with time series or cross-sectional data alone, it was decided to opt for a panel data set, i.e. the data containing time series of a number of individuals. Panel data have several advantages over the usual cross-sectional or time series data (Hsiao, 2003, 2005, 2006; Plasmans, 2006). Plasmans (2006) has shown that panel data are more efficient with respect to random sampling and ease of identification, present less multicollinearity and are better for aggregation as the aggregation may vary over time. Similarly, Hsiao (2005) has indicated that an important advantage of panel data is that it allows to control for the impact of omitted variables, and

⁷ By "active" and "former active" investment projects, it is meant that the projects were operational and were implemented several years after receiving approval from CIB, respectively. "Non-active" and "deleted" projects refer respectively to the ones that were never implemented after the approval and consequently are deleted.

⁸ The fifteen countries include Australia, Canada, China, France, Hong Kong, Indonesia, Japan, Korea, Malaysia, Singapore, Switzerland, Taiwan, Thailand, United Kingdom, and United States.

contain information on the inter-temporal dynamics, and also that the individuality of the entities allows the effects of missing or omitted variables to be controlled for.

Panel data sets can be estimated using three procedures: pooled OLS, fixed-effects (FE) or random effects (RE). Since the regression equations (4-6) contain both time-variant and time-invariant variables, the use of FE estimation is deemed inappropriate as it will drop the time-invariant variables. Therefore, we have opted for the estimation using pooled OLS or RE models. One model against the other will be tested using the Breusch-Pagan (1980) LM test. If individual country-specific effects do not exist, the pooled OLS model is known to be the best linear unbiased estimators (BLUE). while RE estimators are not efficient. The opposite holds if individual country-specific effects are present in the panel data set.

The OLS model assumes that the individual specific effect, α_i , is a constant while the RE model assumes that it is random, independently and identically distributed, that is, $\alpha_i \sim iid(0, \sigma_\alpha^2)$; u_{it} is assumed to be normally distributed with zero mean and constant variance, that is, $u_{it} \sim iid(0, \sigma^2)$. It has been shown that, under the null hypothesis $H_0: \sigma_\alpha^2 = 0$ against the alternative hypothesis $H_1: \sigma_\alpha^2 > 0$, the LM test statistic is as follows:

$$LM_{BP} = \frac{NT}{2(T-1)} \left[\frac{\sum_{i=1}^N \left(\sum_{t=1}^T \hat{e}_{it} \right)^2}{\sum_{i=1}^N \sum_{t=1}^T \hat{e}_{it}^2} - 1 \right]^2,$$

which is asymptotically χ^2 – distributed with one degree of freedom; \hat{e}_{it} denotes OLS residuals obtained under H_0 . A large value for the LM test statistic will reject the null hypothesis in favour of the RE model.

After having chosen the OLS or RE model, the system of equations (4-6) can be estimated in three ways: two-stage least squares (2SLS), seemingly unrelated regression estimation (SUR) and three-stage least squares (3SLS). 2SLS takes into consideration endogeneity (simultaneous determination of dependent variable and regressors). SUR takes into account contemporaneous correlations of error terms across equations. 3SLS, the 2SLS version of SUR, accounts for both endogeneity and contemporaneous correlation. Unlike the RE estimator which is based on a ‘small T , large N ’ dataset, SUR is based on large-sample properties of a ‘large T , small N ’ dataset. Baum (2006:237) writes “applying SUR requires that T observations per unit exceeds N , to render Ω ($NT \times NT$ covariance matrix) of full rank and invertible. If this constraint is not satisfied, we cannot use SUR method. In practice, T should be much larger than N for the large-sample approximations to work well.” Based on the above arguments, SUR method cannot be used in the analysis in this paper. Due to the limited number of T and N in the dataset, 3SLS is not sufficiently appropriate either as it is based on large-sample properties. Heij et al. (2004) argue that 2SLS

is often preferred when the available sample size is not so large. Additionally, in order for 3SLS to be asymptotically more efficient than 2SLS, specification of the complete models (all equations in the system) should be correct (Johnston, 1984). If one equation is misspecified, it will ‘spill’ on all the equations in the system, and consequently all parameters are inconsistently estimated. Moreover, there are no gains from using 3SLS if (i) contemporaneous correlations between disturbances in different structural equations are all zero and (ii) all equations in the model are exactly identified.

We therefore have opted for OLS/RE versus 2SLS (IV).^{9,10} Consistent 2SLS/IV estimation must be balanced against the inevitable loss of efficiency (Baum, 2006). Wooldridge (2006:516) writes: “(there is) an important cost of performing IV estimation when (independent variables) x and u are uncorrelated. The asymptotic variance of the IV estimator is always larger, and sometimes much larger, than the asymptotic variance of the OLS estimator.”

Necessary statistical diagnostic tests are carried out to determine an appropriate model so that misleading results can be avoided. To choose between OLS/RE and 2SLS, the Durbin-Wu-Hausman (or WDH) test is used. This test involves fitting the model by both RE and 2SLS/IV and comparing the estimated coefficient vectors. In the Hausman form, a quadratic form in the differences between the two coefficient vectors scaled by the precision matrix gives rise to a test statistic for the null hypothesis that OLS/RE method is consistent and efficient. The Hausman specification test takes the following quadratic form (Baum, 2006):

$$H = (\hat{\beta}_{2SLS} - \hat{\beta}_{OLS/RE})' [\text{var}(\hat{\beta}_{2SLS}) - \text{var}(\hat{\beta}_{OLS/RE})]^{-1} (\hat{\beta}_{2SLS} - \hat{\beta}_{OLS/RE}),$$

which is distributed as $\chi^2_{(k)}$ with k degrees of freedom—the number of regressors being tested for endogeneity; ‘ $-$ ’ represents a generalized inverse.¹¹ Under the null hypothesis, OLS/RE model is an appropriate estimation technique. A large value of H leads to a rejection of the null hypothesis in favour of 2SLS methods.

To avoid spurious regression results, it is important to carry out panel unit root tests for stationarity of each variable before sound estimations and useful analysis can be performed. Since the time span of the individual series in the available panel data set is relatively short, the recently-developed panel unit root test (IPS test; see Im, Pesaran and Shin, 2003) will be used. The IPS test is shown to be more powerful even with relatively short sample periods (for detailed information, see Cuyvers et al, 2008).¹²

⁹ After having chosen OLS or RE by the Breusch and Pagan test, the selected method is then tested against 2SLS/IV using the Hausman test.

¹⁰ When there are multiple instruments, the IV estimator is known as 2SLS.

¹¹ A generalized inverse, A^- , of a matrix A is any matrix that satisfies $AA^-A = A$. If A is square and nonsingular, then A^- is unique and equal to A^{-1} (Hayashi, 2003).

¹² Im, Pesaran and Shin (2003) indicate that their panel unit root test technique is generally better than previously-proposed tests, and is usually simpler.

To obtain stable estimated slope parameters, additional tests such as collinearity and heteroskedasticity tests are undertaken. The collinearity test is based on the widely-used variance inflation factor (VIF), which has been shown to be equal to $1/(1-R_i^2)$, where R_i^2 is obtained from the multiple correlation coefficient of an explanatory variable X_i regressed on the remaining explanatory variables. Evidently, a higher VIF_i indicates R_i^2 to be near unity and therefore points to collinearity. The commonly-used rule of thumb states that if $VIF < 10$, there is no evidence of harmful collinearity.

7. Estimation Results

Table 2 presents the basic descriptive statistics and panel data unit root test results for both dependent and independent variables. Coefficients on most of the variables are highly statistically significant at the 1% level, except these of the exchange rate and exports which are significantly different from zero at the levels of 5% and 10%, respectively. These unit root test results indicate that both dependent and explanatory variables are all stationary.

Table 2: Descriptive Statistics and IPS Panel Data Unit Root Test Results

Variable	Minimum	Maximum	Mean	Standard Deviation	t-bar Test
LRGDP	7.053	12.873	9.785	1.312	-16.159***
LRPCGDP	15.231	18.500	17.270	0.781	-17.361***
LFDI	0.000	15.434	12.806	2.185	-8.925***
LRER	0.0001	2.051	0.470	0.509	-2.043**
LEXP	5.704	16.435	11.519	1.883	-1.350*
LIMP	8.533	15.679	12.825	1.615	-9.161***
LTB	-7.848	4.728	-1.307	2.358	-3.677***
LDIST	6.273	9.575	8.209	1.007	-

Notes:

1. L refers to values in logarithms.
2. *, **, and *** refer to statistical significance levels at 10%, 5% and 1%, respectively.
3. LRGDP is the logarithm of the product of Cambodia's real GDP and each partner; LRPCGDP is the logarithm of the product of Cambodia's real per-capita GDP and each partner; LRER is the logarithm of the ratio of the real exchange rate of the U.S. dollar to the partner's national currency; LFDI is the logarithm of the annual real FDI stocks of each country in Cambodia. LEXP is the logarithm of Cambodia's real exports to each partner; LIMP is the logarithm of Cambodia's real imports from each partner; LTB is difference between LEXP and LIMP; LDIST is the logarithm of the geographical distance between Cambodia's capital city (Phnom Penh) and that of the home country.

The collinearity test based on VIF statistic of 2.72 suggests that there is no harmful multicollinearity among the included explanatory variables. Using LRPOLRISK and the lagged endogenous variable LFDI as instruments, the endogeneity test statistics of H for equations 4 and 5 are equal to 1.02 and 1.20, respectively, which are very insignificantly different from zero at any conventional level. This suggests that OLS or RE is statistically preferred to 2SLS/IV methods. To choose between OLS against RE, the Breusch-Pagan test is carried out for both equations 4 and 5. The statistical significant LM statistics for the export and import equations indicate that the RE model is better than OLS.¹³ To account for groupwise heteroskedasticity, estimations of equations (4-5) were done with heteroskedasticity-corrected standard errors that are reported along with estimated slope parameters, which were estimated by the more appropriate RE models suggested by the significant Breusch-Pagan LM statistics. Following Rose

(2004) and Eichengreen et al. (2007). a set of year specific fixed effects was included to account for the global business cycle, the extent of globalization, oil shocks, etc. Table 3 reports slope parameter estimates of elasticities for Cambodia's exports. For comparison purposes, Regressions 1 and 2 were estimated without and with year fixed effects, respectively.

Table 3: Slope Parameter Estimates of Elasticities for Exports

Variable	Regression 1	Regression 2
Constant	6.5547 (5.7660)	4.8436 (4.6174)
LRGDP	0.6763*** (0.2416)	0.7427*** (0.2266)
LRPCGDP	0.4153 (0.3048)	0.5038* (0.2712)
LRER	1.2125*** (0.4343)	1.0936*** (0.3540)
LFDI	0.0996* (0.0578)	0.1663** (0.0741)
LDIST	-1.3377*** (0.3703)	-1.4176*** (0.3376)
GSP	1.3246*** (0.4951)	1.5636*** (0.4130)
CHINA	-0.2858 (0.2621)	-1.0671** (0.4353)
Year dummies	—	estimated
No. of Observations	165	165
Overall R^2	0.5253	0.5478
LM statistic $\chi^2(1)$	OLS vs. RE: 42.68***	OLS vs. RE: 45.53***

Notes:

1. L refers to values in logarithms.
2. *, **, and *** denote that the slope parameter estimates are statistically significant at the levels of 10%, 5%, and 1%, respectively.
3. Standard errors are robust standard errors in parentheses.
4. See notes below Table 2 for variable names.

Interestingly, all the variables have the expected signs, and the models fit the panel dataset well, as shown by the overall R^2 of about 0.53 and 0.55 for Regressions 4 and 5, respectively. Since models with year fixed effects appear to be better in terms of fitness and statistical significance, their results are used for interpretations in this paper. Coefficients on the gravity effects variable LRGDP have the expected positive signs and are statistically significant at 1%, which suggests that market size is a significant determinant of export trade flows in Cambodia. This result is in line with the gravity model hypothesis, which predicts that bilateral trade flows will increase as market size becomes larger. The significant coefficient on LRGDP of about 0.74 indicates that a 1 percentage point increase in the product of Cambodia's GDP and that of the partner country, *ceteris paribus*, will lead to a 0.74 percentage point increase in Cambodia's exports.

¹³ LM statistics for export and import equations are reported in Table 3 and 4, respectively.

Additionally, that a larger LR GDP may result in higher exports by Cambodia can be explained based on the supply and demand effects as follows. Given the partners' GDP, an increase in Cambodia's GDP may translate into an increase in goods available for exports. Since Cambodia and its trading partners have been engaging in international trade, then some of Cambodia's exports may be destined for these respective trading partners. Similarly, an increase in the trading partners' GDP may lead to higher demand created by an increase in market size of these countries, and some of higher partners' demand may fall on Cambodia's exports.

The coefficient on the product of per-capita GDP is statistically different from zero at 10%, implying that an increase in per-capita incomes seems to give rise to trade flows between Cambodia and its trading partners. This finding may mean that Cambodian exports were more likely to be directed to rich developed countries, which seems to be the case with a look at the Cambodian data. The finding also appears to be consistent with the standard Heckscher-Ohlin theory, which explains international trade flows by international differences in factor endowments (capital-labor ratios). by implication differences in income levels,¹⁴ and also in line with dynamic comparative advantages explained by the product-cycle model (see Vernon, 1966). which suggests that poor developing countries' exports, such as Cambodia's exports, are more dependent on quantity-based standardized products that are produced there at relatively low costs.

The coefficient of geographic distance has the expected negative sign and is highly significant at the 1% level. This implies that, holding other factors constant, countries that are farther from Cambodia trade less with the Kingdom, which is in line with previous empirical studies. The coefficient of CHINA, the variable used to capture the effect of China's membership into the WTO, is negative and statistically different from zero at the 5% level, indicating that China's WTO accession has had a negative impact on Cambodia's exports. This result is very consistent with a number of recent studies by Ianchovichina and Martin (2003). Ianchovichina and Walmsley (2005). and Eichengreen et al. (2007). They found that China's WTO accession increased the country's own exports at the expense of exports by poorer developing countries such as Cambodia, Vietnam and Bangladesh, etc. that were heavily dependent on the production and exports of consumer goods, especially textiles and garments.

Several reasons may help to explain the negative impact of China's WTO membership on low-income Asian economies. First, China's accession may lead to a reduction, or removal, of quota's on China's textiles and garments exports to the lucrative markets of North America and the European Union, and consequently the mainland may reduce its dependence on other low-income developing countries that benefit from MFN or GSP status, such as Cambodia, as export platform to these markets. Second, with its sheer size and the labor force with relatively higher skills as well as better infrastructure, China may have a comparative advantage in labor-intensive manufacturing sectors, particularly, the textiles and garment sectors even after accounting for productivity-adjusted real wage differentials. These advantages in turn attract more inward FDI in labor-intensive manufacturing at the expense of other Asian countries such as Cambodia which heavily rely on FDI to produce garments for exports (see Cuyvers et al., 2008).

On the other hand, the rise of China might induce the mainland to engage in outward FDI and also attract labor-intensive manufacturing FDI from other economies into the low-income Asian countries that are beneficiaries of e.g. the GSP of industrial countries, for fear that quota restraints are going to be imposed on China's exports of these products. In the case of Cambodia, FDI from China has increased in recent years and China became the main foreign investor in the Kingdom in 2007 (Radio Free Asia, 2008). If these trends continue, one might expect that China's rise may complement Cambodia's exports in a number of years to come.

The slope parameter estimate that interests us most is evidently that of FDI. It has the expected positive sign and is statistically different from zero at 5%. This significant coefficient on FDI suggests that, as expected, FDI is positively related to exports in Cambodia. Based on Table 3, the FDI parameter indicates that a one percent increase in inward FDI will lead to a 0.17 percentage point rise in Cambodia's exports. This finding is in line with several previous studies (USAID, 2005; Neak, 2005; Yamagata, 2006). USAID (2005) and Yamagata (2006) established that almost all garments produced in Cambodia are exported.

The exchange rate also contributed to the boost of the Kingdom's exports during the period under consideration. It is found that a one percent depreciation of the dollar against the partners' currency will result in about a 1.1 percent increase in exports. However, the high degree of dollarization in the Cambodian economy means that the Kingdom loses an important policy instrument—monetary policy, and that Cambodia passively benefits from an increased international trade competitiveness as a result of the depreciation of the dollar or an expansionary monetary policy in the United States. On the other land, the use of the dollar may help to reduce some risks (exchange rate risk) of foreign investors, which in turn attracts inward FDI and stimulates exports.

The coefficient of GSP is highly significantly different from zero at the 1% level, suggesting that Cambodia has benefited from the Generalized System of Preferences status granted by the United States, the European Union, and other developed countries. Since the dependent variable is in natural logarithms, the GSP variable is estimated to increase Cambodia's exports by around 378 percent! [$e^{(1.5636)} - 1 \approx 3.776$].

Table 4: Slope Parameter Estimates of Elasticities for Imports

Variable	Regression 3	Regression 4
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¹⁴ Countries with relatively higher capital-labor ratios tend to rich ones.

Constant	9.3493** (3.7162)	12.1825*** (3.6318)
LRGDP	0.5760*** (0.1345)	0.4711*** (0.1387)
LRPCGDP	0.4873** (0.2162)	0.2965 (0.2242)
LRER	-0.1164 (0.3213)	-0.3197 (0.2671)
LFDI	0.0727** (0.0370)	0.1172*** (0.0448)
LDIST	-1.3482*** (0.2880)	-1.1844*** (0.3125)
GSP	-0.3970 (0.4284)	-0.1677 (0.5083)
CHINA	-0.5543** (0.2569)	-0.8204** (0.4116)
Year dummies	—	estimated
No. of Observations	165	165
Overall R^2	0.5744	0.6005
LM statistic $\chi^2(1)$	OLS vs. RE: 38.14***	OLS vs. RE: 39.24***

Notes:

1. L refers to values in logarithms.
2. **, and *** denote that the slope parameter estimates are statistically significant at the levels of 5%, and 1%, respectively.
3. Standard errors are robust standard errors in parentheses.
4. See notes below Table 2 for variable names.

Table 4 contains estimation results for the elasticities of imports in Cambodia. Similar to the regression results for exports, the coefficient on the gravity variable LRGDP is positive and highly significant at 1%, which implies that the larger market sizes of Cambodia and its trading partners encourage more trade. The geographical distance coefficient is negative and highly significant at the 1% level, meaning that Cambodia imported less from farther away trading partners.

The parameter estimate of CHINA has a negative sign and is statistically different from zero at 5%, suggesting China's WTO accession is negatively related to imports of Cambodia. This finding seems to be at odds. However, it can be explained with reference to the FDI activities in Cambodia. Beresford et al. (2004) and EIC (2007) reported that most of cloth, raw material for production of garments, is imported from other Asian countries, e.g. China, Hong Kong and Taiwan, and that garment factories in Cambodia only perform cut-make-trim activities for exports, which means that the added value in the finished garments is relatively small. This may help to explain the low productivity spillovers from FDI in the Cambodian manufacturing sector in an empirical study by Cuyvers et al. (2008). Since imported intermediate inputs are largely used for final production of finished goods for exports, the negative impact of Cambodia's exports exerted by China's WTO accession may translate directly into a decline in imports, as shown by the estimation results in Table 4.

Table 5: Slope Parameter Estimates of Elasticities for the Trade Balance (LEXP-LIMP)

Variable	Regression 5	Regression 6
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Constant	-3.8829 (7.0936)	-8.4436 (5.8113)
LRGDP	0.1515 (0.2700)	0.3241 (0.2419)
LRPCGDP	-0.0020 (0.3928)	0.2862 (0.3280)
LRER	1.4526*** (0.4587)	1.5463*** (0.3802)
LFDI	0.0334 (0.0679)	0.0519 (0.0823)
LDIST	-0.0777 (0.4318)	-0.3342 (0.4516)
GSP	1.6950*** (0.5702)	1.7131*** (0.6328)
CHINA	0.2003 (0.4536)	-0.3386 (0.6295)
Year dummies	—	estimated
No. of Observations	165	165
Overall R^2	0.4534	0.4932
LM statistic $\chi^2(1)$	OLS vs. RE: 27.25***	OLS vs. RE: 28.06***

Notes:

1. L refers to values in logarithms.
2. *** denotes that the slope parameter estimates are statistically significant at the 1% level.
3. Standard errors are robust standard errors in parentheses.
4. (*LEXP-LIMP*) stands for the difference of the logarithm of exports and the logarithm of imports.
5. See notes below Table 2 for variable names.

The coefficient estimates of exports and imports elasticities reported in Tables 3 and 4 seem to be of similar sizes although the former is higher than the latter. To get some insights into whether or not FDI has improved the external trade balance in Cambodia, (*LEXP-LIMP*) was regressed on LFDI, along with a set of other explanatory variables, and its results are presented in Table 5. The coefficient on FDI is positive, but insignificantly different from zero at any conventional significance level, confirming that, *ceteris paribus*, there is no evidence that FDI plays a role in improving the external trade balance in Cambodia. This may be due to the fact that an increase in exports is just offset by an almost equal increase in imports. Yet, the international trade position in Cambodia is likely to improve by the country being the beneficiary of MFN and GSP status, granted by the rich developed countries such as the United States and the European Union. In line with the empirical literature, the positive coefficient estimates of FDI in the exports and imports equations are indicative for a complementary relationship between FDI and international trade in Cambodia.

8. Concluding Remarks

In this paper we have analyzed the impact of inward foreign direct investment on exports, imports, as well as the external trade balance in Cambodia by taking into consideration a possible endogenous relationship between FDI and international trade in specifying the widely-used augmented international trade gravity models of a three-equation system. The gravity variables such as market size, income, geographical distance, a set of dummy variables which are believed to affect the international trade flows, and FDI, are used as explanatory variables. All variables are in natural logarithms, except the dummies.

To obtain the best possible slope parameter estimates, several important statistical diagnostic tests such as collinearity and panel data unit root tests were carried out. Since there is a high cost of estimations with 2SLS/IV when FDI can be statistically considered as an exogenous variable, an endogeneity test was undertaken and the result suggests the absence of endogeneity in these models. Having chosen to estimate the models independently, the Breusch-Pagan specification test (see Breusch-Pagan, 1980) was also carried out to select between pooled OLS and RE. The significant Breusch-Pagan LM statistics indicate that the RE model is statistically better and thus to be used to estimate all the models by also accounting for groupwise heteroskedasticity.

Using the standard augmented gravity equations, the estimation results show that the gravity variables, market size and income, appear to be significant determinants of trade in Cambodia. However, as could be expected, geographical distance is shown to be a deterrent to international trade flows between Cambodia and its trading partners, which is consistent with the empirical literature. Mainland China's WTO accession, while boosting its own exports, significantly reduced both exports and imports of the Kingdom. The depreciation of the dollar seems to have played a vital part in stimulating exports, but the role of the exchange rate is a passive one as Cambodia due to the high degree of dollarization of the economy. However, it might be argued that the use of the dollar rather than the 'soft' national currency (riel) may reduce some exchange rate risks of foreign investors, who have produced, e.g. garments, in Cambodia for exports.

Interestingly, this paper shows that FDI has stimulated both Cambodia's exports and imports. It should also be noticed that, although the estimated coefficient of exports is marginally higher than that of imports, there is no evidence that FDI has played an important role in improving the chronic external trade deficit of the Kingdom, as evidenced by the insignificant slope parameter estimate of FDI in Table 5. However, the role that FDI has played in the Cambodian economy should not be overlooked either. Even though unable to improve the international trade position of Cambodia, FDI activities are likely to absorb a vast pool of the unemployed as well as the bulk of the low-skilled labor force being underemployed in the agriculture sector in rural Cambodia. As showed in Cuyvers et al. (2008). FDI has contributed to the improvement of domestic labor productivity via indirect effects or technology transfers and training of domestic personnel, which augments the country's relatively low skilled labor force. The GSP status of the country is shown to have significantly contributed to the improvements of the external trade balance through its role in stimulating exports, induced further by inward FDI into the Kingdom.

Our findings are leading to some important policy implications. Since FDI is found to have a positive impact on international trade flows, in particular on exports, there is a need for the design of favourable policies to effectively coordinate external trade and FDI activities so that benefits from these positive effects to the Cambodian economy can be maximised. As found in Cuyvers et al. (2008). FDI has also contributed to improving domestic labor productivity through its indirect effects in Cambodia, which in turn will give rise to higher income and growth. To be more competitive in a world of increasing competition, unofficial payments (e.g., the so-called 'speed' money). trade barriers and the repeatedly reported non-

trade barriers as well as unnecessary bureaucracy related to the FDI application procedures also need to be further reduced so that FDI can be further attracted, and exports be boosted accordingly.

Appendix: Variable Name, Definitions and Data Sources

Variable Name	Definitions and Data Sources
EXP	Cambodia's real annual bilateral exports to each partner, deflated by Cambodia's GDP deflator. Source: IMF's <i>Direction of Trade Statistics</i> and <i>World Economic Outlook Database</i> and World Bank's <i>World Development Indicators</i> .
IMP	Cambodia's real annual bilateral imports from each partner, deflated by Cambodia's GDP deflator. Source: IMF's <i>Direction of Trade Statistics</i> and <i>World Economic Outlook Database</i> and World Bank's <i>World Development Indicators</i> .
FDI	Real annual realized FDI stocks into Cambodia from 1995-2005. The real realized FDI stock is the annual realized FDI stock in current dollars divided by Cambodia's GDP deflator. The realized FDI stock is cumulative FDI, estimated from data from the Project Monitoring Department, <i>Cambodian Investment Board</i> , and GDP deflator is from World Bank's <i>World Development Indicators</i> , and IMF's <i>World Economic Outlook Database</i> .
RGDP	Product of Cambodia's real GDP and that of each partner country. Cambodia's real GDP and that of each partner are measured in Purchasing Power Parity. Cambodia's real GDP is derived from GDP in Purchasing Power Parity in current US\$ deflated by Cambodia's GDP deflator in the corresponding years. Real GDP of each home country is computed in a similar way. Sources: IMF's <i>World Economic Outlook database</i> , and World Bank's <i>World Development Indicators</i> .
RPCGDP	Product of Cambodia's real per-capita GDP and that of each partner country. Cambodia's real per-capita GDP and that of each partner are obtained from real GDP measured in Purchasing Power Parity divided by the corresponding population of each country. Sources: IMF's <i>World Economic Outlook's database</i> , and World Bank's <i>World Development Indicators</i> .
RER	Relative real exchange rate, defined as the real exchange rate of the US\$ to the home country's currency. ¹⁵ The real exchange rate is computed as the official nominal exchange rate divided by the consumer price index of the country. Source: <i>IMF's International Statistical Yearbooks</i> . Data on Taiwan are from IMF's <i>World Economic Outlook database</i> and <i>Taiwan's Ministry of Economic Affairs (MOEA)</i> .
RPOLRISK	Relative political risk, defined as the ratio of the annual political risk score of Cambodia to that of the home country in the corresponding year. The annual political risk scores for each country are computed from the average of the country's political risk scores in March and September. The country's political risk scores range between 0 and 25. The higher the score, the better a country is. Source: <i>Euromoney</i> (various issues). <i>Euromoney Magazine</i> publishes the political risk in March and September of each year.
DIST	Geographical distance between Cambodia and the home country, measured in kilometres between Cambodia's capital city (Phnom Penh) and the home country's capital city. Source: <i>Great Circles Distance</i> .
GSP	Dummy variable, equal to 1 for countries granting Most Favoured Nations (MFN) and Generalized System of Preferences (GSP) for the years (1996-2005) when Cambodia was granted the status, and 0 otherwise. Source: <i>Beresford et al. (2004)</i> , <i>Neak (2005)</i> and Cambodia's <i>Ministry of Commerce Website</i> .
CHINA	Dummy variable, equal to 1 for the years 2001-2005, when China was a member of the World Trade Organization (WTO). and 0 in the previous years.

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¹⁵ In this paper, Cambodia's currency-per-US\$ exchange rate is equal to 1 (dollar-per-dollar exchange rate) since Cambodian economy has been highly dollarized. Payments for wages and other business transactions are mainly in dollars.

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