ASEAN (AFTA) Membership and Cambodian Trade

~A Gravity Study of Cambodia's Bilateral Trade Flows~

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Abstract (要旨)

In this paper, I test how Cambodia's accession to the Association of Southeast Asian Nations (ASEAN) affects its bilateral trade with other countries by using a gravity model of trade specifically adopted for the study on Cambodian trade. The result of this empirical study proves that the ASEAN (AFTA) membership has had a significant effect in increasing Cambodia's bilateral trade with other ASEAN members, but does not divert its bilateral trade from outside the ASEAN bloc to inside the ASEAN bloc. By using a smaller set of data, this study also shows that the effect of the ASEAN membership on Cambodian trade was larger before Cambodia became a WTO member. This reduction in the effect of the ASEAN membership may be explained by the effects of Cambodia's entry to the WTO in 2004.

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I- Introduction

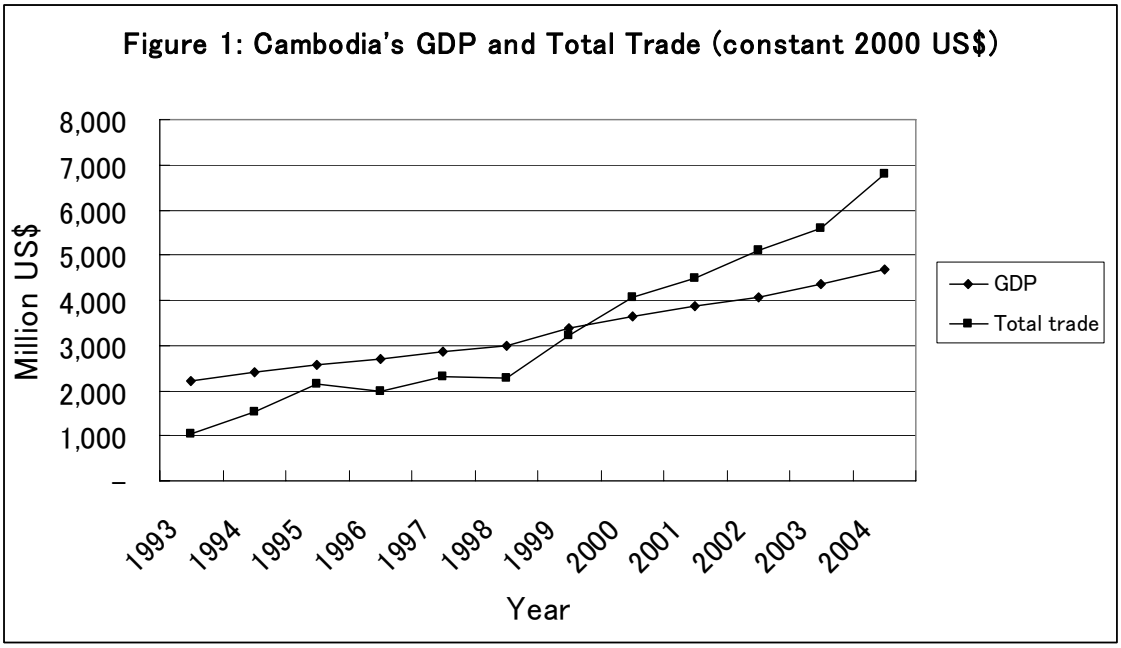
After World War II, world trade has risen rapidly, most of the time at a faster rate than world GDP. Economies have been increasingly integrated, and some countries with the same objective of trade liberalization have become partners via Regional Trade Agreements (RTAs). According to the World Trade Organization (WTO), up to July 2007, 380 RTAs have been notified to the GATT/WTO and many more are scheduled to be implemented by 2010. Of these RTAs, over 90% are free trade agreements (FTAs) and partial scope agreements, while less than 10% are custom unions (WTO, 2007).

In Asia, an important association called the Association of Southeast Asian Nations (ASEAN), with the objectives of economic growth acceleration and regional peace and stability, was created in Bangkok, Thailand in 1967 by five Southeast Asian nations: Thailand, Malaysia, Indonesia, the Philippines and Singapore. Later, five more members joined the association: Brunei in 1984, Vietnam in 1995, Laos and Myanmar in 1997, and Cambodia in 1999. All of the ASEAN leaders have declared that one of the goals of ASEAN is to create a stable, prosperous and highly competitive ASEAN economic region in which there is a free flow of goods, service, investment and a freer flow of capital, equitable economic development and reduced poverty and socio-economic disparities.

In 1992, the ASEAN Free Trade Area (AFTA) was launched to promote greater economic efficiency, productivity, and competitiveness among member countries, and now it has almost been established. The AFTA aims to eliminate tariff and non-tariff barriers through the Agreement on the Common Effective Preferential Tariff (CEPT) scheme which requires 0-5 percent tariff levied on a wide range of products traded within the region. Tariffs on more than 99 percent of the products in the CEPT Inclusion List of ASEAN-6, comprising Brunei, Indonesia, Malaysia, the Philippines, Singapore, and Thailand, have already been reduced to no more than 5 percent, and 60 percent of these products have zero tariffs. For new members, Cambodia, Laos, Myanmar, and Vietnam, tariffs on about 81 percent of their Inclusion List have been brought down to less than 5 percent (ASEAN, 2007).

Cambodia is the youngest ASEAN member, and is one of the least developed countries in the region. Until early 1990s, Cambodia had suffered from a terrible civil war for many decades. During the war, both financial capital and human capital were destroyed, and its social and economic infrastructures were severely damaged. However, after the civil war ended, with full support of the United Nations and several key countries, in 1993 Cambodia held its first general election. Subsequently, its politics gradually became stable and its economy began to grow. Its economic growth

accelerated quickly, especially during the last few years. Its GDP grew from US$ 2,204 million in 1993 to US$ 4,678 million in 2004 at an average growth rate of more than 5%, while its total trade increased more than five times, from US$ 1,051 million in 1993 to US$ 6,804 million in 2004 (World Bank, 2006).



Source: Calculation based on the World Bank's *World Development Indicators 2006*

Cambodia's entry to ASEAN (AFTA) in April 1999 is considered to have had a large positive impact on its trade. However, up to now, there have not been any empirical studies about the effects of ASEAN (AFTA) membership on Cambodian trade yet. Does ASEAN (AFTA) really increase Cambodian trade? If it does, does it also cause trade diversion? And, other than joining ASEAN, what else can possibly affect Cambodian trade?

As an ASEAN member, Cambodia should know whether its entry to ASEAN benefits it by creating trade with other members, or it just diverts trade from possible lower cost non-member countries to member countries, which may decrease its welfare. Understanding the effects of the ASEAN membership on its trade is very important for Cambodia to take the next step toward ASEAN's economic integration, and may help Cambodia, for its benefit, make more effective trade policies and trade agreements with others nations in the future. This paper, by using the gravity model specifically adopted for the study on Cambodian trade, attempts to prove that Cambodia's entry to ASEAN has increased trade with other ASEAN members, and not resulted in any significant trade diversion. Moreover, this study also attempts to investigate other possible determinants of Cambodia's trade flows, such as the WTO and foreign ODA, and their effects on Cambodian trade.

II－ Gravity Model of Trade

The gravity model of trade is a well known empirical model used to predict bilateral trade flows based on the economic sizes and the distances between them. It was first introduced in 1962 by Tinbergen who proposed the idea of using the Newtonian gravity concept in physics to explain bilateral trade flows. Later, it was used

by Pöyhönen in 1963, and since then the gravity model of trade has been widely used in the study of international trade. Moreover, it has also been used to study what economists call "border effects" to prove that prices of traded goods are not the same in each country even when transportation costs and tariffs are low, which is a paradox of the standard assumption of the Heckscher-Ohlin model.

In 1995, McCallum used a gravity model to study the border effect between Canada and the US. As a result, he found that in 1988, trade between provinces within Canada was 22 times the expected amount of trade between the provinces and the states of the US. In 1999, Anderson and Smith re-examined the finding of McCallum's and they found a similar result.

The gravity model of trade has also been used to test if an international organization has any impact on international trade flows. In 2002, Rose used the gravity model to study the effects of the World Trade Organization (WTO) and the Generalized System of Preferences (GSP) on trade. He found that the GSP seemed to have a strong effect, while the WTO did not. In 2005, he used the same gravity model to test the effects on trade of three international organizations: (1) the WTO/GATT, (2) the International Monetary Fund (IMF), and (3) the Organization for European Economic Co-operation (OECD). With a large panel dataset covering over 50 years and 175

countries, he found that the OECD had a large positive effect on trade, while accession to the WTO/GATT also increased trade.

Moreover, Roberts (2004) also used the gravity model to study the proposed China-ASEAN Free Trade Area. He found that the results of gravity model exhibited a good fit in explaining trade flows within a China-ASEAN Free Trade Area. Also, the result of his study shows that the China-ASEAN FTA economies have to map out policies and strategies to bring about convergence in their income levels to reap maximum benefits from the proposed free trade area.

Although the gravity model had become a popular trade model, it was also criticized because it lacked theoretical foundations. However, these foundations were subsequently developed. In 1979, Anderson helped to explain the presence of income variables in the gravity model by employing the product differentiation by country of origin assumption. Another approach brought by Bergstrand (1989) provides theoretical foundations to the gravity model using a monopolistic competition model. He replaced product differentiation by country of origin with product differentiation by firm and he found that the empirical success of the gravity model is considered to be supportive of the monopolistic competition explanation of intra-industry trade. Later, Deardorff (1998) found that this approach to gravity model-based explanations of bilateral trade

depends on complete specialization. However, in 2004, Haveman and Hummels explained another approach to gravity-based explanations that does not relate to complete specialization by accounting for trade frictions in the form of distance based shipping costs and other trade costs.

Today, the gravity model becomes one of the most important trade models used to explain the determinants of trade flows of a nation. In this paper, I study how the ASEAN membership and other trade determinants affect Cambodia's bilateral trade with other nations by specifically adopting the recently standardized gravity equation for the study of Cambodia's trade flows.

1- Model Specification and Methodology

Since the gravity model was introduced by Tinbergen (1962), many empirical studies on trade have been successfully made, and at the same time, many more determinant variables have been added to the original gravity equation, which consisted of only two explanatory variables: income and distance. In 1997, Frankel formulated a more advanced, yet standardized gravity equation by adding new variables, such as population, border sharing and common language. The standard gravity equation formulated is specified as follows:

$$\ln(Trade_{ijt}) = \beta_0 + \beta_1 \ln(GDP_{it}GDP_{jt}) + \beta_2 \ln(GDP_{it}GDP_{jt}/Pop_{it}Pop_{jt})$$

$$+ \beta_3 \ln Dist_{ij} + \theta Z_{kijt} + \varepsilon_{ijt}$$

Where i and j denotes trading partners, t denotes time, and the variables are defined as:

- $Trade_{ijt}$ denotes the value of real bilateral trade between i and j at time t,
- GDP is real GDP of country i,
- Pop is Population,
- $Dist_{ij}$ is the distance between i and j,
- Z_{kijt} is a vector of dummy variables Z_k representing border sharing, common language, colonial relationship, etc. between country i and j at time t. The values of these variables are typically binary.
- ε_{ijt} represents other omitted influence on bilateral trade, assumed to be well behaved.

To test the effect of ASEAN membership on Cambodian trade, I use this standard gravity equation and add some new dummy variables that seem to have some effects on Cambodia's trade. The gravity model used in this study takes the following form:

$$\ln(Trade_{ijt}) = \beta_0 + \beta_1 \ln(GDP_{it}GDP_{jt}) + \beta_2 \ln(GDP_{it}GDP_{jt}/Pop_{it}Pop_{jt})$$
$$+ \beta_3 \ln Dist_{ij} + \beta_5 Border_{ij} + \beta_{10} Donor_{ijt}$$
$$+ \gamma_1 ASEAN\ 1_{ijt} + \gamma_2 ASEAN\ 2_{ijt} + \phi_1 WTO\ 1_{ijt}$$
$$+ \phi_2 WTO\ 2_{ijt} + \varepsilon_{ijt}$$

Where i and j denotes trading partners, t denotes time, and the variables are defined as:

- $Trade_{ijt}$ denotes the value of real bilateral trade between i and j at time t,
- GDP is real GDP,
- Pop is Population,
- $Dist_{ij}$ is the distance between i and j,
- $Border_{ij}$ is a binary variable which is unify if i and j share a land border,
- $Donor_{ijt}$ is a binary variable which is unify if i is a donor country to j at time t, or vice versa,
- $ASEAN\ 1_{ijt}$ is a binary variable which is unify if only one of i and j is an ASEAN (AFTA) member at time t,
- $ASEAN\ 2_{ijt}$ is a binary variable which is unify if both i and j are ASEAN (AFTA) members at time t,
- $WTO\ 1_{ijt}$ is a binary variable which is unify if only one of i and j is a WTO member at

time t,

- $WTO\ 2_{ijt}$ is a binary variable which is unify if both of i and j are WTO members at time t, and
- ε_{ijt} represents other omitted influence on bilateral trade, assumed to be well behaved.

Real GDP ($GDP_{it}GDP_{jt}$) and per capita GDP ($GDP_{it}GDP_{jt}/Pop_{it}Pop_{jt}$) are expected to have positive effects on trade, while distance, on the other hand, is expected to have a negative effect. It has been confirmed by many previous studies, that greater economic mass (real GDP and per capita GDP) expands trade, while distance reduces it (Rose, 2002 and Roberts, 2004).

Other variables are dummy variables. The dummy variables of greatest interest for this paper are *ASEAN 1*, and *ASEAN 2*. These dummy variables were introduced by Haveman and Hummels (1996) to capture the trade creation and trade diversion effects of trade agreements. The first dummy, *ASEAN 1*, takes a value of one when only one of the country pair is an ASEAN (AFTA) member, and the second dummy variable, *ASEAN 2*, takes the value of one when both of them are ASEAN members. If trade is created after Cambodia joined ASEAN, the coefficient of *ASEAN 2* should be positive. If trade is diverted from non-ASEAN members to the ASEAN members, the

coefficient of *ASEAN 1* should be negative. However, if there is only a trade creation, the coefficient of dummy *ASEAN 2* is expected to be positive and significant while the coefficient of dummy *ASEAN 1* is expected to be insignificant. On the other hand, if there is only trade diversion, the coefficient of dummy *ASEAN 1* is expected to be negative and significant while the coefficient of dummy *ASEAN 2* is expected to be insignificant. Based on the same method, dummy *WTO 1* and *WTO 2* are added to the equation to capture the effects of the WTO membership on Cambodian trade. If the WTO creates trade between Cambodia and other WTO members, the coefficients of *WTO 2* will be positive. On the contrary, if it diverts trade from non-WTO members to WTO members, the coefficient of *WTO 1* will be found negative.

Border is one of the most important dummy variables used in the gravity model. It has been found to have a positive impact on trade flows in many previous studies (Frankel, 1997 and Rose, 2002).

In addition to the dummy Border, I add one more dummy variable, *Donor*, which takes the value of one if the trade partner is one of Cambodia's international donors. The donor countries are the countries that provide ODA to support any development programs in Cambodia through either government organizations or non-government organizations. Cambodia is likely to trade more with its ODA provider

countries than with the others. For instance, Austria and Switzerland are quite similar in distance from Cambodia, population and GDP, but their trade values with Cambodia differ greatly. In 2000 Cambodia's trade value with Switzerland, which was one of Cambodia' donor countries, was $22.98 million, while its trade value with Austria, which was not a donor country, was less then $2 million. In the same year, the share of Cambodian trade with its major ODA provider countries made up about 55% of its total trade. As such the coefficient of this dummy variable is also of interest. If the ODA of trading partners has an effect in increasing trade with Cambodia, the coefficient of dummy *Donor* is expected to be positive and significant. On the contrary, if it does not have any impact on Cambodian trade, its coefficient is expected to be zero (or close to zero) and insignificant.

2- Data and Data Sources

The trade value of Cambodia with a trade partner is the sum of import and export values between Cambodia and that country. To calculate the value of trade between Cambodia and other countries, I use the trade data from the International Monetary Fund's Direction of Trade Statistics Yearbook (2003 and 2006). The available data covers Cambodia's trade data with 70 trading partners between 1997 and 2005. I

choose to use the data from the World Bank's World Development Indicator 2007 for GDP (in constant 2000 US$) and population data of the years between 1997 and 2005, and conducted a pooled regression over the entire sample. For the distance between Cambodia and each country, I use the distance between Cambodia's capital and largest economic city, Phnom Penh, and the largest economic cities of those countries. For example, the distance between Cambodia and Japan is the distance between Phnom Penh to Tokyo, and the distance between Cambodia and Australia is the distance between Phnom Penh to Sydney.

III- Results

The OLS results of this study are shown in Table 2 below. Column I of Table 2 reveals the result of the study using only standard variables: GDP, per capita GDP and distance, while column II, on the other hand, reveals the result of the study in which all determinant variables are included. In addition, Column III of Table 2 shows the result of the study (using the same data) in which WTO variables are not included, while column IV shows the result of the study on the effects of ASEAN on trade before Cambodia's entry to the WTO in 2004 by using only the 1997-2003 data.

The most important result of this study is reported in column II. This result

shows an empirical success of the gravity model of trade in explaining Cambodia's trade flows. As in many previous gravity studies, in this study the standard gravity variables *GDP* and *per capita GDP* are found to have significant effects in increasing bilateral trade, while *distance* is found to have a negative effect. The coefficients of log GDP and log per capita GDP are 0.94 and 0.16, and are significant at 1% level and 5% level, which respectively means a 1 percent increase of GDP of Cambodia or its trade partners leads to an increase in its bilateral trade with them by $(1.01^{0.94} - 1 =)$ 0.94 percent while a 1 percent increase of per capita GDP of Cambodia or its trade partner increases its bilateral trade by $(1.01^{0.16} - 1 =)$ 0.16 percent. On the contrary, the coefficient of log distance is –1.59 and significant at 1% level, which means a 1 percent increase of distance between Cambodia and its trade partners decreases its bilateral trade with them by $(1.01^{(-1.59)} - 1 =)$ 1.57 percent.

The *Border* dummy is also found to be positive, which may prove border sharing increases bilateral trade as transportation costs are lower. However, its t-statistic is only 0.97, which is not completely consistent with the expected result. This may be explained by the bad political history between Cambodia and Vietnam, and by the boycott of Thai products in 2002. Moreover, this result may also be explained by the effect of cheaper products with more varieties and higher quality produced in other

Table 2: The Gravity model OLS results

Variables	Coefficients			
	I	II	III	IV
	1997–2005	1997–2005	1997–2005	1997–2003
Constant	-27.61*	-20.07*	-20.32*	-21.43*
	(2.51)	(2.83)	(2.77)	(3.22)
Log GDP	1.13*	0.94*	0.95*	0.96*
	(0.06)	(0.06)	(0.06)	(0.07)
Log per capita GDP	0.39*	0.16***	0.20*	0.16****
	(0.08)	(0.08)	(0.08)	(0.09)
Log distance	-1.97*	-1.59*	-1.59*	-1.61*
	(0.10)	(0.14)	(0.14)	(0.15)
Border	-	0.49	0.35	0.50
		(0.50)	(0.49)	(0.57)
Donor	-	1.77*	1.72*	1.67*
		(0.23)	(0.22)	(0.26)
One in ASEAN	-	0.06	0.04	0.10
		(0.23)	(0.22)	(0.23)
Both in ASEAN	-	1.09**	1.13*	1.21**
		(0.44)	(0.43)	(0.47)
One in WTO	-	0.53	-	-
		(0.38)		
Both in WTO	-	0.42	-	-
		(0.42)		
Observations	371	371	371	271
Adjusted R2	0.66	0.70	0.70	0.69

Note: Standard errors in brackets,

*Significant at 1% level, ** Significant at 2% level,

*** Significant at 5% level, **** Significant at 10% level

nearby countries (but not sharing border), such as China (mainland), Hong Kong, Singapore, and Malaysia.

The coefficients of greatest interest are the coefficients of dummy *ASEAN 1* and *ASEAN 2*. The result of the study shows a strong, positive and 2% level significant coefficient of ASEAN 2, and an insignificant coefficient of *ASEAN 1*. This estimate statistically proves that Cambodia's entry to the ASEAN (AFTA) has had a significant effect in increasing Cambodia's trade with other ASEAN members, but does not divert its bilateral trade from outside the ASEAN bloc to inside the ASEAN bloc.

The coefficient of *ASEAN 2* is 1.09, which means Cambodia's entry to the ASEAN increases its trade with other ASEAN members by ($e^{1.09} - 1 =$) 198.29 percent. The coefficient of ASEAN 1 is also found positive, but close to zero and insignificant (with t-statistic = 0.26), which proves that the ASEAN membership does not divert trade from non-member countries to member countries.

The effects of the WTO membership are also a part of my interest. The result of this study reveals positive effects of Cambodia's entry to the WTO in 2004 on its trade with WTO member countries and with non-member countries. The coefficients of WTO 1 and WTO 2 are both found positive, but surprisingly the coefficient of WTO 1 is found larger than the coefficient of WTO 2, which means the WTO membership may have a larger impact on its bilateral trade with non-WTO members more than on its bilateral trade with member countries. The coefficient of WTO 2 is 0.42, which implies that

Cambodia's accession to the WTO increased its trade with other WTO members by ($e^{0.42}$ – 1 =) 52.98 percent. On the other hand, the coefficient of WTO 1 is larger with the value of 0.53, which statistically means the WTO membership increases its bilateral trade with other non-member countries by ($e^{0.53}$ – 1=) 69.98 percent. However, the coefficients of both WTO 1 and WTO 2 are insignificant with their t-statistics of 1.39 and 0.99. Cambodia just became a WTO member in late 2004, so the data of Cambodian trade after it became a WTO member is limited. More data may be necessary for the study on the effects of the WTO on Cambodia's bilateral trade with other WTO member countries and non-member countries.

The last dummy variable discussed in this study is *Donor*. The result reveals a strong and positive coefficient of this dummy variable, which confirms the assumption that Cambodia trades more with its donor countries than with the others. Its coefficient is 1.77 and significant at 1% level (with its t-statistic = 7.70). It proves that, if the trading partners are Cambodia's major ODA providers, their trades with Cambodia increases ($e^{1.77}$ – 1 =) 488.55 percent.

Why does Cambodia trade more with its donors than with the other nations? This may be explained by the tied-aid (the aid that must be spent in the donor countries) and some trade promotion projects supported by those countries. Up to now,

international donors have been playing an important role in Cambodia's economic development. In 2005, ODA of US$525 million, about 10 percent of Cambodia's GDP, was provided through both government and non-government organizations. Among all the donor countries, Japan is the largest ODA provider whose ODA made up more than 18 percent of total ODA provided in that year (CDC, 2007). Japan as well as other donor countries, has been involving with many activities and programs to promote trade and investment in LDC countries, including Cambodia, through its ODA (MOFA, 2007). In addition, most of the donor countries have initiated some trade policies, such as tariff free imports from Cambodia and other developing nations, which are also considered to have a large positive impact on trade.

In column I, the result of the study, which uses only the standard variables, confirms the success of the gravity equation in explaining Cambodian trade by showing large and significant coefficients of all the standard variables. Column III, which shows the result of the study on the effects of the ASEAN membership when dummy WTO is not included, reveals similar coefficients of *ASEAN 1* and *ASEAN 2* to the study in column II. This confirms that the ASEAN membership has a strong effect in increasing Cambodia's bilateral trade with other ASEAN members, while column IV shows the result of the study in which the 2004-2005 data is not included. Interestingly, this result

shows a stronger and larger effect of the ASEAN membership in creating trade before Cambodia became a WTO member. The coefficient of *ASEAN 2* is found to drop from 1.21(before its WTO entry) to 1.09 (after its WTO entry) in column II. This drop of the coefficient of *ASEAN 2* may be caused by Cambodia's entry to the WTO in 2004, as the coefficients of *WTO 1* and *WTO 2* are also found positive (column II). The coefficient of *ASEAN 1* is also found larger and more significant, which possibly means that before Cambodia joined the WTO, the ASEAN membership also increased Cambodian trade with non-ASEAN members while it increased trade with the other ASEAN members. However, further study with more data after Cambodia's entry to the WTO is required to study the effects of the WTO and how it changed the effects of ASEAN membership on Cambodian trade.

IV- Conclusion

In this paper I use a gravity model of trade to analyze the effect of the ASEAN (AFTA) membership on Cambodia's trade flows. The result of this study shows that the gravity model works well in explaining Cambodia's bilateral trade flows. As with many other gravity studies, this study proves that larger GDP or per capita GDP increases trade, but distance, on the other hand, reduces it. In addition, this study also proves

that the ODA provided by its trading partners also has a large, significant effect in increasing its bilateral trade with them.

The effect of the ASEAN membership, which is the main point of this study, is found to be strong and positive in increasing Cambodia's bilateral trade with other ASEAN members. Moreover, the ASEAN membership is not found to have any significant effect in diverting Cambodian trade from non-ASEAN member countries to member countries. By using the same method, but with pre-WTO accession data from 1997 to 2003, this study also shows that the effect of the ASEAN membership on Cambodian trade is larger and stronger before Cambodia became a WTO member in 2004 and there was a small positive effect of the ASEAN membership on Cambodia's bilateral trade with non-ASEAN member countries. The reduction in the effect of the ASEAN membership may be caused by Cambodia's accession to the WTO. However, further study with a larger panel data of Cambodian trade is necessary to analyze and understand more deeply about the effects of the WTO membership on Cambodia's bilateral trade flows with other WTO and other ASEAN members.

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