Exchange Rate Regime and Export Performance of Developing Countries

By
Surachart Wongsariyawanich

A Thesis submitted in partial fulfillment
of the requirements for the degree of

Master of Business Administration

Graduate School of Business
Assumption University
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ABSTRACT

This study investigates the net effects of 99 developing countries' choice of exchange rate regimes on their exports during 1995-1999. This includes exports of 99 developing countries to the EU, Japan and the USA during this time period. It also aims to develop a model to explain the export value from exporting country to importing country that are affected by importing country's potential demand, exporting country's potential supply, transaction costs and exchange rate regime.

In explanation of export from exporting to importing country, there are four main variables included in the framework. They are importing country's potential demand, exporting country's potential supply, transaction costs and exchange rate regime.

The study on export performance of exporting countries, the analysis will be conducted from 1995 to 1999. All data is collected from United Nations, World Bank, International Monetary Fund and The MacMillan World Atlas. The regression analysis with pooled data of time series and cross sectional is used in this study.

The results of the study show that the following variables can explain the export performance at 95 per cent level of confidence. They are GNP and Per Capita GNP of developing countries, distance, a peg to US dollar, a peg to currencies other than the US dollar, a peg to a composite of currencies, more flexible regimes, European Union and Japan.

The empirical result indicates that GNP and Per Capita GNP of developing countries are the positive factors in increasing the export value. On the other hand, GNP and Per Capita GNP of developed countries are insignificant in the model. Distance is one factor that reduces the export value from developing countries to developed countries.

There are four exchange rate regimes are significant throughout the study. They are a peg to US dollar, a peg to currencies other than the US dollar, a peg to a composite of currencies, more flexible regimes. Earlier mentioned, the first three exchange rate regimes have the negative affect on export performance except the last one when comparing to the independently floating. But there are limited flexibility and multiple exchange rates, which cannot be concluded in this study. However, it can be concluded that the more flexible exchange rate regime, the more value of export performance.

This study is hoped to benefit policymakers, businesspersons and academic. Policymakers can use this study as a development strategy to increase their exports. Businesspersons can use the result as a considering factor before investing any countries. Students can learn the impact of exchange rate regimes on export performance of developing countries

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GENERALITIES OF THE STUDY

1.1 Background

1.1.1 Economic performance of Thailand

At present export sector is the major sector to recover the economy of each country besides the banking sector that lends the money to business and manufacturing sectors to increase their total output. Each country tries to stimulate their exports and reduce their imports to have the trade surplus. The more export value than the import value, the more trade surplus.

The first month of year 2001, Thailand faced the falling export growth and rising import growth that led to the first trade deficit in 11 months at US $ 282 million. Even though the export value in 2000 was equal to US $ 67.9 billion increased by 19.62 percent from 1999. But the export value in January 2001 declined to US $ 5.04 billion that decreased by 12.4 percent from the previous month and decreased by 3.9 percent in January last year. The estimated percentage change in import value in 2001 is equal to 2000 about 31.3 percent (Table 1.1).

Table 1.1 Thailand's Key Economic Indicators

	1995	1996	1997	1998	1999	2000P	2001 1/
1. GDP							
1.1 GDP at constant 1988 price (% change)	8.9	5.9	-1.7	-10.2	4.2	4.0-4.5	n.a.
1.2 GNP per capita (baht)	69,316	75,103	75,991	73,056	73,771	n.a.	n.a.
2. Inflation							
2.1 Headline Inflation (% change)	5.8	5.9	5.6	8.1	0.3	1.6	1.3
3. External Account (billions of US$)							
3.1 Export	55.7	54.7	56.7	52.9	56.8	67.9	5.0
(% change)	(24.6)	(-1.8)	(3.7)	(-6.8)	(7.4)	(19.6)	(-3.9)
3.2 Import	70.4	70.8	61.3	40.6	47.5	62.4	5.3
(% change)	(31.8)	(0.6)	(-13.4)	(-33.8)	(16.9)	(31.3)	(31.3)

	1995	1996	1997	1998	1999	2000P	2001 1/
3.3 Trade balance	-14.7	-16.1	-4.6	12.2	9.3	5.5	-0.3
3.4 Current account balance	-13.2	-14.4	-3.1	14.3	12.5	9.2	0.3
(% of GDP)	(-7.9)	(-8.1)	(-0.9)	(12.8)	(10.0)	n.a.	n.a.
3.5 Net capital movement	21.9	19.5	-4.3	-9.8	-7.9	-9.5	n.a.
3.6 Balance of payments	7.2	2.2	-10.6	1.7	4.6	-2.0	0.5
3.7 International reserves (billions of US$)	37.0	38.7	27.0	29.5	34.8	32.7	32.8
3.8 Swap Obligation (billions of US$)			18.0	6.6	4.8	2.1	2.1
3.9 Total debt outstanding (billions of US$)	100.8	108.7	109.3	105.1	95.6	80.2	n.a.
(of which : public debt 2/)	(16.4)	(16.8)	(24.1)	(31.1)	(36.0)	(33.8)	
3.10 Total debt service ratio (%)	11.4	12.3	15.7	21.4	19.4	15.4	n.a.
of which : public (included BOT since 1997)	(2.8)	(2.5)	(2.7)	(3.3)	(4.0)	(4.2)	
Fixed deposits (1 yr.)	10.25-11.00	8.50-9.25	10.00-13.00	6.00	4.00-4.25	3.50	3.50
4. Exchange rate							
Baht : US$ (EEF) average 3/	24.92	25.34	31.37	41.37	37.84	43.09	43.12

Source: Bank of Thailand
Remark : 1/ Item 1 through 2 are yearly estimates as at end-January 2001.
Item 3 through 4 are preliminary figures of January 2001.
2/ Include Bank of Thailand's debt.
3/ Since July 1997, the figures are represented by average inter-bank exchange rate.

The balance of payments in January 2001 recorded a surplus of US $ 513 million following the surplus of US $ 181 million in the month before. The international reserves as of January 2001 was at US $ 32.8 billion (Table 1.2).

Table 1.2 Balance of Payments

Million US$	Monthly Avg.			Last 4 months 2000				2001
	1998	1999	2000	Sep	Oct	Nov	Dec	Jan
Exports	*4,407*	*4,733*	*5,662*	*5,941*	*6,170*	*6,051*	*5,753*	*5,040*
Imports	*3,387*	*3,961*	*5,202*	*5,340*	*5,900*	*5,581*	*5,340*	*5,323*
Services&Transfers	*171*	*266*	*307*	19	*191*	*400*	*426*	*580*
Current Account	1,191	1,038	767	620	461	870	839	298
Capital Flows	-812	-659	-792	-397	-283	-927	-440	
Error	-235	3	-139	-207	-95	3	-218	
Balance	145	382	163	16	83	-54	181	513
Reserves (end period)	*29.5*	*34.8*	*32.7*	*32.2*	*32.2*	*32.3*	*32.7*	*32.8*

Source: Bank of Thailand

Constructed from data of Customs Department and Tourism Authority of Thailand

1.1.2 Export & Import of Thailand

In 2000, the export growth of agriculture, fishery and manufacturing of labor and high technology were better than in 1999. At the end of year 2000, all categories

Table1.3 Exports Growth (US$ term)

(% Δ Y-O-Y)

Jan2001 =$ 5.0 Bn(-3.9%) Dec 2000 = $5.8 Bn (9.6%)

	Share[1/] %	1998	1999	2000	Last 4 months 2000			
					Sep	Oct	Nov	Dec
Agriculture	7.1	-15.4	-3.6	1.4	-6.5	12.1	4.9	-10.6
Fishery	3.3	-6.7	-4.2	10.9	-10.9	-3.0	9.0	12.7
Manufacturing	85.5	-6.9	9.8	21.3	23.3	15.8	19.7	12.3
- Labor	*11.7*	*-12.2*	*3.1*	*8.0*	*13.0*	*-6.5*	*3.3*	*-3.1*
- High - tech	*60.8*	*-2.5*	*11.5*	*27.6*	*30.2*	*26.3*	*24.1*	*18.6*
- Resource	*8.1*	*-12.3*	*12.0*	*7.5*	*9.3*	*19.2*	*18.1*	*0.2*
TOTAL	100.0	-6.8	7.4	19.6	20.0	15.6	18.0	9.6
Price		-14.1	-3.4	-2.2	-1.4	2.5	2.0	2.4
Quantity		8.5	11.1	22.3	21.7	12.7	15.7	7.0

[1/] Share based on 2000 data

Source: Bank of Thailand. Constructed from data of Customs Department

except fishery category had the exports growth declined from the previous month (Table 1.3).

The major destination of Thai export in 2000 was USA, ASEAN(5), EU and Japan with the percent share of total export 21.3, 16.3, 15.8 and 14.8 respectively. In December, the figure declined from the last month caused of economic slowdown of all major trading countries. USA and Japan are both major export markets of Thailand. The destiny of Thailand's economy mainly depends on these two markets. The percentage shares of total export of these two markets are equal to 36.1 percent (Table 1.4).

Table 1.4 Destination of Thai Export in 2000

Destination	% share of Total Export	% y-o-y			
		Jan-Sep	Oct	Nov	Dec
USA	21.3	19.4	12.1	14.3	11.4
ASEAN (5)	16.3	26.3	27.3	21.6	18.6
EU	15.8	13.9	8.1	10.5	2.1
Japan	14.8	28.3	20.1	24.8	10.0
Hong Kong	5.0	19.1	23.1	18.5	6.7
China	4.1	49.4	70.7	55.1	54.4
Taiwan	3.5	28.5	17.4	-12.2	-9.0
Sub total	80.8				
ALL	100.0	21.4	15.4	17.0	10.7

Source: Bank of Thailand (Constructed from data of Customs Department)
% y-o-y = % year on year

In 2000, the import value of major capital goods was US $ 19,835 million that was higher than 1999. From the table 1.5 shows that in year 2000, the demand for non-electric and electric machinery were increasing especially aircraft and ships that increase 143.7 percent comparing to the last year. The import growths of major capital goods especially aircrafts and ships are the main cause of trade deficit in January 2001.

Table 1.5 Import of major capital goods

Capital goods	1999	2000		2000 (% yoy)			2000
	(milUS)	(milUS)	% yoy	Oct	Nov	Dec	Weight
Non-electrical machinery and parts	4,044	5,663	40.0	36.06	25.72	25.08	28.5
Electrical machinery and parts	5,698	7,267	27.5	36.72	31.73	23.08	36.6
Aircrafts and ships	737	1,797	143.7	319.49	162.09	164.26	9.1
Others	5,247	5,107	-2.7				25.8
Total capital goods*	15,726	19,835	26.1	40.44	21.16	22.80	100.0

* Capital goods does not include IC and IC parts and computer and computer parts

Source: Bank of Thailand

Constructed from data of Customs Department

From Table 1.6 the imports growth in 2000 was 31.3 percent that was higher than in 1999. In 2000 the demand of vehicles & parts decreased from 1999 but the demands of the other categories were still high. At the end of the year 2000, the large quantity demand of oil declined when comparing to the last month. The total capital goods increased from US $ 15,726 million in 1999 to US $ 19,835 million in 2000.

Table 1.6 Imports Growth (US$ term)

(% Δ Y-O-Y)

Jan2001 = $5.3 Bn(31.3%) Dec 2000 = $5.3 Bn (16.3%)

	Share 1/ %	1998	1999	2000	Last 4 months 2000			
					Sep	Oct	Nov	Dec
Capital 2/	31.9	-33.8	3.5	26.1	17.6	40.4	21.2	22.8
Raw material	43.3	-26.9	21.0	29.8	26.9	30.8	11.3	16.6
Consumer	10.6	-27.8	13.9	20.1	24.2	32.7	13.8	-3.4
Oil	11.0	-42.8	36.3	59.9	10.9	51.7	59.1	8.8
Vehicles & parts	3.1	-79.6	154.3	54.7	35.4	19.3	-3.8	6.9
TOTAL	100.0	-33.8	16.9	31.3	24.3	36.6	18.8	16.3
Price		-8.7	-4.6	7.4	9.0	10.4	12.1	13.8
Quantity		-27.5	22.5	22.3	14.1	23.8	5.9	2.1

1/ Share based on 2000 data

2/ Computer and IC are recategorized from Capital to Raw material

Source: Bank of Thailand (Constructed from data of Customs Department)

The price of exports since 1996 – 2000 in crude materials are below than the base year (1995). In-group of animal and vegetable oils and fats, the price index is decreasing continuously. The price index of the total export in 2000 increased from 1999 at the low number. Different to price index of the total imports that it increased from 144.62 in1999 to be 161.35 in 2000 (Table 1.7).

Table 1.7 Import and Export Price Indices

Price Indices 1/ by Commodity Groups

(1995=100)

(In terms of BAHT)

Line	(In terms of BAHT)	1996	1997	1998	1999	2000	Line
	a. Exports						
1	Food	101.94	116.80	141.74	112.16	111.51	1
2	Beverages and tobacco	113.83	137.65	155.55	128.97	131.81	2
3	Crude materials	98.05	95.75	93.96	74.84	87.99	3
4	Mineral fuel and lubricant	100.05	108.97	96.94	86.91	150.11	4
5	Animal and vegetable oils and fats	101.89	72.19	69.99	56.85	29.24	5
6	Chemicals	95.40	108.33	116.87	107.29	138.22	6
7	Manufactured goods	118.95	137.00	149.31	121.61	120.72	7
8	Machinery	114.12	137.57	167.83	154.76	149.38	8
9	Miscellaneous manufactured goods	108.31	130.62	155.46	147.74	158.95	9
10	**Total**	**110.77**	**132.02**	**151.44**	**133.14**	**138.32**	**10**
	b. Imports						
11	Food	105.65	117.83	147.49	118.72	116.06	11
12	Beverages and tobacco	73.03	57.99	52.41	40.14	38.04	12
13	Crude materials	105.64	112.96	129.67	105.72	107.88	13
14	Mineral fuel and lubricant	114.18	138.68	130.53	137.18	246.35	14
15	Animal and vegetable oils and fats	95.38	105.08	111.99	81.53	67.66	15
16	Chemicals	90.94	97.83	113.43	96.13	114.58	16
17	Manufactured goods	105.53	116.13	152.44	136.35	131.90	17
18	Machinery	123.51	153.52	200.84	163.68	178.12	18
19	Miscellaneous manufactured goods	111.39	131.98	177.19	171.27	181.21	19
20	**Total**	**113.00**	**133.98**	**162.50**	**144.62**	**161.35**	**20**

1/ From January 1996 onwards, for both export and import categories, unit value indices are calculated by using FISHER CHAINED method and the base year was 1995 (i,e,1995=100)

Source : Bank of Thailand

1.1.3 Export and Import of the World

Table 1.8 Developing Countries- by region: Total Trade in Goods

(Annual percentage change)

Developing countries	1996	1997	1998	1999	2000	2001
Value in U.S. dollars						
Exports	12.1	8.2	-7.7	9.5	20.4	5.9
Imports	9.4	6.6	-4.6	1.5	15.1	10.3
Volume						
Exports	8.7	10.9	3.5	5.3	10.3	7.0
Imports	7.8	8.8	0.2	0.5	11.2	9.9
Unit value in U.S. dollars						
Exports	3.4	-2.2	-10.5	5.3	9.2	-0.9
Imports	1.9	-1.7	-5.0	2.6	3.4	0.5
Terms of trade	1.4	-0.5	-5.8	2.6	5.7	-1.3

Source: World Economic Outlook October 2000

The annual percentage change of export value in US dollars is estimated to decline from 20.4 percent in 2000 to be 5.9 percent in 2001. Same to imports that decreases from 15.1 percent in 2000 to be 10.3 percent in 2001. The reason comes from the economies of major importing countries are slowdown such as USA. The demands of importing countries are declining. For the estimation in 2001, the term of trade will be –1.3 percent. All figures in 2000 were higher than both 1999 and 2001.

Most of developing countries could improve their economies through new exchange rate regimes. The choice of an exchange rate regime can reveal a country's choice of economic policy and it affects the export performance. It also has impact on their country's trading partners that its exchange rate regimes may lead to the new relative competitiveness. Exchange rate regimes can thus decide the conditions on the basis of which economies participate in the international economy.

Developing countries in Southeast Asia that were the cause of economic crisis changed their old exchange rate regimes to the new one to strengthen their export performance. For example, in mid-1997 Thailand changed from a basket of currencies to dirty float. In that time, the Thai baht as it was fixed to a basket of currencies in which 80% of the total value was the US dollar.

1.1.4 Exchange Rate Regime and Export Performance

An exchange rate regime is the sum-total of rules and regulations that govern intervention in the exchange market by monetary authorities and, consequently, influence the pattern of behavior of an exchange rate. There are a great variety of exchange rate regimes: fixed rates of exchange and flexible rates of exchange (Lahrè che-Revil, 2000).

In this study, exchange rate regimes are classified into six categories accordingly to IMF classification, ranging from fixed rate to independently floating. Dummy variable for these exchange rate regime categories are then included in a gravity model which is estimated in time series and cross-sections of bilateral export flows for 99 developing countries.

The fixed rate of exchange rate regime implies that the domestic currency will be pegged to the one major foreign currency such as pegged to U.S. dollar or a group of currencies such as pegged to five major currencies (U.S. dollar, Yen, Mark, Pound Sterling and Franc Swiss). The central bank has the function to stabilize the exchange rate between currencies. In order to support the commitment of central bank to make the parity, it must intervene on the uncertainty of foreign exchange rate

in which to establish the constant exchange rate. The intervention will affect the reserve fund if it is unsuccessful in the longer run. This intervention is to guarantee the exporters and importers that they will gain the exact money after making the business but the central bank has to take the risk of uncertainty. When a country uses fixed exchange rate regime as their economic policy, they will lose some of the freedom of action to set economic policy. A great point in favor of fixed exchange rates is that they are an aid to economic growth and international trade (Douch, 1989).

The flexible rate of exchange rate regime implies that the domestic currency will not depend on any foreign currencies. If exchange rates are floating, then market forces will determine the equilibrium level at which supply and demand will match (Douch, 1989). The central bank will not to intervene on the money transaction. There is no need to do anything but depends on the market forces. The government can pursue their any economic policies. The exchange rate will be fluctuated in everyday so the importers and exporters will gain or loss from the uncertainty of exchange rate. This regime is good for the country that no use of reserve fund to support the depreciation of the domestic currency.

1.2 Statement of the problem

In the second half of the 1997, Thailand adopted the floating exchange rate system to avoid the economic crisis with a hope to stimulate the economy especially export sector. However, another developing countries such as Indonesia also accepted the floating exchange rate system to strengthen their export performance.

That was the important episode in which many other developing countries in the world changed their economic policy to keep their international competitiveness.

After changing the exchange rate regime from fixed to float exchange rate system, Thai baht was depreciated from 25.34 baht / US dollar in 1996 to be 31.37 / US dollar in 1997. This increased exchange rate cost to both public and private sectors that owned debt from foreign borrowing. It also costs to importers who order the raw materials and goods in foreign currencies.

In the export sector, Thailand faced export decreased in January 2001, which is the first time in eleven months. It makes people confusing that this independently floating is good or not in the long term or just go along to economic theory.

1.3 Research objective

The objectives of this research are

- To analyze the net effects of developing countries' choice of exchange rate regime on their exports during 1995-1999.

- To develop a model to explain the export value from exporting country to importing country that are affected by importing country's potential demand, exporting country's potential supply, transaction costs and exchange rate regime.

1.4 Scope of the study

This study concentrates on the chosen developing countries from the International Monetary Fund, United Nations and World Bank, which all those countries provide the available data to be used in completing this research accordingly to

1. Time - 1995 – 1999
2. Variables - GNP of importing and exporting countries, per capita GNP of importing and exporting countries, classification of exchange rate regime, EU countries and Japan.
3. Countries - Ninety-nine countries

The following are the chosen countries listed in the table

Table 1.9 List of Developing countries included in the study

Algeria	Ghana	Oman
Argentina	Guatemala	Pakistan
Bahamas	Guinea	Panama
Bahrain	Guinea-Bissau	Papua New Guinea
Bangladesh	Guyana	Paraguay
Barbados	Haiti	Peru
Belize	Honduras	Philippines
Benin	Hong Kong	Qatar
Bolivia	India	Rwanda
Brazil	Indonesia	Saudi Arabia
Bulgaria	Iran	Senegal
Burkina Faso	Israel	Seychelles
Burundi	Jamaica	Singapore
Cameroon	Jordan	Solomon Islands
Central African Republic	Kenya	South Africa
Chad	Korea RP	Sri Lanka
Chile	Kuwait	St Kitts and Nevis
China	Laos	Sudan
Colombia	Madagascar	Suriname
Comoros	Malawi	Syria
Congo	Malaysia	Tanzania
Costa Rica	Maldives	Thailand
Côte d'Ivoire	Mali	Togo
Cyprus	Malta	Trinidad & Tobago
Dominican Republic	Mauritania	Tunisia
Ecuador	Mauritius	Turkey
Egypt	Mexico	Uganda
El Salvador	Morocco	United Arab Emirates
Equatorial Guinea	Mozambique	Uruguay
Ethiopia	Nepal	Venezuela
Fiji	Nicaragua	Yemen
Gabon	Niger	Zambia
Gambia	Nigeria	Zimbabwe

Source: IMF

1.5 Limitation of the study

The result limitations are as following:

1. The years are studied only during 1995 – 1999.
2. The selected developing countries and available information are gathered from International Monetary Fund(IMF), United Nations(UN), World Bank and The MacMillan World Atlas.
3. Distance between two countries is represented as the transaction costs.
4. Exchange rate regimes of developed countries are excluded in this study.

1.6 Significance of the study

After the study completed, the researcher hopes to benefit the following parties:

1. To Policymakers

   Since export-led growth is the main factor to lead the economy. They can use this study as a development strategy to increase their export performance.

2. To Businesspersons

   Exchange rate regime is important in determining the exchange rate system of the country. Both fixed and flexible exchange rate systems can impact on the confidence of the investors. The undervaluation of currency stimulates the export performance. On the other hand, the overvaluation of currency also can reduce the export sector. Then, they can use this study as a tool in considering which country to be invested.

3. To Academic

This study can be used as the case study in learning the impact of exchange rate regimes on export performance of developing countries. To see the result whether independent floating is the best choice when comparing to the other exchange rate regimes.

1.6 Definition of terms:

For clarifying and understanding, the terms in this research are defined as follows:

Demand - the quantities per unit of time that buyers will take at all possible alternative prices, other things being equal (Leftwich, 1984).

EU -The EU group of countries consists of Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, and the UK. Greece, Portugal and Spain have been excluded from this analysis, as have the Eastern European countries.

Export performance- is interpreted by the export value from exporting country to importing country (Nilsson, 2000).

Exchange rate - the value of one currency relative to another (Melicher, Welshans, and Norton, 1997)

Exchange rate regime- An exchange rate regime is the sum-total of rules and regulations that govern intervention in the exchange market by monetary authorities and, consequently, influence the pattern of behavior of an exchange rate. There are a great variety of exchange rate regimes: fixed rates of exchange and flexible rates of exchange (Revil, 2000).

Gross Domestic Product(GDP) - is the value of all final goods and services produced within the territory of a country by using domestic factors of production within a given period. GDP includes the value of goods produced as well as the value of services (Bank of Thailand).

Gross National Product(GNP) - is the value of final goods produced within the country by using factors of production of that nationality, including all income earned abroad by residents (Bank of Thailand).

Heteroskedasticity – is the violation of the classical assumption that the observations of the error term are drawn from a distribution with a constant variance (Studenmund, 1992).

Independently floating – The exchange rate is market determined, with any foreign exchange intervention aimed at moderating the rate of

change and preventing undue fluctuations in the exchange rate, rather than at establishing a level for it (IMF, 2000).

International competitiveness- the relative price of domestic tradable goods in terms of foreign tradable (Turner and Golub, 1997).

International Monetary Fund(IMF)- Institution formed by the Bretton Woods agreement to ensure the convertibility of currencies.

Per capita GNP - measures the value of the output according to the size of population and is obtained by dividing the GNP by total population (Bank of Thailand).

Per capita income- GDP or GNP divided by the population of a country in a given period.

Perfect Multicollinearity – is the violation of the assumption that no explanatory variable is a perfect linear function of other explanatory variables (Studenmund, 1992).

Serial Correlation or autocorrelation – is the violation of the classical assumption that the observations of the error term are uncorrelated with each other (Studenmund, 1992).

Supply -quantities per unit of time that will be placed on the market at all possible alternative prices, other things being equal (Leftwich, 1984).

Transaction costs- The costs of undertaking exchange, including fees, bank charges, communications expenses, and so on (Berry, Conkling and Ray, 1997).

CHAPTER II

LITERATURE REVIEW

This chapter is divided into three parts. The first part is the Exchange Rate Regime and Export. The second part is the Gravity model. The third part is the review of empirical studies, which have been conducted on Exchange Rate Regime on Export Performance and other related studies.

2.1 Exchange Rate Regime and Export

When a country has a trade relationship with other countries, it has a task to choose a policy in managing an exchange rate to secure the internal and external equilibrium in the economy. Real-targets approach and nominal-anchor approach are two main strategies for policymaker to choose (Corden, 1990).

The real target approach suggests that the nominal exchange rate can be and should be allowed to vary, or be adjusted to avoid exchange rate misalignment and keep international competitiveness. This approach allows using the nominal exchange rate together with other policy instrument to attain real objectives such as a desired current account target. By attaining the real objectives, the nominal exchange rate should follow rather than lead other nominal variables. This approach can call for a flexible exchange rate regime (Nilsson, 2000). Corden (1993) advocated this approach is the best approach for developing countries to be rely on.

With the nominal-anchor approach suggests that the nominal exchange rate should be used to fix with the domestic inflation rate to the inflation rate of trading

countries. Thus, the nominal exchange rate should lead rather than follow other nominal variables. It calls for a pegged exchange rate regime (Nilsson, 2000). The exchange rate in this approach is used as a tool for anti-inflation policy (Corden, 1990).

The Real Exchange Rate (RER) and the Real Effective Exchange Rate (REER) are employed to evaluate the international competitiveness. The real exchange rate is the nominal exchange rate adjusted for inflation. The real exchange rate can be defined as (Edwards, 1989)

$$RER = E \times \frac{P^*_T}{P_N}$$

Where E is the nominal exchange rate in units of domestic currency per unit of foreign currency

P^*_T is the world price of tradables in term of foreign currency

P_N is the price of non-tradable goods

The real exchange rate is a good measure of a country's degree of international competitiveness (Edwards, 1988).

An overvaluation of the real exchange rate has negatively impact on international competitiveness and should be expected to be obstacle to exports. It may also increase protectionist pressure. If protectionist measure are operated, export incentives are most likely to be further reduced (Edwards, 1988). Contrary to an

undervaluation of the real exchange rate, it should tend to support the export incentives.

The Real Effective Exchange Rate (REER) indices measure how nominal exchange rates, adjusted for price differential between a country and its trading partners, have moved over a period of time (Lafrance, Osakwe and St-Amant, 1998). It measures the multilateral international competitiveness.

$$REER = P/[(P_1E_1)^{W_1} * (P_2E_2)^{W_2} \ldots (P_nE_n)^{W_n}]$$

Where P is an index of domestic prices

$P_1 \ldots Pn$ is price indices of competitor countries

$E_1 \ldots En$ is the respective bilateral exchange rates

and $W_1 \ldots Wn$ is the relative weights of the foreign countries in the index

A number of alternative exchange rate regimes are available in both the real-targets approach and the nominal-anchor approach, ranging from independently floating to single currency pegging. Different exchange rate regimes have their own various effects that may affect developing countries' exports (Nilsson, 2000).

(i) Misalignments of the real effective exchange rate

(ii) Volatility in the real effective exchange rate

(iii) Exchange rate volatility vis-a'-vis the invoicing currency(currencies) of exports

Misalignment of the real exchange rate is the deviation of the actual real exchange rate from its equilibrium value (Lim, 2000). Edward (1989) defined that misalignments of the real exchange are as sustained deviations of the actual real exchange rate from its long-run equilibrium level. The long-run equilibrium value is the value of the real exchange rate that maintains internal and external equilibrium. It is a measurement reflecting the level of the actual real exchange rate (Nilsson, 2000). This real exchange rate misalignment happens in markets when the actual exchange rate, often terms the nominal exchange rate, does not adjust to changes in economic fundamentals (Pick and Vollrath, 1994).

When a country relies on the nominal-anchor approach to have a greater tendency to develop real exchange rate misalignment than countries keeping more flexible exchange rate regimes. Misalignment may increase or decrease exports depending on whether they reflect an undervaluation or an overvaluation of the exchange rate. As above, despite less flexible exchange rate regimes are expected to deal with real exchange rate misalignments to a bigger extent than more flexible regimes. It is not possible to establish an unambiguous effect on exports of such misalignments (Nilsson, 2000).

Exchange rate volatility is a measure of the uncertainty of the real exchange rate. A measurement is used for exchange rate volatility. It is the standard deviation of the percentage change of the detrended exchange rate over a period of time (Coté, 1994). It can affect trade directly, through uncertainty and adjustment costs, and indirectly, through its effect on the structure of output and investment and on government policy (Coté, 1994). Exchange rate volatility is important issue because

volatility may act as an impediment to international trade (McKenzie and Brooks, 1997).

The effect of exchange rate volatility on trade prices depends on the degree of competition and the relative degree of risk aversion and risk exposure of importers and exporters. If exporters bear the risk, price will increase. If importers do, prices may fall (Coté, 1994). It can be seen as uncertainty in future international competitiveness.

In the study of McKenzie and Brooks (1997) about the impact of exchange rate volatility on German-US trade flows by using an ARCH model to generate estimates of the volatility, they found out that there is a significant positive relationship between volatility and trade flows. McKenzie (1998) studied about the impact of exchange rate volatility on Australian trade flows by using ARCH and GARCH models to generate volatility estimates, he found out that Australian exports are affected in a positive result by exchange rate volatility while imports are impacted upon in a negative result. Many studies appear to favor the conventional assumption that exchange rate volatility depresses the level of trade (Coté, 1994). From various empirical studies have produced ambiguous results on the effects of real exchange rate volatility on the volume of exports same to real exchange rate volatility to various exchange rate regimes also proves difficult (Nilsson, 2000). The effects of real exchange rate volatility on exports still remain an open question (Nilsson, 2000).

Exchange rate volatility vis-a'-vis the invoicing currency (currencies) of exports makes uncertainty in outstanding export revenues, which affect developing

countries' exports negatively (Clark, 1973). It is sometimes argued in the literature that this invoicing currency effect on exports should be of relatively little concern since it may easily be hedged at a low cost (Nilsson, 2000). By hedging the currency to US dollars, developing countries can eliminate the exchange rate volatility and its potentially negative effect on exports (Nilsson, 2000).

2.2 Gravity Model

Bilateral trade patterns are well described empirically by gravity model. Gravity model tries to explain the value of export and import in terms of income, distance and population. It applies to a various goods and factors that move across from one regional or national borders to others under different circumstances. Gravity model relates trade between two trading parties, which is positive to bot of their incomes and population and negatively to the distance between them. Gravity model is also used to explain many other types of flows such as migration, commuting, tourism and commodity shipping (Bergstrand, 1985)

In the simple form of gravity model, the value of exports from one country to others will depend on the national incomes and distance between them (Deardorff, 1995).

$$T_{ij} = A \frac{Y_i Y_j}{D_{ij}}$$

Where T_{ij} is the value of exports from country i to country j, the Y's are their respective national incomes, D_{ij} is a measure of the distance between them, and A is a constant of proportionality.

In 1979, James E. Anderson studied the bilateral trade between countries and he built a gravity model that includes population in his model. The export value depends on the incomes, population of both countries and distance between them. Normally the equation is run on cross section data and sometimes on pooled data.

$$M_{ijk} = \alpha_k Y_i^{\beta k} Y_j^{Yk} N_j^{Ek} N_j^{\epsilon k} d_{ij}^{\mu k} U_{ijk}$$

Where M_{ijk} is the dollar flow of good or factor k from country or region i to country or region j, Y_i *and* Y_j are incomes in i and j, N_i *and* N_j are population in i and j, and d_{ij} is the distance between countries (regions) i and j. The U_{ijk} is a log normally distributed error term with E (ln U_{ijk}) = 0.

Jeffrey H. Bergstrand studied the international trade in 1985 that he used the gravity model to explain the trade flow between countries. It was different to Anderson (1979). In his model, he did not include the population in his model but added one factor that is either positive or negative to the trade. The value of exports depends on the nominal GDP of both countries, distance between them and any factor (s) either aiding or resisting trade of both countries. He used GDP instead of the incomes of the countries in explaining the revenue of the countries.

$$PX_{ij} = \beta_0 (Y_i)^{\beta 1} (Y_j)^{\beta 2} (D_{ij})^{\beta 3} (A_{ij})^{\beta 4} u_{ij}$$

Where PX_{ij} is the U.S. dollar value of the flow from country i to country j, Y_i (Y_j) is the U.S. dollar value of nominal GDP in i (j), D_{ij} is the distance from the

economic center of i to that of j, A_{ij} is any other factor(s) either aiding or resisting trade between i and j, and u_{ij} is a log-normally distributed error term with $E(\ln u_{ij}) = 0$.

This model was also used in Tinbergen (1962), Pöyhönen (1963a,1963b), Pulliainen (1963), Geraci and Prewo (1977), Prewo (1978), and Abrams (1980) to explain their bilateral trade.

After 1985, Jeffrey H. Bergstrand studied more about gravity model. In 1989, he focused more on the monopolistic competition, and the factor-proportion theory in international trade. One more variable was added in his model. Population of both countries are major factors. The value of exports depends on the nominal GDP and population of both countries, distance between them and any factor(s) either aiding or resisting trade of both countries. According to his gravity equation in international trade gross bilateral trade flows across pairs of countries can be explained:

$$PX_{ij} = \Psi_0 (Y_i)^{\Psi 1} (Y_i/L_i)^{\Psi 2} (Y_j)^{\Psi 3} X(Y_j/L_j)^{\Psi 4} (D_{ij})^{\Psi 5} (A_{ij})^{\Psi 6} e_{ij}$$

Where PX_i is the U.S. dollar value of the flow from country i to country j. $Y_i(Y_j)$ is the U.S. dollar value of nominal GDP in $i(j)$, $L_i(L_j)$ is the population in $i(j)$, D_{ij} is the distance from the economic center of it to that of j, A_{ij} is any factor(s) either aiding or resisting trade between i and j, and e_{ij} is a log-normally distributed error term. Estimates of Ψ_1, Ψ_2, Ψ_3, and Ψ_4 are typically positive; estimates of Ψ_5 are negative.

Income of international trade flow of importer and exporter is significant for quantities for demand and supply. The more importer's incomes, the more export value. A bilateral trade flow equation must include importer and export incomes as exogenous variables to be a gravity model (Bergstrand, 1985). Income affects the ability of both trading countries. A rise of income in importing country or an appreciation of their currency will increase quantity demanded of goods that lead to more trade. Importer's income, adjacency, and preferential trading arrangements have positive related to trade (Bergstrad, 1985). Under usual monopolistic competition assumption, firms view the marginal utility of income s fixed (Bergstrand, 1989). In the study of Bahmani-Oskooee (1986), income had statistically significant impacts on imports of Brazil, Greece and Israel.

Even though per capita income is one major factor that should be included in the gravity model because of showing the income of each people. But in the studies of gravity model, Anderson (1979), Bergstrand (1985) and Helpman and Krugman (1985) did not include per capita income. Same to the study of Thursby (1987), he added absolute per capita income differences without population. It is added to test the reflection difference in importer's tastes. It is different to Linnemann (1966) and Leamer (1974). They gave the importance on per capita income. The absolute difference between the two countries' per capita incomes was added as an explanatory variable to the basic gravity model. Per capita income differences are used to specify like the model of Bergstrand in 1989 as a "crude index of the difference in consumption patterns" (Gruber and Vernon, 1970). Income per capita is an exogenous demand side factor and population (country size) a supply-side factor in the trade-share expenditure system (Anderson, 1979).

Here trade tends to the standard gravity model with trade declining in distance, with departures from it that depends on relative transport costs. Distance is a negative factor that reduces the trade flow between trading parties. Importing country will choose a nearby trading party instead of choosing a far one. The greater distance between these countries will reduce the trade flow (Bergstrand, 1989). The transport cost factor can be expressed by the distance between economic centers of both countries (Bergstrand, 1985).

2.3 Empirical studies on Exchange Rate Regime and Export Performance

The study of Kristian Nilsson and Lars Nilsson(2000) has been carried out which serve as useful and practical reference. Arize (1990) is another study, which his model is used to compare with the Nilsson's model to explain the export performance. This study will be represented in details on the research framework and methodology.

Kristian Nilsson and Lars Nilsson (2000) conducted their working on the Exchange rate regimes and Export performance of developing countries. There are some 100 countries included in his study. The study was to analyze the net effects of developing countries' choice of exchange rate regime on their exports. They focused on only developing countries' exports rather than on their total trade. Arize (1990) studied the export behavior in seven Asian developing countries. They are India, Indonesia, Malaysia, Pakistan, The Philippines, The Republic of Korea, and Thailand.

a) Research framework and Methodology

The study consists of two main parts and was done on one time period, between 1983 – 1992. The first part discussed the role of exchange rate regimes and exchange rate policies for exports of developing countries by taking some 100 countries. The second part presented the classification of exchange rate regimes and introduces a gravity model for estimating the export effects of different exchange rate regimes.

They used the gravity model to explain bilateral trade flows. They also used Regression Analysis to test the dependent variable can be explained by the independent variables. The method uses multiple regression, T-test and F-test.

This gravity model has three sets of factors: the import country's potential demand, the export country's potential supply, and transaction costs. The first factor uses the variables GNP*i* and GNP*i*/POP*i* to capture the import demand of the importing country. The second factor uses the variables GNP*j* and GNP*j*/POP*j* to capture the potential export supply of the developing countries. The third factor uses the variable DIST*ij* as a measurement of transport and transaction costs.

In the study of Arize (1990), an econometric model was used to examine the extent of short-run competitive factors in developing countries' export performance. The model is in the reduced-form export function to explain export performances. There are assumptions in the simple reduced form model of equilibrium export.

1. Market is equilibrium
2. Goods exported are all imperfect substitutes for domestic goods.

3. The export of Thailand is imperfect substitutes for the goods exported from competing countries.
4. In each export market, the Thai exports compete particularly with the exports of the competitors.

According to the assumptions, the reduced-form export model comes from:

1. Export Demand: The demand for Thai exports depends on the GDP of the importer countries, relative price between the Thai exports and the competitors exports expressed in the units of common currency. It is defined in the log linear form as following:

$$\ln XD = a_0 + a_1 \ln YM + a_2 \ln ePXT/PO + e_1$$

Where XD is the demand for the Thai exports, YM is the GDP of the importer countries which represents the marketing power, ePXT/PO is the relative price between the Thai exports and the competitor's exports expressed in the units of common currency and e_1 is error term.

2. Export Supply: The supply of Thai exports depends on the country's capital inputs and the incentive to export relative to domestic sale. It can be defined in the log linear form as following:

$$\ln XS = b_0 + b_1 \ln K + b_2 \ln PXT/PD + b_3 \ln W + e_2$$

Where XS is the supply of the Thai exports, K is capital accumulating condition, which represents the capital inputs. PXT/PD is the relative price of the exports and domestic goods, which represent the incentive to export relative to domestic sale, W is the labor cost and e_2 is error term.

The Reduced-Form

At the equilibrium, the export demand equals the export supply.

$$\ln XD = \ln XS$$

b) Empirical findings

Kristian Nilsson and Lars Nilsson (2000) found out that the more flexible the exchange rate regime, the greater the exports of developing countries, ceteris paribus. The results are stable over time. The fact that the number of developing countries under the various exchange rate regimes has fluctuated substantially over the study period implies that the results are quite robust.

Arize (1990) found out that the both export demand and export supply have the high value of R^2 which indicate that the export demand and export supply model well explain the demand and supply path across the Asian countries. Following to his study, the results obtained convincingly support the theory. The reduced-form model is strong for explaining the export performances of developing countries.

- Another related empirical finding according to Gravity equation

Table 2.1 Model and finding of Gravity equation to each author

AUTHOR	DEPENDENT VARIABLE	INDEPENDENT VARIABLE	FINDING
Bergstrand(1989)	Value of exports	The nominal GDP of both countries, population of both countries, distance between them and any factor(s) either aiding or resisting trade of both countries.	Generalized gravity equation explains empirically between 40% and 80% of the variation across countries in one-digit SITC trade flows.
Bergstrand(1985)	Value of exports	The nominal GDP of both countries, distance between them and any factor(s) either aiding or resisting trade of both countries.	Gravity equation is a reduced form from a partial equilibrium subsystem of a general equilibrium model with a nationally differentiated products.

CHAPTER III

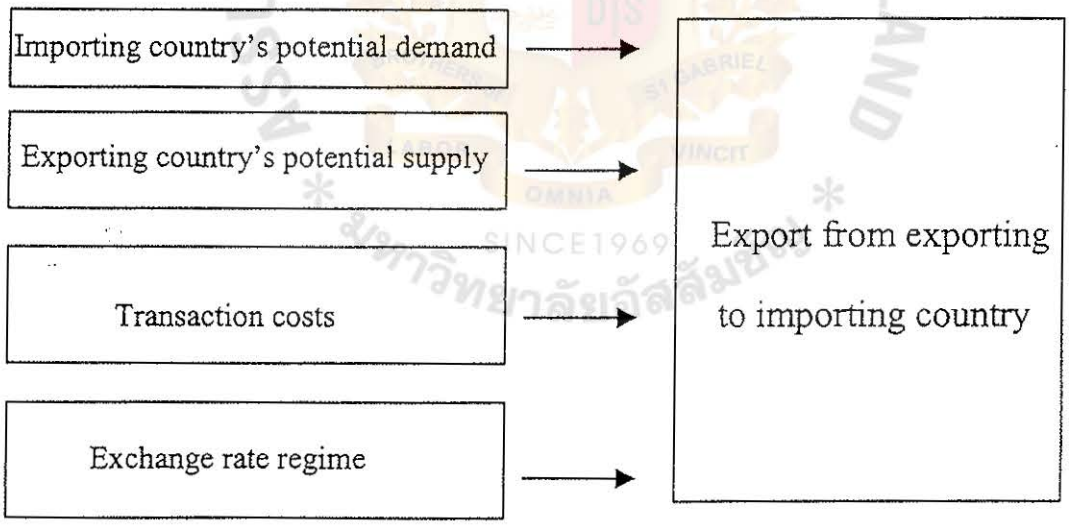
THEORETICAL AND CONCEPTUAL FRAMEWORKS

This chapter includes four parts. The first part presents the conceptual framework, based on concepts and theories in the previous chapter. The second part presents the regression model. The third part presents operationalization of the independent and dependent variables. The forth part presents research hypotheses.

3.1 Conceptual Framework

The following conceptual framework is based on the integration of concepts and theories of demand, supply, transaction costs and related theories and concepts.

Figure 3.1 Conceptual framework



For the importing country's potential demand, the quantities of goods and services demanded depend on many factors. One of them is the income of the importing country. The incomes of buyers is one factor that determines the quantities demanded per unit of time (Leftwich, 1984).

The more money buyers have to spend the greater the quantity they will want to buy of most goods and services. When their income falls, their willingness to buy goods and services also decline. Quantities demanded fall during the recession and expanded during the recovery period.

Gross National Product (GNP) is the principal measure of aggregate production. GNP is also the most widely used measure of national income. It is defined as the total market value of the final goods and services produced in the nation during a given period of time (Fleisher, Kopecky and Paul, 1976). The measure of GNP is used to conceive of the economy as being one huge production unit turning out goods for sale to consumers, business firms, and the government (Horvitz and Ward, 1983). Gross national product includes the annual outputs of both the private sector of the economy and the public sector (Leftwich, 1984).

Real GNP provides the information on what occurs to country's economy in the real output of goods and services over time but it does not regard to the living standards that can be change over time. The per capita GNP plays a major role in finding the output of individual in a country. The population and population changes of the economy from year to year have been left out of account (Leftwich, 1984).

The measurement of the importing demand of the importing country is GNP*i* and GNP*i*/POP*i*. GNP*i* reflects economic size and is expected to positively affect exports. A higher per capita income shows a higher import demand. The population component of per capita income may however affect trade in two ways. A large population indicates a large domestic market, a higher degree of self-sufficiency and

less need to trade. A large population also promotes division of labor and implies the presence of economies of scale in production and therefore opportunities and desire to trade with a greater variety of goods. Thus, the effect of per capita income on imports is ambiguous.

For the exporting country's potential supply uses the same arguments applied to import demand. The measurement of this is GNP*j* and GNP*j*/POP*j*. The number of varieties is more available if the GNP increases. When people have more income, they will have more saving. Finally, saving will be used to reinvest in the business and manufacturing again. The country will have a variety of goods to be exported. A higher output per person indicates a potential for higher exports, but a larger population may both increase and decrease trade.

Distance has performed as a barrier to trade in a various ways. The most obvious effect of distance is the burden of transport cost it imposes on every shipment of goods between two countries (Berry, Conkling and Ray 1997). The cost is not the number of miles to be covered but also the characteristic of the route to be delivered. So the shipment cost will be increased if the route is unusual such as mountain terrain. The shipments to foreign destinations also incur transaction costs such as bank collection charges and freight forwarders.

The transport costs are related to distance and transaction costs shows the fact that people are better informed of products. It has smaller cultural difference when belonging to adjacent countries. Total transportation costs are different from one commodity to another commodity. They are higher on finished goods than on bulk shipments of raw materials (Suuza and Stutz, 1994). Raw materials requires less care

and less special handling. The measurement of the transaction cost is the distance between the economic centers of two countries.

The choice of exchange rate regime is to estimate the effects of the developing countries' exchange rate regime on exports. The IMF's classification of various exchange rate regimes is employed in this study. There are six exchange rate regime categories, ranging from single currency pegging to independently floating.

3.2 Regression model

The Econometric Regression model

$$EXP_{ij} = \alpha + \beta_1 GNP_i + \beta_2 (GNP_i/POP_i) + \beta_3 GNP_j + \beta_4 (GNP_j/POP_j) + \beta_5 DIST_{ij} + \beta_6 A1 + \beta_7 A2 + \beta_8 A3 + \beta_9 A4 + \beta_{10} A5 + \beta_{11} MR + \beta_{12} EU + \beta_{13} JAP + \varepsilon_{ij}$$

When the variables stand for the following;

α = a constant
EXP_{ij} = dollar value(1000 dollar) of the exports to country i from country j (i= the EU countries, Japan, USA)
GNP_i = GNP of country *i* in dollars
GNP_j = GNP of country *j* in dollars
GNP_i/POP_i = per capita income of country *i* in dollars
GNP_j/POP_j = per capita income of country *j* in dollars
$DIST_{ij}$ = the geographical distance (in kilometres) between the capitals of the importing and exporting countries
EU = a binary variable for the EU countries
JAP = a binary variable for Japan
ε_{ij} = a log normally distributed error term
β's = parameters to be estimated

USA is reference group of EU countries and Japan.

A1 – A5 and MR = classification of exchange rate regimes as

Table 3.1 Summary Features of Exchange Rate Regimes and Other Arrangements

Exchange rate Determined On the basis of:		Classification in this study
1. (a) A peg to:	(i) the US dollar	A1
	(ii) the pound sterling	A2
	(iii) the French franc	A2
	(iv) other currencies	A2
	(v) composite of currencies	A3
1. (b) Limited flexibility with respect to:	(i) Single currency	A4
	(ii) co-operative arrangement	A4
1. (c) More flexible exchange rate regimes:	(i) adjusted according to a set of indicators	A5
	(ii) other managed floating	A5
	(iii) independently floating	reference group
Other arrangements		
2. Separate exchange rate(s) for some or all capital transactions and/or some or all invisible.		MR
3. More than one rate for imports.		MR
4. More than one rate for exports.		MR
5. Import rate(s) differ from export rate(s)		MR
All variables are in logs, and the dollar values are in constant 1995 prices.		

Source: IMF(1995-1999) *Exchange rate Arrangement and Exchange Restriction*, Annual Report, IMF, Washington, DC.

The purpose of this study is to find out the relationship of income, population, transaction costs and exchange rate regime toward export performance of developing countries. The independent variables consist of GNP of importing and exporting countries in dollars, per capita income of importing and exporting countries in dollars, the geographical distance (in kilometers) between the capitals of the importing and exporting countries, classification of exchange rate regimes according to IMF classification are dummy variables, EU as a binary for the EU countries, JAP as a binary variable for Japan. The dependent variable is export performance of developing countries.

The volume of the developing countries' exports may differ with respect to the importing countries. A binary variable is therefore assigned to the EU countries and Japan, respectively, using the US as the reference group. The binary variables for the importing countries are included in order to discern special characteristics among the importers (e.g. trade preferences and colonial ties) that may affect the trade flows. These binary variables act only as control variables.

3.3 Operationalization of the Independent and Dependent variables

Table 3.2 Operationalization of the independent and dependent variables

Variables to be tested	Operationalized by	Literature support
Dependent variables Export performance	Dollar value(1000 dollar) of the exports to country i from country j (i = the EU countries, Japan, USA)	Calculated by using Gravity model Nilsson(2000)
Independent variables Importing country's Potential demand	GNPi GNPi/POPi	Leftwich(1984), Fleisher, Kopecky and Paul (1976) Horvitz and Ward(1983),
Exporting country's Potential supply	GNPj GNPj/POPj	Leftwich(1984), Horvitz and Ward(1983), Fleisher, Kopecky and Paul (1976)
Transaction costs	The geographical distance (in kilometres) between the capitals of the importing and exporting countries	Berry, Conkling and Ray (1997), Suuza and Stutz(1994)

Variables to be tested	Operationalized by	Literature support
Exchange rate regime	1. Peg to the US dollar 2. Peg to currencies other than the US dollar 3. Peg to a composite of currencies 4. Limited flexibility 5. More flexible regimes 6. Independently floating	IMF

3.4 Research hypotheses

From the conceptual framework and research questions of this study, the research hypotheses are as following:

Ho: Export cannot be explained by the GNP*i*, GNP*i*/POP*i*, GNP*j*, GNP*j*/POP*j*, DIST*ij*, Exchange rate regime, MR, EU and JAP

Ha: Export can be explained by the GNP*i*, GNP*i*/POP*i*, GNP*j*, GNP*j*/POP*j*, DIST*ij*, Exchange rate regime, MR, EU and JAP

Table 3.3 Expected Signs of the Variables in the Gravity Model

Variable	Sign	Reason
National income of importing country *i* (GNP*i*)	+	Economically larger countries import more.
Per capita income of importing country *i* (GNP*i*/POP*i*)	+/-	A higher per capita income indicates a higher import demand but a larger population may both increase and decrease trade.
National income of developing country *j* (GNP*j*)	+	Potential export supply, number of varieties available.
Per capita income of developing country *j* (GNP*j*/POP*j*)	+/-	A higher output per person indicates a potential for higher exports, but a larger population may both increase and decrease trade.
Distance (DIST*ij*)	-	Transportation and economic proximity.
Binary variables for exchange rate regimes:		
A1. Peg to the US dollar.	?	Compared to the reference group and groups A3-A5: less exchange rate volatility *vis-á-vis* the invoicing currency of exports, but greater tendency for real exchange rate misalignments.
A2. Peg to currencies other than the US dollar.	?	Compared to the reference group and groups A3-A5: less exchange rate volatility *vis-á-vis* the invoicing currency of exports, but greater tendency for real exchange rate misalignments.
A3. Peg to a composite of currencies.	?	Compared to the reference group and groups A4-A5: less exchange rate volatility *vis-á-vis* the invoicing currency of exports, but greater tendency for real exchange rate misalignments.

Variable	Sign	Reason
A4. Limited flexibility.	?	Compared to the reference group and groups A5: less exchange rate volatility *vis-á-vis* the invoicing currency of exports, but greater tendency for real exchange rate misalignments.
A5. More flexible regimes.	0	Compared to the reference group:approximately the same level of exchange rate volatility *vis-á-vis* the invoicing currency of exports and the same tendency for real exchange rate misalignments.
MR. Multiple exchange rates.	-	Multiple exchange rates and separates rates for some transactions are assumed to affect the volume of exports negatively (-).
Binary variables for the importing countries:		
The European Union	?	Control variable.
Japan	?	Control variable.

Source: Nilsson(2000)

CHAPTER IV

RESEARCH METHODOLOGY

This chapter presents the methodology used to conduct in this study which is divided into Data Sources, Data Collection, Measurement and Data Analysis.

The study is based on secondary data from different sources.

4.1 Data Source & Data Collection

Secondary data is collected from several sources that include UN, IMF, BOT, internet and many libraries.

The following table represents sources of information.

Table 4.1 Data Source & Data Collection

Data	Sources
GNP*i*, GNP*i*/POP*i*, GNP*j*, GNP*j*/POP*j*	United Nations and World Bank
Exchange Rate Regime	International Monetary Fund
Distance	The MacMillan World Atlas(CD-ROM)

The monetary unit in the analysis of this study is US dollar, for the reason of comparisons across different countries.

Distance between two countries is approximately calculated in the MacMillan World Atlas (CD-ROM). France, Germany and United Kingdom are interpreted as EU countries in calculating the distance between the exporting countries to EU countries by using the weight average.

4.2 Measurement

Table 4.2 Measurement

Data	Level of Measurement
GNP*i*, GNP*i*/POP*i*, GNP*j*, GNP*j*/POP*j*	Ratio Scale
Exchange Rate Regime	Nominal
Distance	Ratio Scale

4.3 Data Analysis

For the study on export performance of exporting countries, the analysis covers the time period from 1995 till 1999. The analysis will be conducted with selected 99 developing countries.

The study of export performance of exporting countries will be based on regression analysis by using stepwise method with the help of statistical computer software- SPSS program. This study uses pooled data of time series and cross sectional analysis. The Ordinary Least Square is used in this study for the estimation of the coefficients of econometric models. The following tests will be performed

- **T-test**

T-test will be conducted for all the thirteen variables, subject to 95% confidence level. The relationships will be tested in a single econometric model, which includes the following null and alternate hypotheses.

Ho: Export cannot be explained by the GNP*i*, GNP*i*/POP*i*, GNP*j*, GNP*j*/POP*j*, DIST*ij*, Exchange rate regime, MR, EU and JAP

Ha: Export can be explained by the GNP*i*, GNP*i*/POP*i*, GNP*j*, GNP*j*/POP*j*, DIST*ij*, Exchange rate regime, MR, EU and JAP

The null hypothesis states the EXP*ij* cannot be explained by the independent variables. To reject null hypothesis means the EXP*ij* can be explained by the independent variables.

- **F – Test**

To test the validity of the economic model for the studied developing countries, F-test statistic is highly significant, indicating that the simultaneous test that each coefficient is 0, it is rejected. It is conducted to test whether the regression equation is valid statistically. Again 95% confidence level will be used.

Ho: $\beta_1 = \beta_2 = \ldots = \beta_{13} = 0$

Ha: Ho is not true

- **Co-efficient of Determination : Adjusted R-square**

For the multiple regression model, the statistical significance can also be analyzed by considering the value of R-square (R^2) and Adjusted R-square(R^2_a).

The value of R square is between 0 and 1 depicting the correlation between the dependent and the independent variables.

Adjusted R-square, on the other hand, is a value adjusted for the degrees of freedom and it will always be less than the value of R-square. Adjust R^2 is designed to compensate for the optimistic bias of R^2. It is a function of R^2 adjusted by the number of variables in the model and sample size. The test will be computerized in SPSS program.

- Assumption of Ordinary Least Squares (OLS), will be considered as following:

Table 4.3 Assumption of Ordinary Least Squares

What can go wrong?	What are the consequences?	How can it be detected?	How can it be corrected?
Multicollinearity Some of the independent variables are(imperfectly) correlated.	No bias βs, but estimates of the separate effects of the Xs are not reliable.	No universally accepted rule or test is available. Use the t-test on r_{12} or the VIF test.	Drop redundant variables, but to drop others might introduce bias. A combination variable may be useful, but often doing nothing is best.

What can go wrong?	What are the consequences?	How can it be detected?	How can it be corrected?
Autocorrelation The error terms for different observations are correlated.	No biased βs, but the variances of the βs increase (and t-scores fall) in a way not captured by OLS.	Use Durbin-Watson d test; if significantly less than 2, positive autocorrelation exists.	If impure, add the omitted variable or change the functional form. Otherwise, consider generalized least squares.
Heteroskedasticity The variance of the error term is not constant for all observations.	Same as for autocorrelation.	Plot the spread or contraction of the residuals or use the Park or Goldfeld-Quandt tests.	If impure, add the omited variable. Other wise, redefine the variables or apply a weighted least squares correction.

Source: *Using Econometrics*. A.H. Studenmund (1992)

CHAPTER V

RESULT OF THE STUDY

This chapter represents the empirical results of the model proposed in the chapter 3. The research findings and the analysis of the study are also included in this chapter. This chapter is divided into five sections. The first section is the profile of developing countries. The second section is the regression equation. The third section is the result of the T-test, F-test, R^2 and adjusted R^2. The forth section is the validity of Ordinary Least Squares(OLS). The last section is the interpretation of the result.

5.1 Profile of developing countries

Table 5.1 The Number of Developing Countries Under the Various Exchange Rate Regimes and the Number of Developing Countries Maintaining Multiple Exchange Rates

Year	Peg to the US dollar	Peg to currencies other than the US Dollar	Peg to a composite of currencies	Limited Flexibility	More flexible regimes	Independently Floating	Total Number of countries	Multiple exchange rates
	A1	A2	A3	A4	A5	Reference		MR
1995	11	14	13	4	26	31	99	19
1996	9	14	13	4	27	29	96	17
1997	7	15	11	3	29	29	94	10
1998	6	17	9	3	36	25	96	11
1999	6	16	6	7	28	28	91	10

Note:
The figures denote the number of developing countries included in each exchange rate regime in regression.
Source: Own calculations based on the classification of exchange rate regime in IMF (1995-1999) *Exchange Rate Regimes and Exchange Restrictions*, Annual Report, IMF, Washington, DC.

5.2 Regression Equation

The gravity model advocated by Kristian Nilsson and Lars Nilsson(2000), is employed in this study. In this model, the research pooled data of all developing countries together since 1995 – 1999 which all variables are estimated by the OLS method with stepwise method. All variables are in log form except those binary variables for the interpretation of the estimated coefficients. By using stepwise method, model 9 is the best model (see appendice).

In the result of the study, regression equation under model 9 is estimated as following:

$$LN\ EXP_{ij} = \alpha + \beta_3\ LNGNP\_DI + \beta_4\ LNPER\_DI + \beta_5\ LNDIST_{ij} + \beta_6\ A1 + \beta_7\ A2 + \beta_8\ A3 + \beta_{10}\ A5 + \beta_{12}\ EU + \beta_{13}\ JAP + \varepsilon_{ij}$$

$$= \underset{(2.151)}{2.253} + \underset{(23.804)}{0.620\ GNP_j} + \underset{(11.150)}{0.449\ (GNP_j/POP_j)} - \underset{(-8.756)}{0.817\ DIST_{ij}}$$

$$\underset{(-4.294)}{-0.811\ A1} - \underset{(-2.531)}{0.375A2} - \underset{(-3.750)}{0.628\ A3} + \underset{(2.941)}{0.353\ A5} + \underset{(5.375)}{0.617\ EU}$$

$$\underset{(-9.808)}{-1.165\ JAP}$$

Significant at 95% confident interval. Number of observations = 1336

Where :

α = a constant

$LNEXP_{ij}$ = EXP_{ij} = dollar value(1000 dollar) of the exports to country i from country j (i= the EU countries, Japan, USA).

LNGNP_DI = GNP_j = GNP of country *j* in dollars

LNPER_DI = GNP_j/POP_j = per capita income of country *j* in dollars

LNDIST = $DIST_{ij}$ = the geographical distance (in kilometres) between

the capitals of the importing and exporting countries

A1 = Peg to US dollar

A2 = Peg to currencies other than the US dollar

A3 = Peg to a composite of currencies

A5 = More flexible exchange rate regimes

EU = a binary variable for the EU countries

JAP = a binary variable for Japan

ε_{ij} = a log normally distributed error term

β's = parameters to be estimated

5.3 Quality of model in term of F-test, T-test, R, R square and adjusted R square

5.3.1 F-test

Table 5.2 F-test

	Sum of Squares	df	Mean Square	F	Sig.
Regression	5073.815	9	563.757	191.597	.000
Residual	3901.640	1326	2.942		
Total	8975.455	1335			

Under model 9, the F-test is 191.597 or P(F > 191.597) = 0.000. Ho is rejected and accept Ha because Significance = 0.000 < 0.05.

So it shows that there is at least one independent variable that has relationship with the dependent variable (EXP*ij*). From the hypothesis,

Ho: $\beta_1 = \beta_2 = \ldots = \beta_{13} = 0$

Ha: Ho is not true

5.3.2 T-test

Table 5.3 The Estimation Result by OLS Estimation

SMPL 1995 –1999
1336 observations
LS // Dependent variable is EXP*ij*

Variables	Coefficient	T-Statistic	Significance
(Constant)	2.253	2.151	.032
LNGNP_DI	0.620	23.804	.000
LNPER_DI	0.449	11.150	.000
LNDIST	-0.817	-8.756	.000
Peg to US. dollar	-0.811	-4.294	.000
Peg to Currencies other than US Dollar	-0.375	-2.531	.012
Peg to a Composite of Currencies	-0.628	-3.750	.000
More flexible regimes	0.353	2.941	.003
European Union	0.617	5.375	.000
Japan	-1.165	-9.808	.000

5.3.3 R, R^2 and Adjusted R^2

Table 5.4 R, R^2 and Adjusted R^2

R	R^2	Adjusted R^2
0.752	0.565	0.562

5.4 Validity of Ordinary Least Squares(OLS) assumption

The results of Assumptions of the Ordinary Least Squares are as following:

Table 5.5 Validity of Ordinary Least Squares(OLS)

Durbin-Watson	Variance Inflation Factor(VIF)	Plot spread
2.062	VIF are all about 1	Good form

5.5 Interpretation of result

The result of the F-test shows that the F value = 191.597 and the significance level equal to 0.000. This means that there is at least one independent variable in the model that can explain the dependent variable (Table 5.2).

By analysis the T-test to see which variable will be included in the equation by using the stepwise method (Table 5.3). There are total nine variables included in the model. They are LNGNP_DI, LNPER_DI, LNDIST, Peg to US dollar, Peg to Currencies Other than the US Dollar, Peg to a Composite of Currencies, More flexible regimes, European Union and Japan. The T-test of LNGNP_DI, LNPER-DI, more flexible regimes and EU are all positive and the others are negative.

The coefficients of the variables aim to measure potential export demand, GNP*j* and GNP*j*/POP*j*, are positive and significant at the five per cent. The coefficients of the exporting countries' income per capita present that the supply of exports increase as per capita income rises. Furthermore, the export performance will be better when the developing countries have higher GNP. On the other hand, the coefficients of the variables aim to measure potential import demand, GNP*i* and GNP*i*/POP*i*, are insignificant in the model.

Based on exports of NICs (Newly Industrialize Countries): the higher export value will lead to generate the higher income of people. Some part of income as profit will be contributed to the production like investments of owners. Goods and services will be produced and exported to importing countries again. This trading cycle will repeat again and again.

The coefficients of the distance variable, DIST*ij*, is negative and significant at the five per cent indicating that distance represented as transaction cost is negatively impact on the volume of the developing countries' exports.

A peg to US. dollar, a peg to currencies other than the US Dollar, a peg to a composite of currencies and more flexible regimes are significant to the model. The negative signs of the exchange rate regime means that their export performance will be worsen when compared to independently floating. The export performance of developing countries will be better when comparing to reference group, if the sign is positive.

EU dummy is positive and significant at the five per cent level. Furthermore the Japan dummy is negative and significant at the five per cent level. So trade preferences affect the export performance of developing countries when comparing to the United States. The positive sign of EU countries means that they provide more trade preferences to developing countries than United States. The negative sign of Japan means that developing countries have the low trade preferences with this country when compared to United States.

There are total four variables excluded in this equation. They are LNGNP_DE (GNP of importing country), LNPER_DE (Per Capita GNP of importing country), Limited Flexibility and Multiple Exchange Rates. They are excluded from the model because all variables have the significance higher than 0.05.

GNP and Per Capita GNP of importing countries are excluded from the equation. Logically explanation to this might be Japan, United States and EU countries have the same high level of income so income would not play important role in the model.

The β of each variables included in the equation can be concluded as following:

Constant	α	=	2.253
GNP*j*	β_3	=	0.620
GNP*j*/POP*j*	β_4	=	0.449
Distance	β_5	=	-0.817
Peg to US. dollar (A1)	β_6	=	-0.811
Peg to currencies other than the US dollar (A2)	β_7	=	-0.375
Peg to a composite of Currencies (A3)	β_8	=	-0.628
More flexible regimes (A5)	β_{10}	=	0.353
EU	β_{12}	=	0.617
Japan	β_{13}	=	-1.165

All coefficients (β_i) are interpreted as the elasticity except dummy variables. Dummy variables are A1, A2, A3, A5, EU and Japan. When the independent variable (Xi) changes 1 per cent, it causes the dependent variable to change β_i per cent.

From the above coefficients show that the important factors stimulating the export performance are GNP and Per Capita GNP of exporting countries and more flexible regimes. One percentage increase of GNPj will increase the export performance by 0.620 per cent. Also to one percentage increase of Per Capita GNP of exporting countries, it will increase the export value by 0.449 per cent. From this result, it implies that the more income of per capita and of total country have the impact on the export performance.

The distance is one factor that reduces the export performance. From the result, one percentage increase of distance will reduce the export value by 0.817 per cent. This implies that the longer the distance, the lower the export value.

For the three exchange rate regimes, negative signs of dummy variables, a peg to US dollar, a peg to currencies other than the US dollar and a peg to a composite of currencies reduce the export performance during 1995 – 1999. Whenever an developing country pegged to any of those exchange rate regimes, it will decrease its export performance when compared to the independently floating. On the other hand, the positive sign of more flexible regimes means they will have the better export performance when compared to the independently floating.

The variables included in the equation have the correlation(R) among them 75.2 %. The overall goodness of fit of the model measured by R^2 is 56.5%. This means that the independent variables can explain the changing of the dependent variable (EXP_{ij}) 56.5%. Another 43.5% are explained by other factors, which are not included in this model. The adjusted R^2 is 56.2%, which is close to R^2.

The validity of Ordinary Least Squares (OLS) are as followings:

- Durbin-Watson is used to test the Auto-correlation. The best value of Durbin-Watson is 2. It shows that e_i and e_j are independent of each other where e_i is random error of i and e_j is the random error of j. If value < 2 and close to 0, it shows that it shows that e_i and e_j have the positive relationship. If value > 2 and close to 4, it shows that e_i and e_j have the negative relationship. The value of Durbin-Watson in the study is 2.062 or approximate to 2. So it can be concluded that this model has no relationship between e_i and e_j.

- Variance Inflation Factor (VIF) is used to test the Multicollinearity to see that there is a relationship among independent variables or not. If VIF > 5, it means that there is high correlation among independent variables[1]. VIF of each variable in the study is close to 1. So it can be concluded that there is no relationship among independent variables in this model.

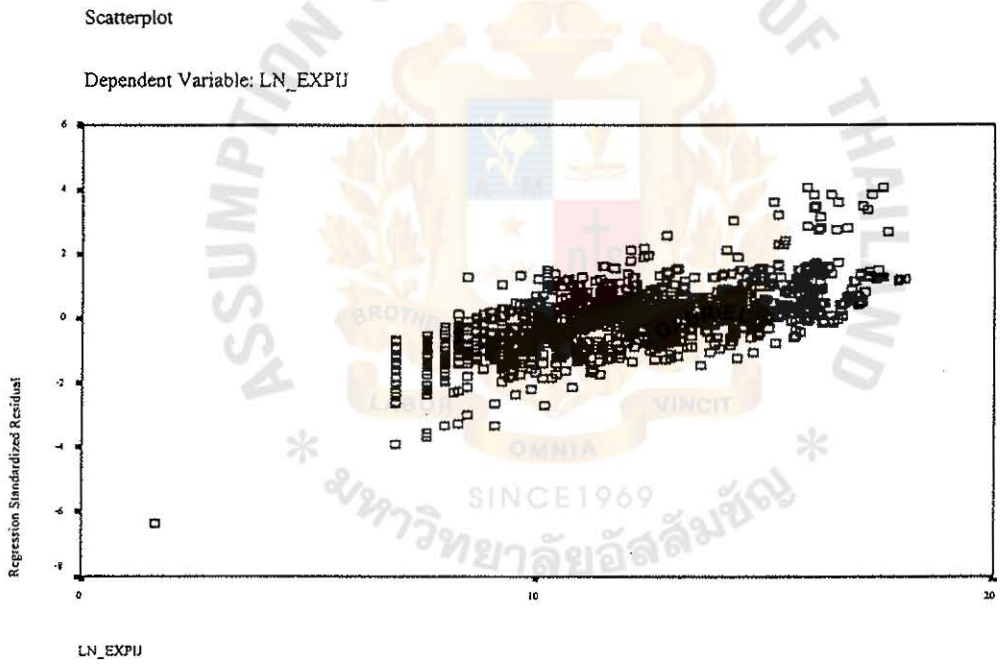
  From the result of the analysis (see appendices), the VIF of GNP and Per Capita GNP of developing countries are 1.292 and 1.318 respectively.

1. A.H. STUDENMUND. USING ECONOMETRICS 2ND EDITION. Pg. 276

Although these two variables have a high relationship on each other accordingly to economic theory, the VIF results show that no relationship of these two variables appear in this study.

- Plot the spread is used to test the Heteroskedasticity. From the figure X axis = LNEXPij and Y axis = Predicted value. In this model, there is no violation of the classical model that the observations of the error term are drawn from the distribution with the constant variance.

Figure 5.1 Plot graph



CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

There are two parts included in this chapter. First part is summary of findings. The second part is recommendation.

6.1 Summary of Findings

From the result of the analysis, there are total nine variables significantly to the model. They are GNP and Per Capita GNP of developing countries, distance, Peg to US dollar, Peg to Currencies Other than the US Dollar, Peg to a Composite of Currencies, More flexible regimes, European Union and Japan. The excluded variables are GNP and Per Capita of importing countries, Limited Flexibility and Multiple Exchange Rates.

The equation can be presented as following:

$$LN\ EXP_{ij} = \alpha + \beta_3\ LNGNP\_DI + \beta_4\ LNPER\_DI + \beta_5\ LNDIST_{ij} + \beta_6\ A1 + \beta_7\ A2 + \beta_8\ A3 + \beta_{10}\ A5 + \beta_{12}\ EU + \beta_{13}\ JAP + \varepsilon_{ij}$$

Where:

α = a constant

$LNEXP_{ij}$ = EXP_{ij} = dollar value(1000 dollar) of the exports to country i from country j (i= the EU countries, Japan, USA).

LNGNP_DI = GNP_j = GNP of country *j* in dollars

LNPER_DI = GNP_j/POP_j= per capita income of country *j* in dollars

LNDIST = $DIST_{ij}$ = the geographical distance (in kilometres) between

the capitals of the importing and exporting countries

A1 = Peg to US dollar

A2 = Peg to currencies other than the US dollar

A3 = Peg to a composite of currencies

A5 = More flexible exchange rate regimes

EU = a binary variable for the EU countries

JAP = a binary variable for Japan

ε_{ij} = a log normally distributed error term

β's = parameters to be estimated

From the above equation, it can explain that the export performance of 99 developing countries during 1995 – 1999 will be affected by the GNP and Per Capita GNP of developing countries, distance, a peg to US dollar, a peg to currencies other than the US dollar, a peg to composite of currencies, more flexible regimes, European Union and Japan.

Both coefficients of GNP and Per capita GNP of developing countries are significant positively in increasing the export value of developing countries. They have the same sign of coefficient as expected. The positive sign of GNP of developing countries implies that the more GNP they are, the more export performance it is. The exporting country's potential supply will increase as the GNP increases. The number of varieties is more available if the GNP increases. The positive sign of per capita GNP of developing countries shows that the supply of export increases as per capita income rises.

Both GNP and Per Capita GNP of importing countries are insignificant to the equation. Their significant levels are higher than 0.05. It is therefore difficult to draw any conclusions on the effect of the importing countries' GNP and Per Capita GNP on imports.

The coefficient of distance is same to the expectation; it will reduce the export value when it has the longer distance. It suggests that distance interpreted as transaction costs negatively influence the volume and value of exporting countries.

The estimated parameters of the variable "Peg to US dollar", "Peg to Currencies other than the US dollar and "Peg to a Composite of currencies" are all significance with the negative sign to the model. This means that when the exporting countries use one of these exchange rate regimes, it indicates a weaker performance compared to the countries with independently floating currencies.

On the other hand, more flexible regimes can increase the export performance of developing countries when comparing to reference group. The coefficient of limited flexibility and multiple exchange are all insignificant to the study at the five per cent level. Then, they cannot be concluded the impact on export performance in this study.

European Union dummy is positive impact throughout the study at five per cent level. EU imports from developing countries seem to have been significantly greater than the corresponding US imports. It suggests the developing countries should

increase their export value by having more trade preferences such as GSP (Generalized System of Preferences) with US.

On the other hand, the Japan dummy is negative impact throughout the study at the five per cent significantly. Japan imports from developing countries seem to have been significantly lower than the corresponding US imports. The result suggests that the developing countries should deal more with Japan to have better export performance by having more trade preferences such as quota.

The alternative hypothesis is accepted cause of significance of the F-test = 0.000 < 0.05. The R value is 75.2%. The overall goodness of fit of the model measured by R^2 is 56.5% and adjusted R square is 56.2%. There is no violation of the assumptions of Ordinary Least Squares(OLS). The Durbin-Watson value is 2.062. VIF are all about 1 which is lower than 5. The plot spread is in good form.

6.2 Recommendation

After this study completed, researcher hopes it will give benefit to policymakers, businesspersons and academic.

Exchange rate regime is one of economic policies that policymakers must choose one regime from many to determine the exchange rate system of the country. From the fixed one, the currency cannot move upward and downward accordingly to the demand and supply of the exchange market, vice versa.

Both of them make the different affects. A fixed exchange rate will make the real exchange rate misalignment higher than the flexible exchange rate regime. It causes the problem of overvaluation and undervaluation of the real exchange rate. The overvaluation of real exchange rate can hurt exports while undervaluation can promote the exports.

However, this fixed exchange rate regime will have lower exchange rate volatility vis-à-vis the invoicing currency than flexible one. When currency pegged to the trading country such as USA, it can reduce the risk of exchanging from foreign currency to domestic currency.

As result of this study presented, more flexible exchange rate regime such as independently floating is the introductory policy in stimulating the export performance. It suggests that policymakers should choose this floating exchange rate regime as a policy measurement in building the stabilization of the economy.

Businesspersons actually want to invest in a stable country's economy. They will look at the economic policy issued by government. Each economic policy can increase or decrease their confidence. If a fixed exchange rate regime is employed in that country, they may face the faked value of currency same to the event in 1997

In the long-term investment, they do not want to affect from uncertainty of exchange rate. The exchange rate movement should depend on the money market. The fluctuation of exchange rate can increase their debt burden. The funds of most businesses come from the foreign borrowing.

In avoiding the risk of economy, businesspersons should give the importance in the exchange rate regime used by that country. This study suggests that more flexible exchange rate regime will move them away from undervaluation or overvaluation of currency. It is a good choice to choose the country with independently floating policy.

Exchange rate regime is an interesting topic to the students in understanding the nature of exchange rate system. Students can learn various exchange rate regimes and differences between the fixed and floating exchange rate regimes in this study. They also know the pros and cons of each regimes employed in each country. They will see the reaction of policymakers in trying to promote their economies with the expectation of boosting the exports.

Students can use this research as a case study in economic subject to see the impact of exchange rate regimes on export performance of developing countries. Finally, they can look at the results that will be the same as their expectation or not.

APPENDICE

Regression

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	LNGNP_DI	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Japan	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
3	LNPER_DI	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
4	LNDIST	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
5	more flexible regimes	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
6	European Union	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
7	a peg to US dollar	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
8	peg to a composite of currencies	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
9	a peg to other currencies	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a Dependent Variable: LN_EXPIJ

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.603(a)	.364	.363	2.0691	
2	.677(b)	.459	.458	1.9093	
3	.711(c)	.506	.505	1.8249	
4	.731(d)	.535	.534	1.7707	
5	.739(e)	.547	.545	1.7490	
6	.746(f)	.556	.554	1.7308	
7	.748(g)	.560	.558	1.7248	
8	.750(h)	.563	.561	1.7188	
9	.752(i)	.565	.562	1.7153	2.062

a Predictors: (Constant), LNGNP_DI

b Predictors: (Constant), LNGNP_DI, Japan

c Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI

d Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST

e Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes

f Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes, European Union

g Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes, European Union, a peg to US dollar

h Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes,

European Union, a peg to US dollar, peg to a composite of currencies
i Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes, European Union, a peg to US dollar, peg to a composite of currencies, a peg to other currencies
j Dependent Variable: LN_EXPIJ

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3264.249	1	3264.249	762.450	.000(a)
	Residual	5711.206	1334	4.281		
	Total	8975.455	1335			
2	Regression	4115.904	2	2057.952	564.507	.000(b)
	Residual	4859.551	1333	3.646		
	Total	8975.455	1335			
3	Regression	4539.386	3	1513.129	454.341	.000(c)
	Residual	4436.070	1332	3.330		
	Total	8975.455	1335			
4	Regression	4802.481	4	1200.620	382.946	.000(d)
	Residual	4172.974	1331	3.135		
	Total	8975.455	1335			
5	Regression	4906.771	5	981.354	320.792	.000(e)
	Residual	4068.684	1330	3.059		
	Total	8975.455	1335			
6	Regression	4994.149	6	832.358	277.850	.000(f)

	Residual	3981.306	1329	2.996		
	Total	8975.455	1335			
7	**Regression**	5024.921	7	717.846	241.309	.000(g)
	Residual	3950.534	1328	2.975		
	Total	8975.455	1335			
8	**Regression**	5054.974	8	631.872	213.875	.000(h)
	Residual	3920.481	1327	2.954		
	Total	8975.455	1335			
9	**Regression**	5073.815	9	563.757	191.597	.000(i)
	Residual	3901.640	1326	2.942		
	Total	8975.455	1335			

a Predictors: (Constant), LNGNP_DI

b Predictors: (Constant), LNGNP_DI, Japan

c Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI

d Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST

e Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes

f Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes, European Union

g Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes, European Union, a peg to US dollar

h Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes, European Union, a peg to US dollar, peg to a composite of currencies

i Predictors: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes, European Union, a peg to US dollar, peg to a composite of currencies, a peg to other currencies
j Dependent Variable: LN_EXPIJ

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-5.372	.633		-8.492	.000	-6.614	-4.131		
	LNGNP_DI	.763	.028	.603	27.612	.000	.709	.817	1.000	1.000
2	(Constant)	-5.398	.584		-9.247	.000	-6.543	-4.253		
	LNGNP_DI	.788	.026	.622	30.825	.000	.738	.838	.996	1.004
	Japan	-1.732	.113	-.309	-15.284	.000	-1.955	-1.510	.996	1.004
3	(Constant)	-6.093	.561		-10.853	.000	-7.194	-4.991		
	LNGNP_DI	.677	.026	.535	25.714	.000	.625	.729	.857	1.166
	Japan	-1.737	.108	-.309	-16.033	.000	-1.949	-1.524	.996	1.004
	LNPER_DI	.454	.040	.234	11.276	.000	.375	.533	.860	1.163
4	(Constant)	1.825	1.022		1.786	.074	-.179	3.829		
	LNGNP_DI	.674	.026	.533	26.392	.000	.624	.724	.857	1.167
	Japan	-1.443	.110	-.257	-13.126	.000	-1.658	-1.227	.911	1.098
	LNPER_DI	.427	.039	.220	10.909	.000	.350	.504	.855	1.169
	LNDIST	-.865	.094	-.180	-9.161	.000	-1.050	-.680	.910	1.099
5	(Constant)	2.583	1.017		2.539	.011	.587	4.579		
	LNGNP_DI	.643	.026	.508	24.889	.000	.592	.693	.819	1.221
	Japan	-1.448	.109	-.258	-13.334	.000	-1.661	-1.235	.911	1.098

	LNPER_DI	.398	.039	.205	10.196	.000	.321	.474	.841	1.189
	LNDIST	-.867	.093	-.180	-9.298	.000	-1.050	-.684	.910	1.099
	more flexible regimes	.634	.109	.113	5.839	.000	.421	.847	.910	1.099
6	(Constant)	1.407	1.030		1.366	.172	-.614	3.428		
	LNGNP_DI	.644	.026	.509	25.219	.000	.594	.694	.819	1.221
	Japan	-1.161	.120	-.207	-9.685	.000	-1.396	-.926	.732	1.366
	LNPER_DI	.401	.039	.207	10.376	.000	.325	.476	.841	1.189
	LNDIST	-.777	.094	-.161	-8.287	.000	-.961	-.593	.881	1.135
	more flexible regimes	.635	.107	.113	5.908	.000	.424	.845	.910	1.099
	European Union	.625	.116	.115	5.401	.000	.398	.852	.734	1.362
7	(Constant)	1.554	1.028		1.512	.131	-.462	3.569		
	LNGNP_DI	.640	.026	.505	25.076	.000	.589	.690	.816	1.225
	Japan	-1.168	.119	-.208	-9.781	.000	-1.403	-.934	.732	1.367
	LNPER_DI	.430	.040	.222	10.877	.000	.353	.508	.795	1.259
	LNDIST	-.796	.094	-.165	-8.504	.000	-.980	-.613	.877	1.140
	more flexible regimes	.552	.110	.098	5.016	.000	.336	.768	.861	1.162
	European Union	.619	.115	.114	5.364	.000	.393	.845	.734	1.363
	a peg to US dollar	-.582	.181	-.062	-3.216	.001	-.937	-.227	.900	1.112

8	(Constant)	1.681	1.025		1.641	.101	-.329	3.692		
	LNGNP_DI	.635	.025	.501	24.926	.000	.585	.685	.813	1.229
	Japan	-1.164	.119	-.207	-9.774	.000	-1.397	-.930	.732	1.367
	LNPER_DI	.456	.040	.235	11.333	.000	.377	.535	.762	1.312
	LNDIST	-.808	.093	-.168	-8.650	.000	-.991	-.625	.876	1.142
	more flexible regimes	.447	.115	.080	3.905	.000	.222	.672	.790	1.267
	European Union	.618	.115	.114	5.376	.000	.392	.844	.734	1.363
	a peg to US dollar	-.703	.184	-.075	-3.814	.000	-1.064	-.341	.862	1.161
	peg to a composite of currencies	-.516	.162	-.062	-3.189	.001	-.834	-.199	.883	1.132
9	(Constant)	2.253	1.047		2.151	.032	.198	4.308		
	LNGNP_DI	.620	.026	.490	23.804	.000	.569	.671	.774	1.292
	Japan	-1.165	.119	-.208	-9.808	.000	-1.398	-.932	.731	1.367
	LNPER_DI	.449	.040	.232	11.150	.000	.370	.528	.759	1.318
	LNDIST	-.817	.093	-.170	-8.756	.000	-1.000	-.634	.875	1.143
	more flexible regimes	.353	.120	.063	2.941	.003	.118	.589	.714	1.400
	European Union	.617	.115	.114	5.375	.000	.392	.842	.734	1.363
	a peg to US dollar	-.811	.189	-.086	-4.294	.000	-1.181	-.440	.818	1.223

peg to a composite of currencies	-.628	.167	-.075	-3.750	.000	-.956	-.299	.822	1.217
a peg to other currencies	-.375	.148	-.053	-2.531	.012	-.665	-.084	.755	1.324

a Dependent Variable: LN_EXPIJ

Excluded Variables

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	LN_GNPED	-.205(a)	-9.691	.000	-.257	.999	1.001	.999
	LNPER_ED	-.236(a)	-11.302	.000	-.296	.997	1.003	.997
	LNPER_DI	.233(a)	10.273	.000	.271	.860	1.163	.860
	LNDIST	-.269(a)	-13.052	.000	-.337	.999	1.001	.999
	a peg to US dollar	-.016(a)	-.749	.454	-.021	.999	1.001	.999
	a peg to other currencies	-.078(a)	-3.393	.001	-.093	.905	1.105	.905
	peg to a composite of currencies	-.041(a)	-1.857	.064	-.051	.997	1.003	.997
	limited flexibility	.058(a)	2.653	.008	.072	.992	1.008	.992
	more flexible regimes	.136(a)	6.086	.000	.164	.926	1.080	.926
	Multiple exchange rate	-.023(a)	-1.032	.302	-.028	.994	1.006	.994
	European Union	.262(a)	12.698	.000	.328	.998	1.002	.998
	Japan	-.309(a)	-15.284	.000	-.386	.996	1.004	.996
2	LN_GNPED	-.115(b)	-5.425	.000	-.147	.888	1.126	.885
	LNPER_ED	-.075(b)	-2.922	.004	-.080	.619	1.614	.619
	LNPER_DI	.234(b)	11.276	.000	.295	.860	1.163	.857
	LNDIST	-.195(b)	-9.584	.000	-.254	.915	1.093	.912
	a peg to US dollar	-.027(b)	-1.317	.188	-.036	.998	1.002	.995

	a peg to other currencies	-.082(b)	-3.876	.000	-.106	.904	1.106	.902
	peg to a composite of currencies	-.038(b)	-1.886	.060	-.052	.997	1.003	.993
	limited flexibility	.060(b)	2.970	.003	.081	.992	1.008	.988
	more flexible regimes	.140(b)	6.773	.000	.182	.926	1.080	.923
	Multiple exchange rate	-.019(b)	-.919	.358	-.025	.993	1.007	.990
	European Union	.146(b)	6.408	.000	.173	.758	1.319	.756
3	LN_GNPED	-.114(c)	-5.659	.000	-.153	.888	1.126	.857
	LNPER_ED	-.081(c)	-3.304	.001	-.090	.619	1.615	.619
	LNDIST	-.180(c)	-9.161	.000	-.244	.910	1.099	.855
	a peg to US dollar	-.075(c)	-3.814	.000	-.104	.955	1.047	.823
	a peg to other currencies	-.040(c)	-1.963	.050	-.054	.873	1.146	.813
	peg to a composite of currencies	-.066(c)	-3.392	.001	-.093	.982	1.019	.847
	limited flexibility	.015(c)	.768	.443	.021	.949	1.054	.823
	more flexible regimes	.112(c)	5.623	.000	.152	.910	1.099	.819
	Multiple exchange rate	.008(c)	.409	.683	.011	.979	1.022	.845
	European Union	.146(c)	6.720	.000	.181	.758	1.319	.756
4	LN_GNPED	-.089(d)	-4.466	.000	-.122	.868	1.152	.837
	LNPER_ED	-.061(d)	-2.567	.010	-.070	.614	1.629	.598
	a peg to US dollar	-.086(d)	-4.509	.000	-.123	.952	1.051	.820
	a peg to other currencies	-.043(d)	-2.165	.031	-.059	.873	1.146	.813

	peg to a composite of currencies	-.070(d)	-3.738	.000	-.102	.981	1.019	.843
	limited flexibility	.015(d)	.791	.429	.022	.949	1.054	.819
	more flexible regimes	.113(d)	5.839	.000	.158	.910	1.099	.819
	Multiple exchange rate	.010(d)	.514	.608	.014	.979	1.022	.843
	European Union	.115(d)	5.325	.000	.144	.734	1.362	.732
5	LN_GNPED	-.091(e)	-4.610	.000	-.125	.868	1.152	.819
	LNPER_ED	-.057(e)	-2.422	.016	-.066	.613	1.630	.598
	a peg to US dollar	-.063(e)	-3.273	.001	-.089	.900	1.111	.795
	a peg to other currencies	-.020(e)	-1.010	.313	-.028	.836	1.197	.791
	peg to a composite of currencies	-.046(e)	-2.413	.016	-.066	.922	1.084	.817
	limited flexibility	.040(e)	2.079	.038	.057	.907	1.103	.794
	Multiple exchange rate	-.012(e)	-.628	.530	-.017	.942	1.062	.814
	European Union	.115(e)	5.401	.000	.147	.734	1.362	.732
6	LN_GNPED	-.006(f)	-.166	.868	-.005	.256	3.900	.217
	LNPER_ED	.011(f)	.411	.681	.011	.449	2.227	.449
	a peg to US dollar	-.062(f)	-3.216	.001	-.088	.900	1.112	.732
	a peg to other currencies	-.020(f)	-1.015	.310	-.028	.836	1.197	.732
	peg to a composite of currencies	-.046(f)	-2.446	.015	-.067	.922	1.084	.732
	limited flexibility	.040(f)	2.113	.035	.058	.907	1.103	.732
	Multiple exchange rate	-.012(f)	-.632	.527	-.017	.942	1.062	.732

7	**LN_GNPED**	-.008(g)	-.229	.819	-.006	.256	3.902	.217
	LNPER_ED	.015(g)	.539	.590	.015	.448	2.230	.448
	a peg to other currencies	-.032(g)	-1.591	.112	-.044	.811	1.232	.732
	peg to a composite of currencies	-.062(g)	-3.189	.001	-.087	.883	1.132	.732
	limited flexibility	.031(g)	1.602	.109	.044	.881	1.135	.732
	Multiple exchange rate	.003(g)	.150	.881	.004	.886	1.128	.732
8	**LN_GNPED**	-.010(h)	-.291	.771	-.008	.256	3.903	.217
	LNPER_ED	.018(h)	.662	.508	.018	.448	2.234	.448
	a peg to other currencies	-.053(h)	-2.531	.012	-.069	.755	1.324	.714
	limited flexibility	.019(h)	.988	.323	.027	.846	1.182	.691
	Multiple exchange rate	.004(h)	.183	.855	.005	.886	1.128	.731
9	**LN_GNPED**	-.009(i)	-.256	.798	-.007	.256	3.904	.217
	LNPER_ED	.018(i)	.674	.501	.019	.448	2.234	.448
	limited flexibility	.011(i)	.562	.574	.015	.821	1.218	.637
	Multiple exchange rate	-.002(i)	-.094	.925	-.003	.876	1.142	.686

a Predictors in the Model: (Constant), LNGNP_DI

b Predictors in the Model: (Constant), LNGNP_DI, Japan

c Predictors in the Model: (Constant), LNGNP_DI, Japan, LNPER_DI

d Predictors in the Model: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST

e Predictors in the Model: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes

f Predictors in the Model: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible

regimes, European Union
g Predictors in the Model: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes, European Union, a peg to US dollar
h Predictors in the Model: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes, European Union, a peg to US dollar, peg to a composite of currencies
i Predictors in the Model: (Constant), LNGNP_DI, Japan, LNPER_DI, LNDIST, more flexible regimes, European Union, a peg to US dollar, peg to a composite of currencies, a peg to other currencies
j Dependent Variable: LN_EXPIJ

Residuals Statistics

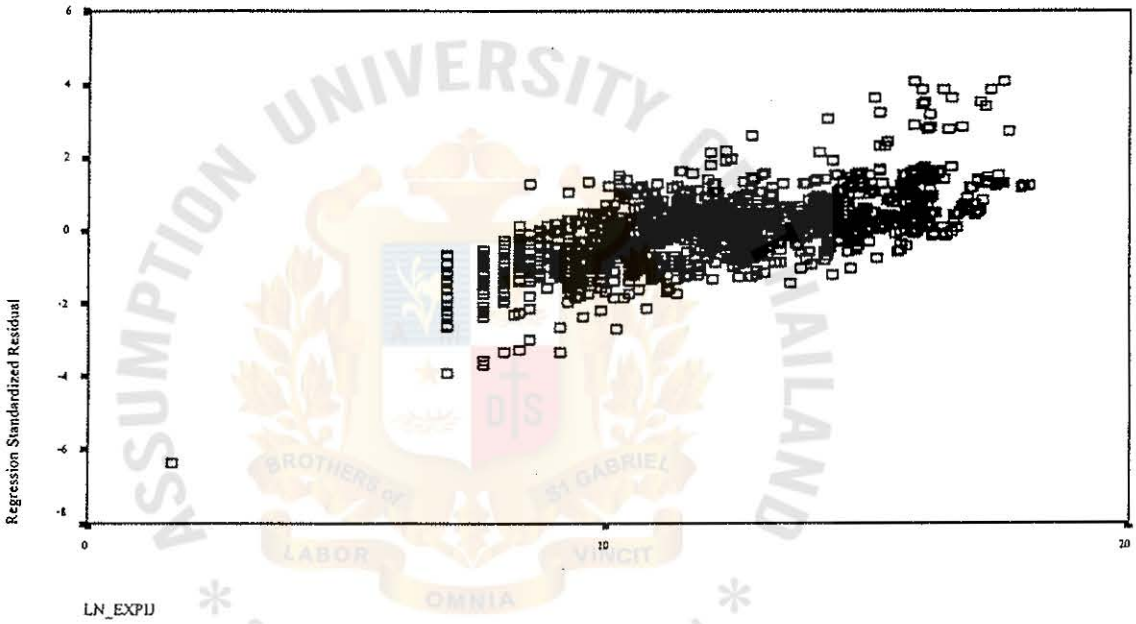
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	6.3415	16.6733	12.0265	1.9495	1336
Residual	-10.8616	6.9923	-2.2353E-14	1.7096	1336
Std. Predicted Value	-2.916	2.384	.000	1.000	1336
Std. Residual	-6.332	4.076	.000	.997	1336

a Dependent Variable: LN_EXPIJ

Charts

Scatterplot

Dependent Variable: LN_EXPIJ



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