



CHAPTER 2

LITERATURE REVIEW

2.1. Summary of Theories

2.1.1. Determinants of Bilateral Trade²

The pattern of international trade specifies the pattern of which country sells what goods to which country. This pattern lies on the concept of comparative advantage. A country has a comparative advantage in producing a good if the opportunity cost of producing that good in terms of other goods is lower in that country than it is in other countries.

On the other hand, the level of international trade is determined by several factors. These factors range from level of national output of trading countries, differences in natural resources, distance, trade restrictions, etc.

² More specific elaborations on this topic see: Krugman, Paul R. and Maurice Obstfeld. *International Economics: Theory and Policy*. Ed.6.

Anderson (1979) states that in explaining the determinants of international trade income per capita can be taken as the exogenous demand-side factor while population representing country size can be taken as the supply-side factor. Hence, he then argues that trade shares “should” be positively related to income per-capita and negatively related with size.

The research does not take the factor of common union, custom union, and common language as a factor affecting trade because as we can see below none of the trading partners observed has this qualification. Moreover, this research does not take the factor of shared-border as a factor affecting trade because only one of five trading partners observed which fulfills this qualification.

2.1.2. Nominal Exchange Rate and Real Exchange Rate

Basically, exchange rate can be defined as the price of one currency in another currency³. This simple definition is usually called the nominal exchange rate. It states the amount of a currency can be exchanged by a unit of another currency for a given period of time. A depreciation of nominal exchange rate means that a unit of currency can buy less amount of another currency, while an appreciation of nominal exchange rate means that a unit of currency can buy more amount of another currency.

Meanwhile, the real exchange rate (RER) can be broadly described as the measure of the prices of goods and services in a country relative to the prices of goods and services in another country. Therefore, RER can be specifically defined as the nominal exchange rate adjusted for relative prices between two countries as shown below:

$$RER = \frac{e.P^*}{P} \quad (2.1)$$

³ More on this topic, see: Krugman, Paul R. and Maurice Obstfeld. *International Economics: Theory and Policy*. Ed.6. p.411-418; Pilbeam, Keith. *International Finance*. Ed.3. p.9-11.

where e is nominal exchange rate between country i and j , P^* is price level in country j , P is price level in country i . A depreciation of a country's RER means that prices of goods and services at home country become relatively cheaper than prices of goods and services abroad, while an appreciation of a country's RER means that prices of goods and services at home country become relatively more expensive than prices of goods and services abroad.

Furthermore, it is argued that in the long run, an amount of money should be able to buy the same amount of goods and services in different countries. This illustrates the theory of purchasing power parity (PPP). The building block of PPP is the law of one price which states that in a competitive market with no trade barriers and transport cost, perfect goods arbitrage will lead to price equalization of identical products sold in different countries⁴.

Purchasing power parity (PPP) states that a unit of a currency can buy the same amount of goods and services at home country or abroad. This theory asserts that the nominal exchange rate between two countries' currency equals the ratio of these countries' price levels. If PPP holds, all countries' price levels will be the same if they are measured in one currency. Consequently, real exchange rate equals to 1 under the PPP.

However, the real world is far from the fulfillment of the perfect goods arbitrage condition. Thus, the law of one price is difficult to prevail. Although under the definition of relative-PPP⁵ RER is not strictly equal to 1, it stresses that RER should remain relatively constant. Contrary, in the world with the existence of various kinds of trade barriers and transport cost as well as non-traded goods, exchange rate movements cannot naturally and easily converge to its PPP path. Hence, under the condition that PPP does not hold, RER may vary over time.

⁴ More on the topic of the law of one price and the theory of purchasing power parity, see: Dornbusch, Rudiger et al. *Macroeconomics*. Ed.10. p.289-291; Krugman, Paul R. and Maurice Obstfeld. *International Economics: Theory and Policy*. Ed.6. p.389-409; Pilbeam, Keith. *International Finance*. Ed.3. p.126-135.

⁵ Relative PPP differs to absolute PPP which specifies that exchange rates equal relative price levels. Relative PPP defines the percentage change in the exchange rate between two countries in a given period of time equals the difference between the percentage changes in national price levels.

Batten and Belongia (1986) prolong that the RER movements occur due to unattributed changes of nominal exchange rate on inflation differentials. These changes reflect the specific structural differences in real economic performance across countries. There are some factors that can affect RER movements. These factors include unexpected changes in macroeconomic variables such as money supply, government expenditure and real national output.

Engels and Rogers (1996) elaborates the effect of trade barriers of international trade on the slow movement toward PPP. These trade barriers exist in forms of transportation costs, tariffs, etc. Frenkel (1981) describes the failure of RER movement to hold PPP.

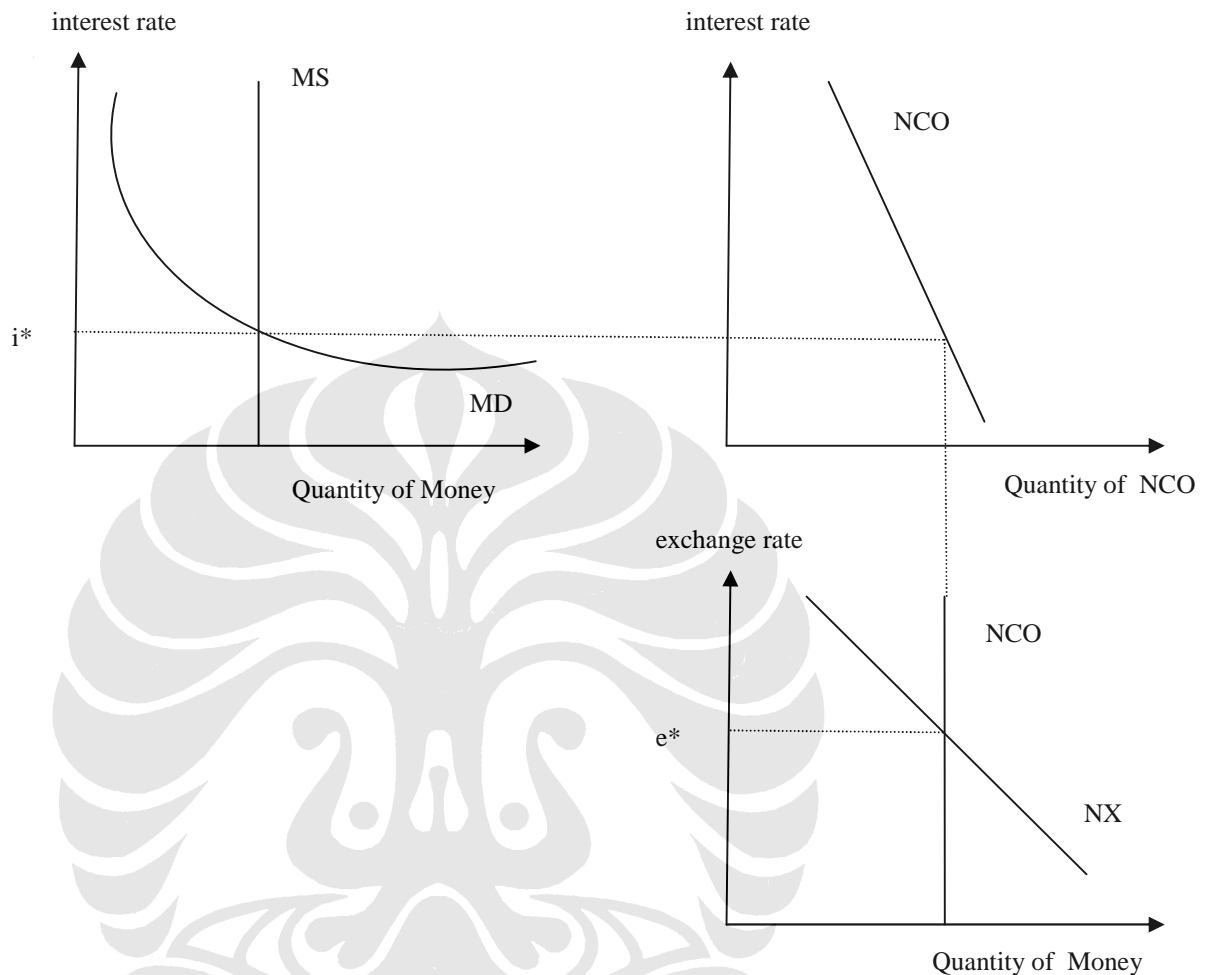
Williamson (1983) defines the phenomenon of RER changes that wander away from PPP as 'misalignment'. Dornbusch (1976) argues that this 'misalignment' occurs because RER may overshoot.

Furthermore, this research recognizes the existence of trade barriers such as transport cost in international trade. Along with the abundant evidences showing the RER's misalignment from its PPP, this research assumes that PPP does not hold.

2.1.3. Relationship between Exchange Rate and International Trade

Exchange rate is derived from market mechanism in domestic money market and foreign exchange market. As the figure below shows, money demand (MD) and money supply (MS) in domestic money market determine the value of interest rate in a country. This interest rate then determines the amount of net-capital outflow of the country. In foreign exchange market, net-capital outflow acts as the supply of the country's currency, while net-exports act as the demand of the country's currency. In this foreign exchange market is the exchange rate of a currency in a particular period of time being settled.

Figure 2.1. Derivation of Exchange Rate from Domestic Market



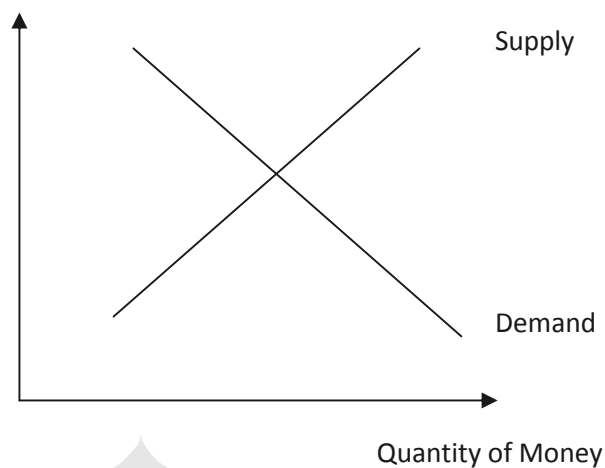
Exchange rate can also be derived by the usual demand and supply function's features by which the demand function is downward sloping and the supply function is upward sloping. Demand for foreign exchange is the exports of the representative country and the demand for the country's assets in the foreign market, while the supply of foreign exchange is the imports of the representative country and the demand for foreign assets by the country. These demand and supply schedules determine the level of the exchange rate of the country's currency, as shown in the figure below.

Figure 2.2. Derivation of Exchange Rate in Foreign Exchange Market

Exchange
Rate

Universitas Indonesia

Exchange rate uncertainty..., Rizki Nauli Siregar, FE UI, 2009



Exchange rate translates domestic prices into foreign prices. Therefore, exchange rate is also a measure of a country's competitiveness in international trade. However, nominal exchange rate depreciation and appreciation do not reflect changes in country's competitiveness. Rather, the real exchange rate movements mirror a country's competitiveness. The theory of PPP asserts that there is no difference in competitiveness among countries. However, since we assume that PPP does not hold, competitiveness may vary across countries. Since a depreciation of a country's RER means that the same amount of goods and services is relatively cheaper in home country compared to abroad, an RER depreciation of a country's currency increases its exports. Meanwhile an RER appreciation of a country's currency decreases its exports.

Given that a country's competitiveness is also determined by its RER, any factor affecting the RER may influence a country's competitiveness in international trade. Therefore, one may argue that the pattern of RER may reflect the pattern of trade as well.

2.1.4. Exchange Rate Uncertainty

Maskus (1986) proposes the equalization of exchange rate uncertainty as exchange rate risk. This term is then defined as the uncertainty about the

magnitude of profits to be obtained from international trade due to exchange rate volatility which is unpredictable.

Since there are two terms of exchange rate, namely nominal exchange rate and real exchange rate, the risk associated with the uncertainty of exchange rate can be classified into two terms as well. Maskus describes the first exchange risk term, the nominal exchange risk, as the risk which occurs when profits become uncertain because of unexpected changes in nominal exchange rate. Meanwhile, the real exchange risk is described as the risk which occurs when profits are uncertain because of unexpected changes in real exchange rate. These real exchange rate changes reflect changes in both nominal exchange rate as well as price levels.

In the world where PPP does hold, the real exchange rate remains constant. Therefore, if PPP holds, unexpected changes in real exchange rate do not occur. Hence, the uncertainty of profits obtained from international trade will be zero. This goes hand in hand with the argument of Perée and Steinherr (1989) which say that as long as exchange rate tracks closely PPP, there is not more uncertainty in foreign trade than in domestic activity.

In order to minimize nominal exchange risk, one can participate in the forward foreign exchange market. However, as Maskus elaborates, these forward markets can not completely eliminate this nominal exchange risk due to several reasons. These reasons are:

- a) Insurance such this forward markets provide is costly. In general, this cost gets more expensive the bigger the uncertainty of exchange rate is.
- b) Forward markets for contracts more than one year have not developed thoroughly.
- c) Uncertain contract amounts cannot be insured. However, firms usually still face these kinds of contracts as well.

Had the nominal exchange risk already insured, firms may still face uncertainty in price levels differential. Thus, as Maskus argues, it is the real exchange risk that matters to firms.

De Grauwe (1988) proposes a somewhat parallel kind of perspective in analyzing the impact of exchange rate variability. He argues that this variability although rooted in the monetary variables and markets can nevertheless still affect real economic variables. However, exchange rate variability which reflects the variability in real economic performance is the RER variability rather than nominal exchange rate variability.

On the other hand, Thursby and Thursby (1987) estimate the effect of nominal exchange risk and real exchange risk on 17 countries for the period 1974-1982. They find that at least for their sample results show that nominal exchange risk and real exchange risk perform a rather indistinguishable effect.

The phenomenon found by Thursby and Thursby who show that the effects of nominal exchange variability and real exchange variability on trade do not vary may be explained by the following elaboration by Rivera-Batiz and Rivera Batiz. Rivera-Batiz and Rivera-Batiz (1994) elaborate that the nominal exchange rates adjust more rapidly than prices of goods and services do. Under this condition, changes in real exchange rate are mainly entrenched from changes in nominal exchange rate. Accordingly, both rates tend to move together and may perform a quite similar impact on trade.

Based on the theories and evidences elaborated above, this research prefers to take real exchange rate uncertainty rather than nominal exchange rate uncertainty as the variable which affect international trade. RER uncertainty is seen as the variable which has the power to affect real economic performance such as net-exports, output, employment and so forth. Therefore, this variable is more relevant than nominal exchange rate uncertainty to be included in estimation about trade which is also a real economic variable.

2.1.5. Exchange Rate Variability in Fixed Exchange Rate Regime and Free-Floating Exchange Rate Regime

De Grauwe (1988) compares the differences of exchange rate variability in two exchange rate regimes which are the fixed exchange rate regime and the flexible exchange rate regime. Under the prior regime, he argues that both nominal and real exchange rate variability are relatively small. Therefore, the exchange rate uncertainty is also small under this regime. In contrary, relatively larger exchange rate variability occurs under the prior regime. This large variability arises especially for real exchange rate. Therefore, one may infer that the measure of exchange rate uncertainty is typically larger under the flexible exchange rate regime.

However, in times of rapid devaluation or revaluation under the fixed exchange rate regime, exchange rate may also have relatively high level of variability. One of the evidence of this notion is the empirical evidence found by Langley et al (2000) in the case of Thailand in the period of mid 1980s and early 1990s. In this period, high volatility of Thailand Baht occurred due to devaluation policy and the opening of financial sector in the early 1990.

Therefore, this research does not *a priori* take the opinion that there are differences in exchange rate variability under fixed exchange rate regime and free-floating exchange rate regime.

2.1.6. Time Frame of Exchange Rate Uncertainty

It is also debatable which time frame of RER that actually affect the pattern of international trade. De Grauwe elaborates that the volatility of RER over periods exceeding a few months or quarters are more likely to affect real economic performance such as trade. His estimation on 10 major industrial

countries for the period of 1960 to 1969 and the period of 1973 to 1984 confirms his postulate that long run RER variability does affect international trade. Klein (2000) argues that long-run time frame is more relevant than short-run one concerning the impact of RER uncertainty on international trade. This point of view is based on his argument saying that there are long lags in international trade adjustments. Moreover, Perée and Steinherr (1989) base their argument on the facts and characteristics of the prevailing short-term and long-term exchange rate risks. They assert that this short-term risks can be hedged in financial market particularly in forward exchange market. In accordance with Maskus, they argue that long-term exchange rate risks cannot be hedged easily since there is no forward market for those risks. This difficulty in treating long-term exchange rate risk is also amplified by the fact that it is also harder to predict long-term exchange rate movements precisely. They also add that even if short term volatility imposes risk as well, there are many possibilities for firms to cope with it. On the other hand, changes in competitive positions lasting for periods of several years are less easy to hedge. Their estimation on 5 main industrial countries for the period of 1960-1985 suggests that medium term and long term exchange rate uncertainty does affect volume of trade.

In contrary, Hooper and Kohlhagen (1978) analyze the impact of short-term exchange rate uncertainty on international trade. Although their finding shows that this short-term exchange rate uncertainty does affect the pattern of international trade, they suggest that long-term exchange rate uncertainty may impose bigger impact on international trade particularly on quantity of trade.

Based on the theories and empirical results elaborated above, this research uses the medium term and long term definition of RER uncertainty. These medium term and long term RER uncertainty are believed to be more relevant in explaining the exchange rate uncertainty's impact on international trade since the decision about investment, pattern of competitiveness and tastes are more likely determined based on medium term and long term experiences rather than the short term ones.

2.1.7. Impacts of Exchange Rate Uncertainty on International Trade

There is no clear conclusion concerning the effects of exchange rate uncertainty on international trade. Côté (1994) states in her literature survey on this topic that the findings of the impacts of exchange rate uncertainty on trade is rather ambiguous. McKenzie (1999) also concludes that there are extensive attempts to explain the relationship between international financial risk and international trade but no conclusive answers. Controversy on this topic ranges from different impact of exchange rate uncertainty imposes on the pattern of trade and varying sectoral impact of exchange rate uncertainty.

Most common view about the impact of exchange rate uncertainty on international trade says that exchange rate uncertainty tends to be detrimental to international trade. Maskus proposes some ways in which exchange rate volatility as the root of exchange rate uncertainty may be disadvantageous. These ways are as follow:

- a) Exchange rate volatility can reduce the volume of international trade by creating uncertainty about profits to be obtained from international trade;
- b) Fluctuations in exchange rate might dampen the international flow of capital by reducing both direct investment and portfolio investment;
- c) Exchange rate volatility might stimulate higher prices for internationally traded goods by causing traders to include a risk premium to cover unanticipated exchange rate movements.

Maskus continues his postulate by estimating the effects of real exchange risk on the volume of U.S. international trade for the period 1974 to 1984. He confirms his postulate that real exchange risk restricted the U.S. volume of trade during the particular period.

In accordance with Maskus' perspectives, Chowdhury (1993) argues that exchange rate volatility has a negative effect on a country's trade flows. Furthermore, Cushman (1988) also finds that RER risk has significant adverse effects in U.S. trade flows. In addition, Thursby and Thursby also support for the negative effects of exchange risk on the value of bilateral trade of 17 countries in the sample. They also find that this negative impact is due to backward shift in demand and a backward shift in both demand and supply of internationally traded goods. De Grauwe and de Bellefroid (1986) find that long run exchange variability accounts about 20% to 30% of the decline of growth on international trade among industrialized countries during the flexible exchange rate regime. Perée and Steinherr (1989) also assert that medium term and long term exchange rate uncertainty contributes to negative impacts on the volume of trade among industrial countries.

Though, De Grauwe (1988) elaborates that exchange rate uncertainty may impose both negative and positive impacts on international trade. The negative impact occurs when the 'misalignment' of RER results to the output and employment losses due to overvalued RER. Individuals hurt by these developments organize themselves to encourage protectionist legislation. In the case that this action is effective, the market becomes more protected which then causes negative impact on international trade. This hypothesis is called the political economy effect of exchange rate variability.

Meanwhile, de Grauwe elaborates that the positive impact of exchange rate uncertainty on international trade may occur when producers are very risk averse. In this case, these producers dislike worst possible outcome and prefer to stay away from that outcome. Hence, when risk increases they tend to export more in order to avoid the possibility of a drastic decline in their revenues.

Positive impacts of exchange rate uncertainty on international trade are also shared by other proponents. Asseery and Peel (1991) find that RER volatility has a significant and positive impact on exports of G-7 countries except for United Kingdom. Langley et al. (2000) also discover that exchange rate volatility has a positive and significant effect on Thai poultry exports. They assert that this

positive effect specifies the nature of risk attitude of poultry firms who react to exchange rate risk by taking advantage of the depreciated currency in export markets. This effect reflects government policy, hedging alternatives available to firms in the industry and the ability of firms in coping with external risk. This finding made by Langley et al goes hand in hand with the arguments proposed by Oi (1961) which assert that exchange rate uncertainty can indeed increase international trade if production can be adjusted after the price uncertainty revealed.

On the other hand, Cushman (1986) explains the positive impact of exchange rate uncertainty on international trade is caused by the third country exchange risk impact. Cushman in general elaborates that this impact takes form of changes in geographical pattern of trade as a result from variation in relative exchange risk.

These various arguments are summarized on the table below.

Table 2.1. Arguments of Exchange Rate Uncertainty's Impacts on International Trade

Impact of Exchange Rate Uncertainty on International Trade	Proponent	Arguments
Positive	De Grauwe (1988)	Firm is very risk-averse that it avoid drastic decline in revenues. Therefore, when exchange rate uncertainty increases, this firm will expand international trade in order to prevent drastic decline of total revenue.
	Maskus (1986)	Exchange rate uncertainty can increase international trade if it induces a highly multinational industry to engage in greater international trade.
Negative	De Grauwe (1988)	Firm is not very risk averse. When exchange rate uncertainty increases, the firm chooses to reduce risk by limiting international trade.
	De Grauwe (1988)	Political economy effect of exchange rate variability: exchange rate risks encourage protectionism which dampens international trade.

Maskus (1986)	<ol style="list-style-type: none"> 1. Exchange rate volatility can reduce the volume of international trade by creating uncertainty about profits to be obtained from international trade; 2. Fluctuations in exchange rate might dampen the international flow of capital by reducing both direct investment and portfolio investment; 3. Exchange rate volatility might stimulate higher prices for internationally traded goods by causing traders to include a risk premium to cover unanticipated exchange rate movements.
Thursby and Thursby (1987)	Negative impact of exchange rate uncertainty is due to a backward shift in both demand and or supply of internationally traded goods.

2.1.8. Sectoral Impact of Exchange Rate Uncertainty of Trade

The various results of the impact of exchange rate uncertainty on international trade may contrast among different trade sectors. Such analysis on the sectoral impact of exchange rate uncertainty was performed by Maskus (1986) as well as by Cho et al (2002).

Before that, Perée and Steinherr (1989) also state that exchange rate movements do not affect uniformly prices of traded goods. There are some characteristics of each good's market that affect this condition. They can take form of market structure, industrial concentration, share of fixed costs in total costs, share of production being exported and stock ability of output.

Maskus argues that a sectoral focus is essential because exchange rate risk may affect industries differently. This condition prevails either because some industries are more exposed to risk than others or because industries do not react similarly to a given level of exchange risk. There are some factors determining an industry's exposure to risk. They are:

- a) The level of openness of a sector to international trade. This extent of openness can be measured by the proportion of cost generated through imports or by the proportion of sales resulting from exports;
- b) The extent of trade contracts is denominated in foreign currencies;
- c) The length of contracts made;
- d) The vulnerability of sector to unexpected changes in the prices of goods and services.

Besides, industries' reactions toward exchange risk vary. There are some reasons to this condition. They are:

- a) The differences in profitability.

This factor determines an industry's ability in absorbing risk. Since high profitability usually correlates to high concentration, one may infer that highly concentrated industry has relatively low response to exchange rate risk. On the other hand, industry with extensive multinational operations has more ability to spread exchange risk across countries. This ability allows this kind of industry to act favourably toward exchange rate risk or has low response to exchange rate risk.

- b) The importance of internationally traded inputs to production.
- c) The ease of reducing domestic cost of importing and exporting.
- d) The structure of trade restrictions.

Table below summarizes characteristics of sectors that may affect their behavior toward exchange rate uncertainty.

Table 2.2 Characteristics of Sector and Impact of Exchange Rate Uncertainty

Impact of Exchange Rate Uncertainty on International Trade	Proponent	Source of Impact
positive	Maskus (1986)	High degree of openness
		High level of foreign investment
		High level of concentration
negative	De Grauwe (1988)	Protectionism

Both researches performed by Maskus and Cho et al. find that exchange rate uncertainty affect highly the trade of agricultural sector. In the case of US export, the reasons of this result are argued to be the high level of openness of the sector, the sector's low level of industry concentration and the tendency to enter into lengthy trade contracts.

Contrary, Pick (1990) argues that agricultural trade should be less sensitive to exchange risk because agricultural products are considered as necessities. Therefore, using this perspective, one may expect to find higher impact of exchange rate uncertainty of industrialized products compared to food products.

Besides, Pick also find a more significant effect of exchange rate uncertainty on agricultural trade in developing markets compared to developed markets. This finding emphasizes the importance of exchange rate risk in developing countries' pattern of trade.

2.2. Review of Previous Related Researches

2.2.1. Keith E. Maskus: *Exchange Rate Risk and U.S. Trade: A Sectoral Analysis*. (1986)

Maskus argues that different trade sectors have different vulnerability toward exchange rate risk. This exchange rate risk is formed by the uncertainty created due to exchange rate volatility. In order to see the effect, Maskus used the equation below:

$$Q = a_0 + a_1y + a_2CU + a_3UC + a_4UC^* + a_5E + a_6R + e \quad (2.1)$$

In equation 2.1, Q is defined as the real volume of U.S. bilateral exports or imports for specific sectors, y is real Gross National Products (GNP) in the importing country, CU is real sectoral capacity utilization in the importing country, UC is real unit labor costs in the importing country, UC^* is real unit labor costs in the exporting country, E is sectoral real exchange rate, R is real exchange rate risk and e is the error term.

Maskus defines the real exchange rate risk in the sector i for US trade with country j in certain quarter as the average of the three monthly measures in the quarter. These measures contain the percentage difference between the bilateral spot and three-month previous forward rates in month m , the error made in predicting inflation in the US in sector i in month m , and the error made in predicting inflation in the US in sector i in month m in country j .

In his research, Maskus finds that in general exchange rate uncertainty affected the volume of US trade negatively during the period between 1974 and 1984. He also finds that there were differences in the ability in coping with exchange rate risk in different trade sectors and different trading partners observed which were Japan, United Kingdom, Germany and Canada.

Maskus's research has become the first empirical evidence showing that different trade sectors may react differently toward exchange rate uncertainty. The model used is comprehensive that it controlled most of the factors affecting trade including both the demand-side and the supply-side factors. However, all of the

countries observed are developed economies. Therefore it is wise to consider further studies which have samples of developing economies in order to explicate the behavior of trade toward exchange rate uncertainty.

Moreover, Maskus forms different equations separately for different sectors and trading partners. It may be arguable that the limitation on the method used is that we cannot perform a fully objective comparison among the results because they were not estimated under an integrated system.

Besides, Maskus uses the measure of exchange rate uncertainty in a relative short-term perspective. The impact of exchange rate uncertainty may be different in the medium or long term perspective due to lack of hedging and forward markets choices.

2.2.2. Guedae Cho, Ian M. Sheldon, and Steve McCorrison: *Exchange Rate Uncertainty and Agricultural Trade. (2002)*

Cho et al. use the expanded gravity equation in order to describe the effect of exchange rate uncertainty on different trade sectors. Specifically,

$$\ln TRADE_{ij,t}^k = \gamma_t^k + \beta_1^k \ln(Y_{it} Y_{jt}) + \beta_2^k (Pop_{it} Pop_{jt}) + \beta_3^k U_{ij,t} + \beta_4^k dis_{ij} + \beta_5^k Lang_{ij} + \beta_6^k Border_{ij} + \beta_7^k EU_{ij,t} + \varepsilon_{ij,t}^k \quad (2.2)$$

In equation 2.2, $TRADE_{ij,t}^k$ is real trade between country i and j for trade sector k in year t , $Y_{it} Y_{jt}$ is the product of country i 's and j 's GDP in time t , $Pop_{it} Pop_{jt}$ is the product of country i 's and j 's population in time t , $U_{ij,t}$ is the measure of exchange rate uncertainty, dis_{ij} is the distance between the trading partners, $Lang_{ij}$ is the dummy variable for the condition if both trading partners used the same language, $Border_{ij}$ is the dummy variable for the condition if the trading partners share the same border, $EU_{ij,t}$ is the dummy variable representing membership of European Union and $\varepsilon_{ij,t}^k$ is the error term.

Cho et al. use the Perée and Steinher's measure of exchange rate uncertainty and defines the equilibrium exchange rate as the mean of exchange rate in a certain period of time. Moreover, Cho et al. calculate the the Perée and Steinher's measure for real exchange rate instead of nominal exchange rate.

The sample of data used in the research is aggregate sectoral trade of ten developed countries during 1974 and 1995. In defining trade sectors, Cho et al. follow the Standard International Trade Classification (SITC) by one digit.

Cho et al. find that there are differences of impacts of exchange rate uncertainty on different trade sector. The finding of the research assures that trade of agriculture products is negatively and significantly affected by exchange rate uncertainty. The research also finds that the impact of exchange rate uncertainty on agriculture trade is relatively more severe compared to other trade sectors.

Similar to the feature of the sample used by Maskus, Cho et al. uses the sample of developed economies. Developing economies, on the other hand, may show different behavior of trade toward exchange rate uncertainty.

However, the research done by Cho et al. is one of the main studies of the impact of exchange rate uncertainty on trade in medium term along with the research run by Perée and Steinher.

Moreover, Cho et al. have tried to control bias that may exist in the sample. In order to achieve the robustness, they incorporate another exchange rate uncertainty measure which is the third-country exchange rate uncertainty measure. The idea is based on the postulate proposed by Cushman that bilateral trade may increase due to the increase in exchange rate uncertainty between one of the trading partner with another country, 'the third country', respectively.

2.2.3. Rizka Yuanita Baely: *Exchange Rate Uncertainty and Foreign Trade: The Case of Indonesia and Its Major Trading Partners (1971-1990)*. (1992)

Baely uses the expanded export demand function in order to explicate the effect of exchange rate uncertainty toward Indonesia's exports. Specifically,

$$E_t = \alpha_0 + \alpha_1 Y_t^* + \alpha_2 R_t + \alpha_3 W_t + \alpha_4 T_t + \delta_t \quad (2.3)$$

Equation 2.3 defines E_t as exports deflated by exports unit values, Y_t^* as the proxy for world demand, R_t as real exchange rate, W_t as the measure of exchange rate uncertainty, T_t as terms of trade which acts as the proxy of supply effects and δ_t as the error term. The proxy for world demand for aggregate export function is the volume of world trade, while for the bilateral export function is the Gross National Products (GNP) of the trading partner. In this research, Baely uses Perée and Steiner's exchange rate uncertainty measure.

In integrating the effect of exchange rate uncertainty, Baely utilizes the nominal exchange rate. This choice may be taken because Baely already accommodates the price differential effect on the variable of real exchange rate. Moreover, Baely uses the nominal exchange rate based on the devaluation policy imposed in 1983 as the equilibrium rate of exchange rate. Baely argues that the devaluation in 1983 can better describe the equilibrium exchange rate of the sample which is throughout the period of 1971 to 1990 because this devaluation's aim was to correct the overvalued rupiah while the aim of the devaluation in 1986 was to save the Balance of Payment (BOP).

Baely finds that exchange rate uncertainty causes negative effects on Indonesia's aggregate and bilateral volume of trade to its major trading partners. However, in the case of Indonesia's exports to Singapore, exchange rate uncertainty does not significantly affect exports. Baely argues that the reason of this finding is because the feature of Singapore as Indonesia's export transit.

Baely's research is the earliest study on the topic of the impact of exchange rate uncertainty on trade in Indonesia. However, the research is still concerned on aggregate data rather than commodity-specific data. As Maskus (1986) also finds, aggregate data may hide varying impact of exchange rate uncertainty on trade.

Moreover, the arbitrary decision to take the value of exchange rate under the 1983 devaluation may become the shortcoming of the research. The reason is that the actors of international trade observed in the period before 1983 might have not had the idea of this level of exchange rate. Therefore, the measure of exchange rate uncertainty calculated by Baely may not reflect the uncertainty faced by the actors of trade observed in the sample.

2.2.4. Antonius Susilo Eka Riadi: *Dampak Ketidakpastian Nilai Tukar Indonesia terhadap Pertumbuhan Ekspor Periode 1979.1-1998.4: Suatu Pendekatan Teknik Kointegrasi dan Model Koreksi Kesalahan.* (2001)

Riadi studies the effect of exchange rate uncertainty toward Indonesia's non-oil aggregate exports quarterly in the period of 1979 to 1998. The tools used are the cointegration test and error-correction model (ECM). In the presence of cointegration between exchange rate uncertainty and aggregate exports data, the research uses the ECM to explicate the behavior in the short run and in the long run.

The measure of exchange rate uncertainty used is the moving sample standard deviation of the growth rate of the real effective exchange rate from the 4 preceding quarter. Riadi finds that in the long run, the real effective exchange rate uncertainty (from the prior 4 quarter) is negatively related to non-oil real exports. However, there is no significant effect of exchange rate uncertainty on non-oil real exports in the short run.

Riadi's studies tries to explicate the impact of exchange rate uncertainty in a relative short term perspective, which is the prior 4 quarters or one year. As he also finds, exchange rate uncertainty can have a more significant impact in long run rather than short run.

Moreover, the study run by Riadi uses the sample of aggregate trade data of non-oil exports. The use of aggregate trade data may disguise more specific impacts of exchange rate uncertainty on commodity-specific trade data.

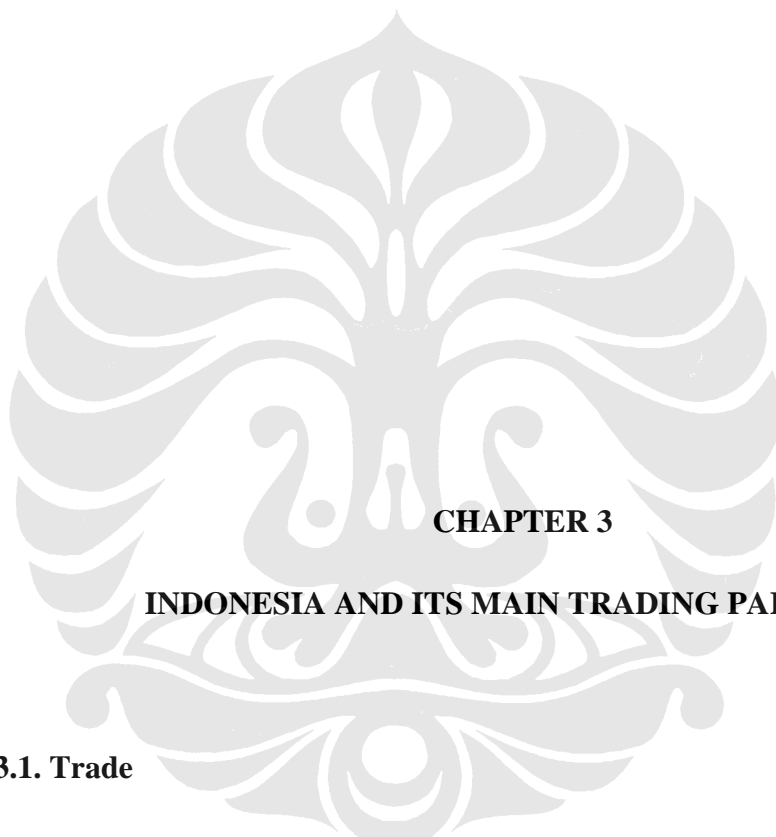
2.2.5. Mahyus Ekananda: *Ketidakpastian Pengaruh Volatilitas Nilai Tukar terhadap Ekspor Komoditi Manufaktur di Indonesia: Suatu Kajian Pendistribusian Pengaruh Volatilitas dengan Menggunakan Distribusi Lag Poissons pada Persamaan Sistem Non Linier Seemingly Unrelated Regression.* (2003)

Ekananda argues that the exports of different commodities may react differently toward exchange rate uncertainty. This may occur due to different elasticity that each commodity has and different ratio of imported-input each commodity has. Using the model of international trade proposed by Hooper and Kohlhagen, Ekananda expands this model and estimates it under the methodology proposed by Klassens and Baum.

For the sample of Indonesia's manufacture exports, exchange rate uncertainty imposes different impacts on different commodities. In general, commodity which has high imported input tends to react slower toward change in exchange rate uncertainty compared to commodity which has low imported input.

Ekananda gives a great contribution on this study. He estimates the lag in which each class of commodity observed needs in order to cope with exchange rate uncertainty. Ekananda also finds the difference between the reactions of the exports of manufactured goods in different exchange rate regimes adopted in Indonesia throughout the period observed.

However, the dependent variable used in the research is nominal export. This may be a shortcoming of the studies because comparison of the volume of trade across time can better be expressed using the real value of exports.



CHAPTER 3

INDONESIA AND ITS MAIN TRADING PARTNERS

3.1. Trade

The research focuses its analysis on the trade relationship between Indonesia and its five main trading partners during the period of the year 1987 to 2006. Main trading partner is defined as the country which has biggest percentage of total international trade, namely exports to Indonesia and imports from Indonesia, from Indonesia's total international trade

Table 3.1. Percentage of Indonesia's trade with Its Five Main Trading Partners from Indonesia's Total International Trade

Year	Percentage from Indonesia's Total International Trade (%)
1987	71.17
1988	68.12
1989	66.79
1990	66.25
1991	65.46
1992	63.40
1993	62.12
1994	61.77
1995	57.18
1996	57.06
1997	56.67
1998	54.53
1999	53.89
2000	55.60
2001	54.45
2002	51.90
2003	50.63
2004	49.01
2005	49.51
2006	47.63

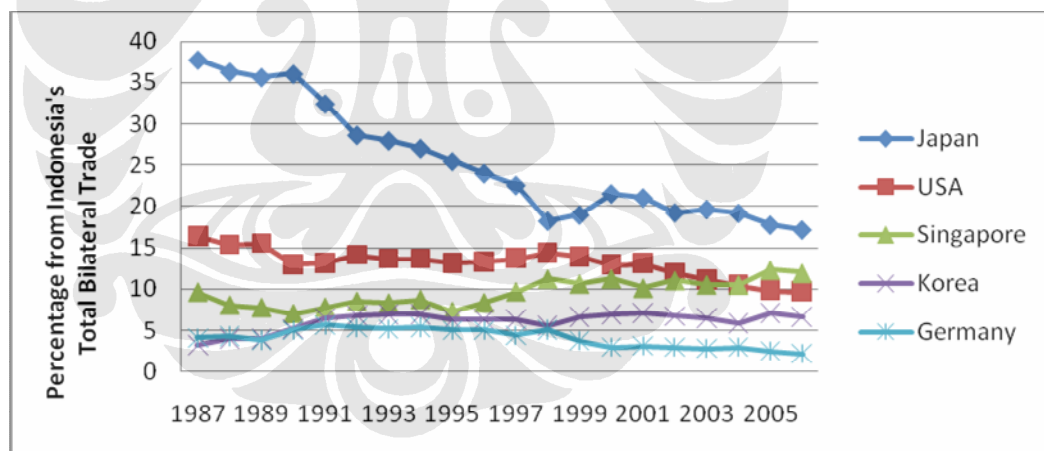
Source: International Monetary Fund (IMF) Direction of Trade (DOT), calculated

The amount of five main trading partners as sample is arbitrarily chosen because it is argued that these five main trading partners are able to represent the behavior of Indonesia's international trade. These five main trading partners are Japan, United States, Singapore, Korea and Germany. As the table shown below, the percentage of Indonesia's trade with its five main trading partners from Indonesia's total international trade in the period of 1987 to 2003 each year exceeds half of Indonesia's total international trade, while it fluctuated above 47% in 2004 to 2006.

However, there are changes in the order of Indonesia's five main trading partners throughout the period of observation. As we can see from the chart below, throughout the years of observation, Japan has the biggest percentage of

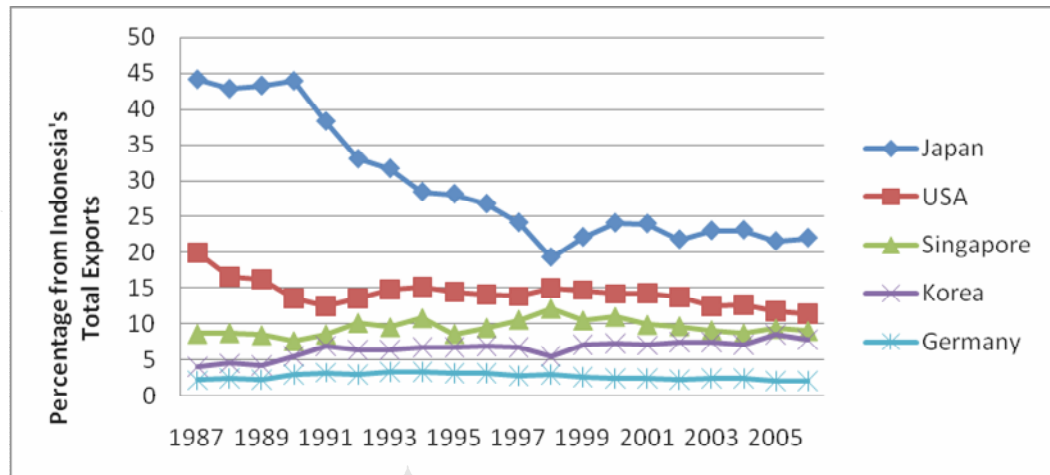
Indonesia's total international trade. Nevertheless, its portion decreases over time. In 1987, it reached the amount of almost 40% of Indonesia's total international trade. Although in 2006 it reached only barely half of it, which was 17,17%. USA started at an amount of 16,38% of Indonesia's total trade and maintained its position as the second biggest Indonesia's main trading partners until 2003. Since 2005, Indonesia's trade with USA declined to the amount below 10% from Indonesia's total international trade. Indonesia's trade with Singapore fluctuated from 9% to 12% of Indonesia's total international trade during the period of 1987 to 2006. Indonesia's trade with Korea kept increasing throughout the period of observation, though relatively slowly. It accounted 3% to 7% of Indonesia's total international trade. Indonesia's trade with Germany grew very moderately during the year 1987 to 1998. It varied around 3% to 5% of Indonesia's total international trade.

Chart 3.1. Trade between Indonesia and Its Five Main Trading Partners



Source: International Monetary Fund (IMF) Direction of Trade (DOT), calculated

Chart 3.2. Indonesia's Exports to Five Main Trading Partners

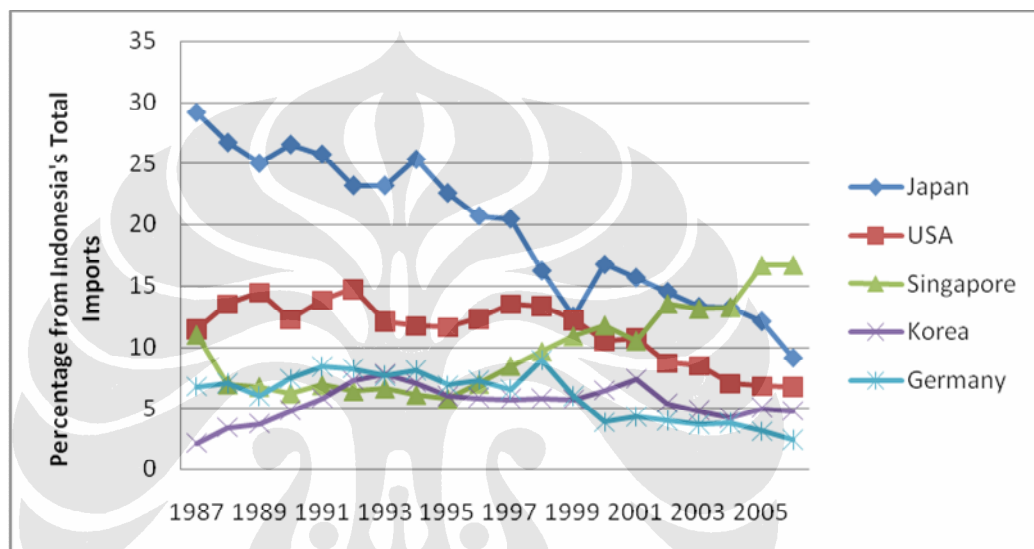


Source: International Monetary Fund (IMF) Direction of Trade (DOT), calculated

Chart 3.2 shows the fluctuation of the proportion of Indonesia's exports to its five main trading partners during 1987 to 2006. It shows that Japan maintained its position as Indonesia's main destination of exports throughout the year of observation. However, it reached its lowest point during the year 1998, which was the period of Asian economic crisis. On the other hand, USA also stayed being Indonesia's second main destination of exports compared to other four main trading partners throughout the observation. The portion of Indonesia's exports to USA declined from almost 20% of Indonesia's total exports in 1987 to an amount around 11% in 2005 and 2006. Most decline of the portion of Indonesia's export to USA occurred in the year 1990. Meanwhile, the percentage of Indonesia's exports to Singapore varied around 7% to 12% during 1987 to 2006. Uniquely, it reached its highest portion during the heart of Asian economic crisis, the year 1998 accordingly. In this year, the percentage of Indonesia's exports to Singapore accounted to 12,13% of Indonesia's total exports. Indonesia's exports to Korea grew moderately during the period of 1987 to 1997. However, it declined from 6,7% to 5,45% in the year 1998. It increased slowly afterwards and reached its highest amount of 8,45% of Indonesia's total exports in 2005. Indonesia's exports to Germany did not vary much through the year 1987 to 2006 in the band of percentage around 2% and 3%.

More significant fluctuations occurred in the proportion of Indonesia's imports from its five main trading partners in the period of 1987 to 2006. As the chart 3.3 shown below, there was no trading partner able to maintain the biggest portion from Indonesia's total imports.

Chart 3.3. Indonesia's Imports from Five Main Trading Partners



Source: International Monetary Fund (IMF) Direction of Trade (DOT), calculated

Indonesia's imports from Japan gradually descended from 29,16% in 1987 and dropped to 12,56% in 1999. It raised back to around 16% in 2000 but decreased moderately afterwards and accounted to 9,12% of Indonesia's total imports in 2006. Indonesia's imports from USA fluctuated around 10% to 14% of Indonesia's total imports during 1987 to 2001 but then decreased to below 10% ever since. The portion of Indonesia's imports from Singapore from Indonesia's total imports kept declining since 1987 to 1995. However, it grew from 5,8% in 1995 and reached the amount of around 16,6 % in 2006. Singapore became Indonesia's biggest source of imports among these five main trading partners since the year 2005. The percentage of Indonesia's imports from Korea from Indonesia's total imports fluctuated around 3% to 7% throughout the years of

observation. On the other hand, the portion of Indonesia's imports from Germany was slightly higher than Indonesia's imports from Korea. It swung between 6% and 8% since 1987 to 1999 and then dropped to a band between 2% to 4% in the year 2000 to 2006.

3.2. GDP per Capita

Gross Domestic Product (GDP) of a country represents the amount of output a country produced during a period of time. It can therefore picture the size of a country as an economy. Moreover, GDP per capita is obtained by dividing GDP with the number of population of a country. GDP per capita can be used as a variable that corresponds to the level of income in a country.

Among Indonesia's five main trading partners, Japan has the highest level of real GDP per capita throughout the years observed. Japan real GDP per capita increased by an amount of \$10.000 in 20 years of time from a level of slightly below \$30.000 per capita in 1987 to a level slightly below \$40.000 per capita in 2006. However, it declined in 1993, during the Asian economic crisis in 1998 and slightly decreased in 2001.

Meanwhile, USA's real GDP per capita increased from the level of \$26.000 in 1987 and reached the level of \$37.000 per capita in 2006. Throughout the observation, it dropped only twice. These drops occurred in 1991 and 2001. The growth acceleration was highest in the period of the year 1996 to 1999.

Germany's real GDP per capita stayed below \$20.000 before the year 1991. It jumped relatively high in the year 1991. After that the pace of growth was relatively slower. This may happen due to massive reconstruction in the area which belonged to East Germany after the reunification in 1990. The real GDP per capita dropped in two consecutive years in 2002 and 2003. In 2006, Germany's real GDP per capita reached the level of \$23.988 per capita.

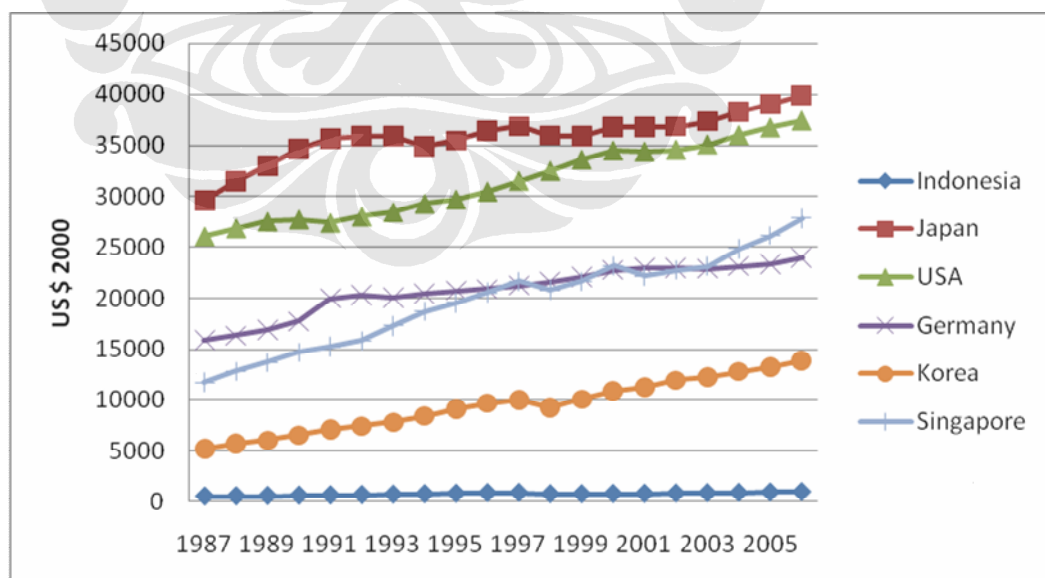
Singapore's real GDP per capita grew rapidly during 1987 to 2006. It started from the level of \$11.700 per capita in 1987 and roared by an amount of

\$16.000 that it was able to reach the level of \$27.800 per capita in 20 years of time. It experienced negative growth twice throughout the observation which occurred in 1998 and 2001.

Korea experienced a relatively steady pace of growth during 1987 to 2006. However, it could not get away from the contagious impact of Asian economic crisis. This caused Korea to experience negative growth in 1998. Korea's real GDP per capita was at the level of \$5.200 per capita in 1987 and increased to the level of \$13.900 per capita in 2006.

In comparison to its five main trading partners, Indonesia had the lowest level of real GDP per capita during the whole years of observation. It started at the level of \$532 per capita in 1987 and increased to the level of \$958 per capita in 2006. It means that in raised only by \$400 in 20 years. During the Asian economic crisis, Indonesia experienced negative growth in two consecutive years. This recession happened in 1998 and 1999.

Chart 3.4. Real GDP per Capita (1987-2006)



Source: International Monetary Fund (IMF) International Financial Statistics (IFS, calculated

3.3. Population

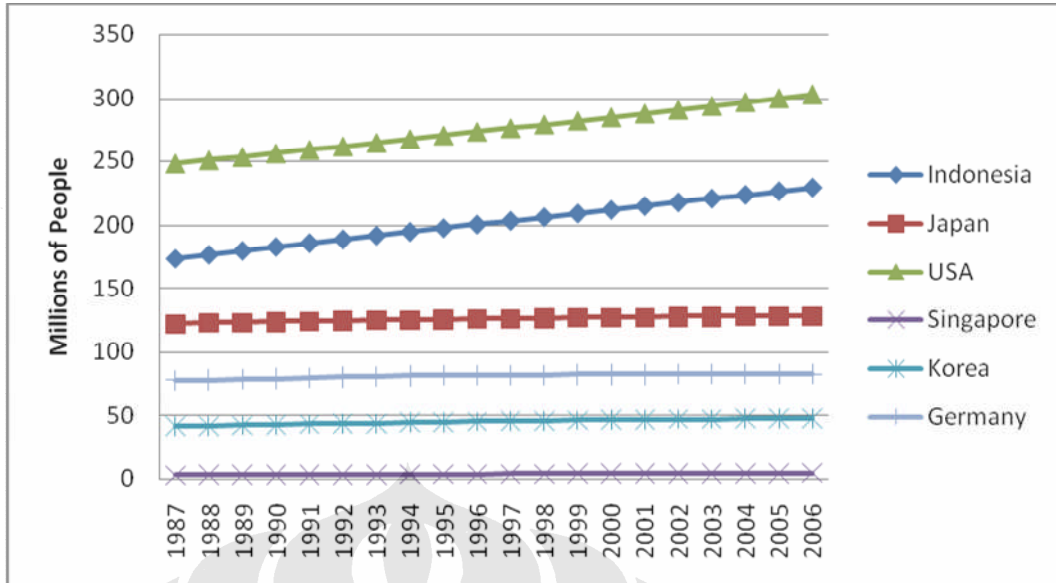
Among the countries observed in this research, each country maintains its positions in the order of countries based on the number of population throughout the years observed. As the first rank, USA's number of population was slightly below 250 millions of people in 1987. It increased by more than 50 millions of people in 20 years of time that it reached an amount of 302 millions of population in 2006. Indonesia's number of population also increased by an amount of approximately 50 millions of people in 20 years. It grew from 173 millions of people in 1987 and reached the amount of 228 millions of people in 2006.

On the other hand, Japan experienced a relatively slow growth of population throughout the years observed. Since 1987 to 2006, the number of population only increased by less than 6 millions of people. Japan's number of population was slightly below 128 millions of people in 2006. Korea's number of population also increased by approximately 6 millions of people in the two decades observed. It started at the level of 41,6 millions of people in 1987 and grew to a level of 48 millions of people in 2006.

Germany experienced even lesser increase in number of population. In 1987, Germany's number of population was 78 millions of people. In two decades, it raised by only 4,5 millions of people so that it reached an amount of 82,6 millions of people in 2006.

Singapore has the least number of populations among the six countries observed. In 1987, Singapore's population showed an amount of 2,8 millions of people. However, this number doubled to 4,4 millions of people 20 years later.

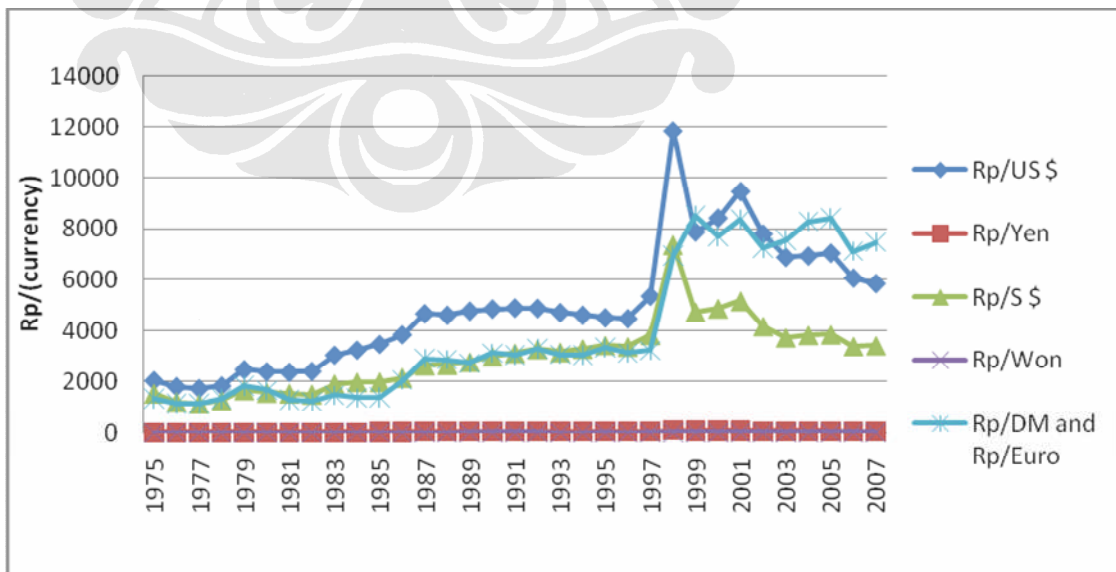
Chart 3.5. Population (1987-2006)



Source: International Monetary Fund (IMF) International Financial Statistics (IFS), calculated

3.4. Exchange Rate

Chart 3.6. Real Exchange Rate: Rupiah against Trading Partners' Currencies

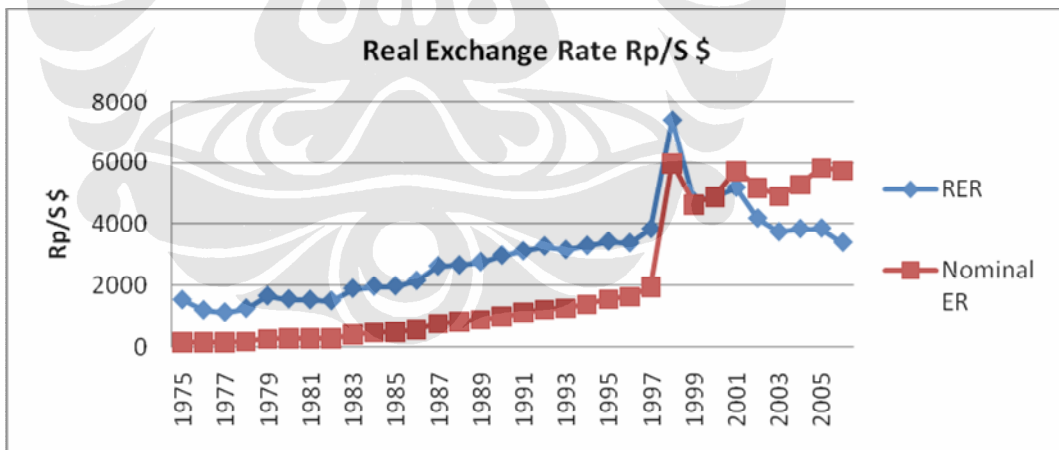
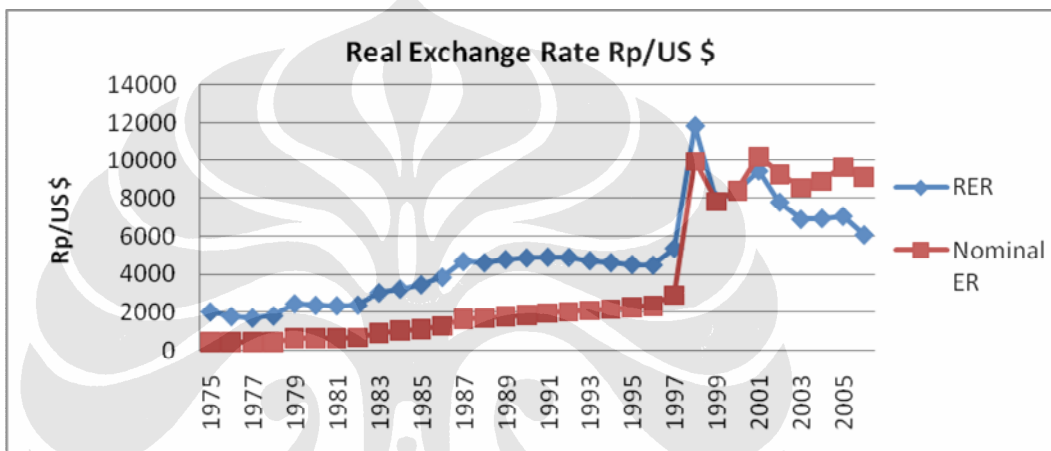
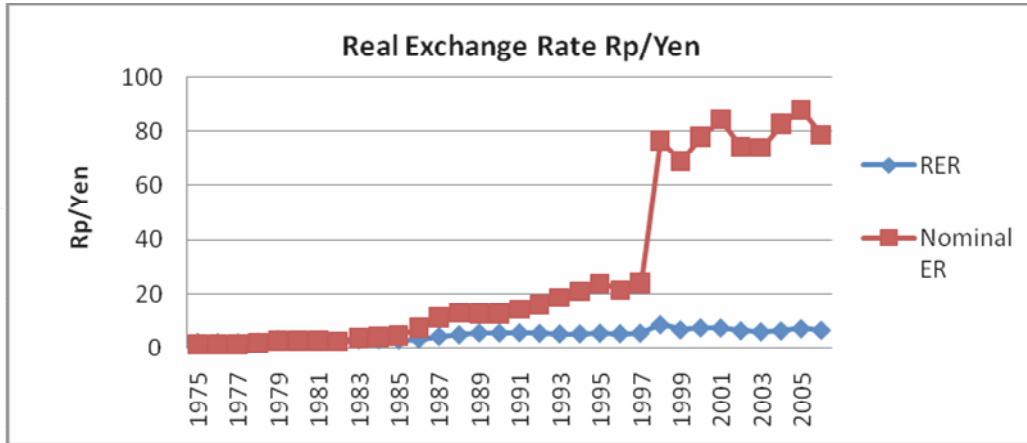


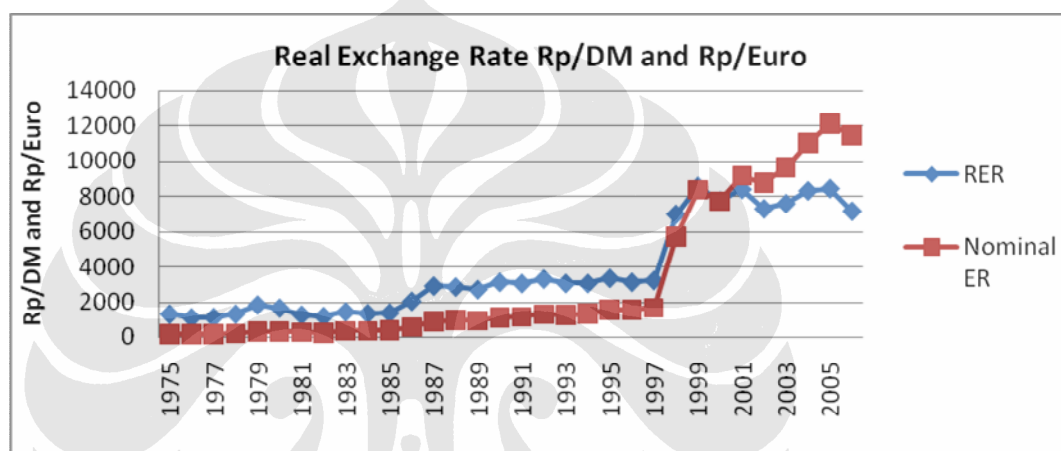
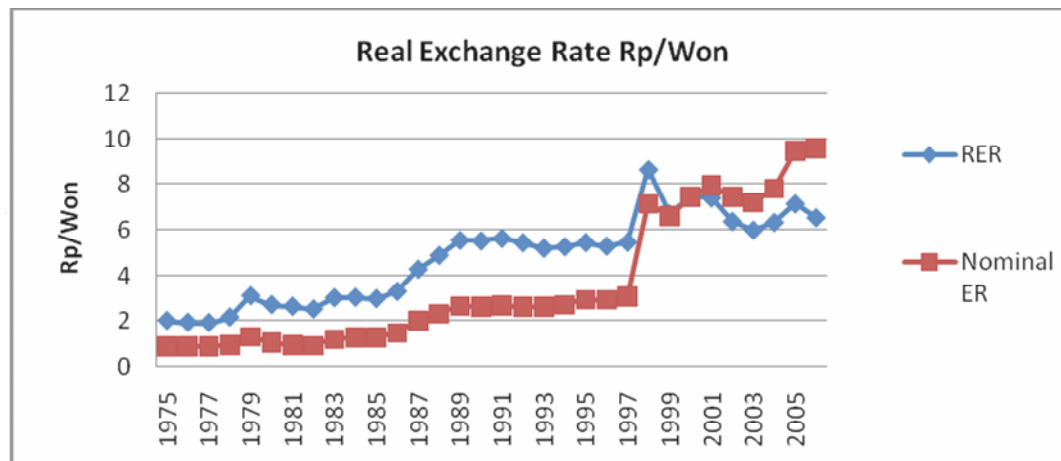
Source: International Monetary Fund (IMF) International Financial Statistics (IFS), calculated

As we can see from the chart above, fluctuations of real exchange rate between Indonesia's currency and its five main trading partners' currencies occurred more rapidly after the Asian economic crisis which pushed Indonesia to adopt floating exchange rate regime. In 1998, rupiah was deeply depreciated against other currencies which indicate the deepness of Asian economic crisis. Rupiah was able to appreciate in the following years but has to experience depreciation again in 2001.

Chart 3.7 shows us the movements of real exchange rate (RER) and nominal exchange rate (NER) between rupiah and the currencies of Indonesia's main trading partners, namely Yen for Japan, US \$ for USA, S\$ for Singapore, Won for Korea and DM or Euro for Germany. In general we can see that the NER and RER were able to track each other relatively closely before the adoption of free-floating exchange rate system in Indonesia. Nevertheless, both of these NER and RER were failed to coincide permanently through the whole years observed. We can also infer a similarity between the movements of NER and RER in the case of rupiah against US \$, S\$, Won and DM or Euro. In this case, rupiah maintained to be overvalued during the whole period between 1975 and 1998. This is implied by the trend of NER which lies below the RER. After the adoption of free-floating exchange rate system in 1997, the gap between NER and RER got closer but also widened as rupiah tend to be undervalued afterwards. Moreover, since 2000 the NER and RER cannot track each other closely like before. In the case of rupiah against yen, the NER and RER were able to relatively coincide in the period of year 1975 to 1983. After 1983, rupiah started to be undervalued and the gap between NER and RER kept widened. In 1998, rupiah was deeply undervalued and it stayed in this condition afterwards.

Chart 3.7. Real Exchange Rate and Nominal Exchange Rate





Source: International Monetary Fund (IMF) International Financial Statistics (IFS), calculated

During the period between 1975 and 2007, Indonesia experienced rapid changes in capital control policy and exchange rate policy. Indonesia adopted the fixed-exchange rate regime during the 1966 to 1986. In 1986, Indonesia changed its exchange rate policy that it utilized the managed-floating exchange rate regime until 1997. The hit of Asian economic crises weakened the adoption of the prior regime. Hence since 1997, Indonesia adopts free-floating exchange rate regime.

In the period of 1973 to 1975, the inflation was very high in Indonesia. Therefore the government imposed stabilization policy which included interest rate cut. The policy was effective in combating high inflation but this also caused the rupiah to be highly overvalued. In order to enhance Indonesian products' competitiveness in international market, the government imposed devaluation policy in which rupiah were devaluated 33,6% from Rp415/US\$ to Rp625/US\$. Moreover, rupiah also pegged to a basket of main trading partners' currencies.

In the beginning of the eighties, Indonesian economy was under-pressured due to the fall of oil prices and world recession. Indonesia's competitiveness in international market was also low due to overvalued rupiah as a cause of relatively Indonesia's higher inflation rate compared to its competitors. In order to solve this problem, Indonesia started to adopt a more market-oriented monetary policy. This was initiated by devaluating rupiah from Rp702,50/US\$ to Rp970/US\$ on 30 March 1983. This policy was followed by deregulation in financial and monetary sector.

In 1986, oil prices declined deeply. This drop of price threatened Indonesia's balance of payment of which the deficit grew bigger. In this era, Indonesian economy was highly dependent to oil exports. In order to prevent the worse condition, the government devaluated the rupiah again by 31% from Rp1134/US\$ to Rp1644/US\$. This policy was able to increase exports but this did not stay long because the value of rupiah was still too overvalued. Besides, people worried by the rapid devaluation policy which the government did. In order to prevent negative sentiment from the people, the government changed the exchange rate regime since 1986 to be managed-floating exchange rate system. Until the first semester of 1997, rupiah was relatively stable in the spread around Rp2350/US\$.

The Asian economic crisis starting in 1997 caused rupiah to be deeply depreciated against foreign currency especially US\$. In order to save reserves, the exchange rate intervention band was released on 14 August 1997 and Indonesia utilizes the free-floating exchange rate regime ever since.

3.5. Distance

This research uses the data for the distance variable from the data used and provided by Andrew K. Rose for the paper titled "Do We Really Know that the WTO Increases Trade ?" which was published in American Economic Review. Here, Rose calculates the value of the great-circle distance among countries for the distance variable by using the information taken from the CIA' World Factbook.

The table below shows us the order of Indonesia's main trading partners by the further distance from Indonesia according to the data used by Rose.

Table 3.2. Order of Indonesia's Trading Partner by Distance

No.	Country
1	USA
2	Germany
3	Japan
4	Korea
5	Singapore

Source: <http://haas.berkeley.edu/~arose>, calculated

From the table above, we can see that USA and Germany are Indonesia's main trading partners which are located furthest among other main trading partners. Meanwhile, Singapore is the nearest trading partners in the sample.

3.6. Trade Sectors

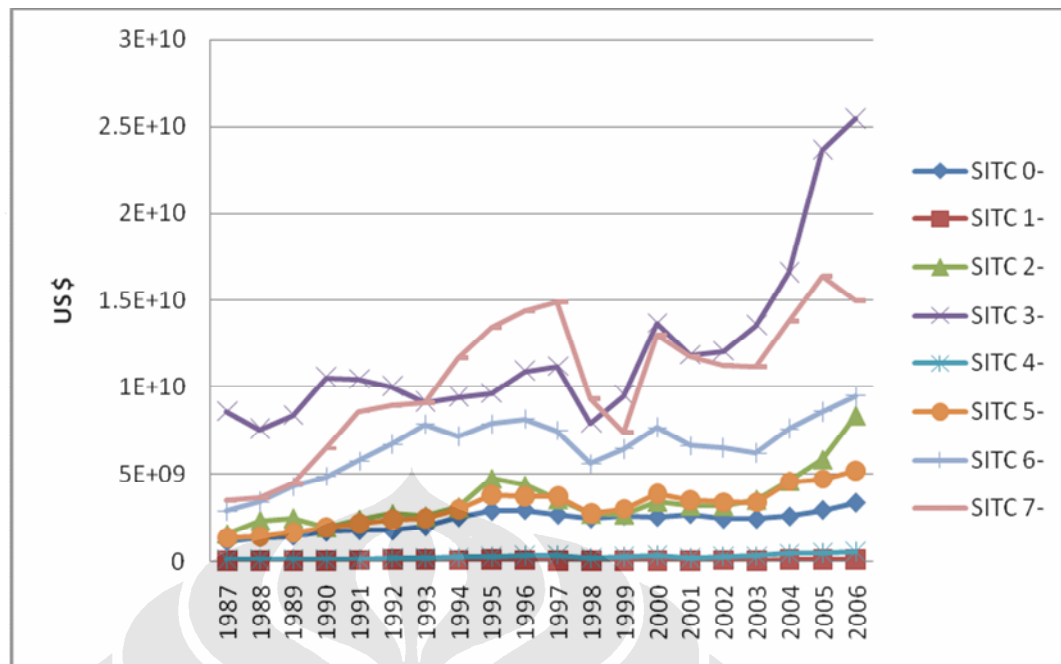
This research uses the classification of international trade under the Standard International Trade Classification Revision 3 (SITC Rev.3). More specifically the research classifies trade of goods under the 1 digit SITC and takes only eight out of ten available trade sectors. They are:

Table 3.3. Trade Sector Classification

SITC 1-digit	DESCRIPTION
0	Food and Live Animals
1	Beverages and Tobacco
2	Crude Materials, Inedible
3	Mineral Fuels, Lubricants etc.
4	Animal and Vegetable Oils & Fats
5	Chemical Products
6	Manufactured Goods
7	Machinery and Transport Equipment

Analyzing from total trade perspectives, which adds exports and imports, Indonesia's trade with its five main trading partners were dominated by the trade of mineral fuels (SITC 3- respectively) and the trade of capital goods such as machinery and transportation equipment (SITC 7-) in the period between 1987 and 2006. Below those trade sectors was trade of manufactured goods (SITC 6-). Most of the trade sectors experienced downfall during Asian economic crisis. However, main trade sectors such as SITC 3- and SITC 7- kept increasing rapidly since 2002.

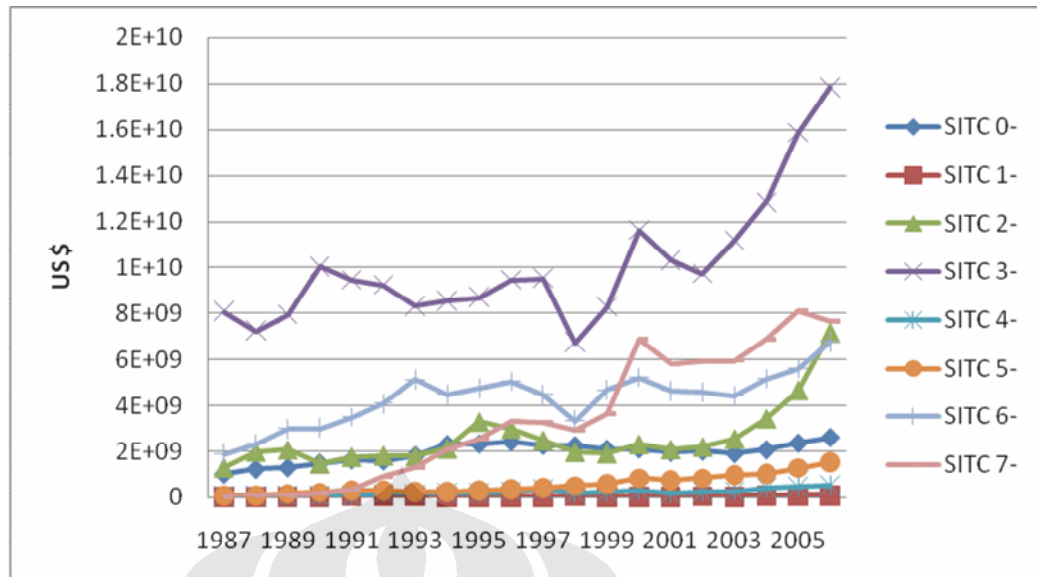
Chart 3.8. Indonesia's Trade with Five Main Trading Partners by Trade Sectors



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

Comparing exports for different trade sectors, we can see that Indonesia's exports to its five main trading partners were highly dominated by exports of mineral fuels (SITC 3-). This sector is then followed by exports of manufactured goods (SITC 6). However, the exports of machinery and transport equipment (SITC-7) experienced a relatively rapid growth since the year 2000. Besides, the exports of crude materials (SITC 2-) grew fast since 2003 as well. In general, Indonesia's exports for almost all trade sectors experienced a downfall in 1998 during the Asian economic crisis, but were later on able to increase again in 1999-2000.

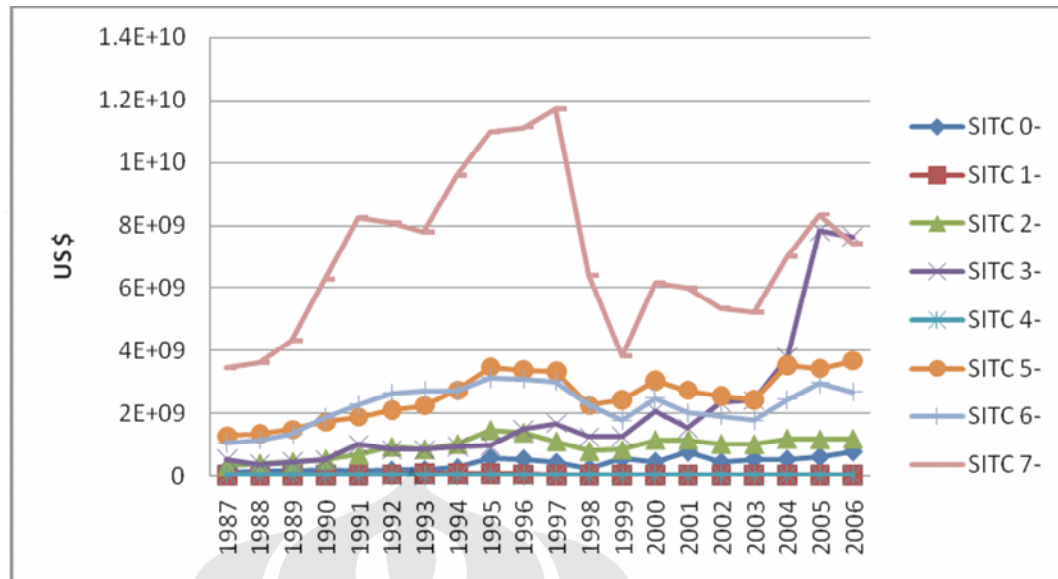
Chart 3.9. Indonesia's Exports to Five Main Trading Partners by Trade Sectors



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

A different pattern is formed in the fluctuation of the values of Indonesia's imports from its five main trading partners. Imports of manufactured goods have been acting as the Indonesia's main imports during the whole observed period. This trade sector (SITC 7) reached its highest peak in 1997 but fell deeply in the following two years due to the deep depreciation of rupiah during Asian economic crisis. It was able to rise again in 2000 but still fluctuated during the rest of the years observed. The next important trade sectors for Indonesia's imports are the imports of manufactured goods (SITC 6) and chemical products (SITC 5). These two sectors seem to move together along the whole period. However, the value of imports of mineral fuels has risen rapidly since 2004. It even exceeds the value of imports of manufactured goods and chemical products. In general, Indonesia's imports also decreased during the Asian economic crisis for most of the trade sectors.

Chart 3.10. Indonesia's Imports from Five Main Trading Partners by Trade Sectors

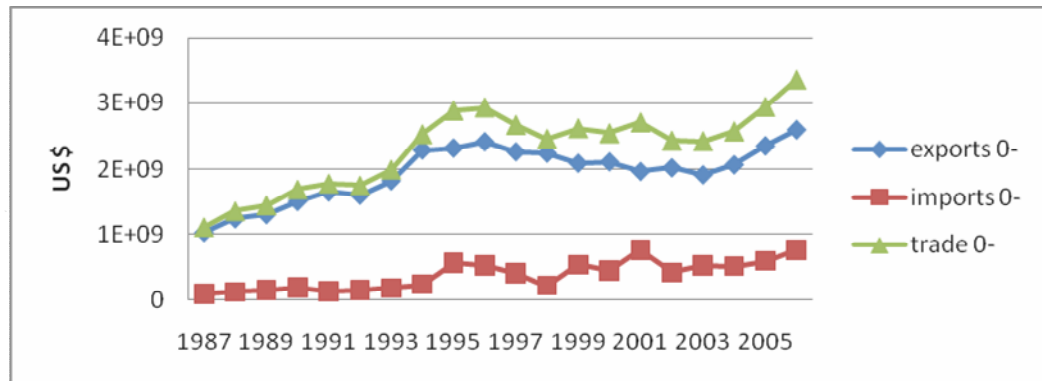


Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

3.6.1. Trade of Food and Live Animals (SITC 0-)

The trade of Food and Live Animals were mostly dominated by the exports of Indonesia Food and Live Animals products to its 5 main trading partners compared to Indonesia's imports from these partners throughout the period observed. The trade experienced rapid growth during 1992 to 1995. It experienced two times of downturns in the period of 1997 to 1998 and 2002 to 2003. But since 2004, the trade has an upward trend.

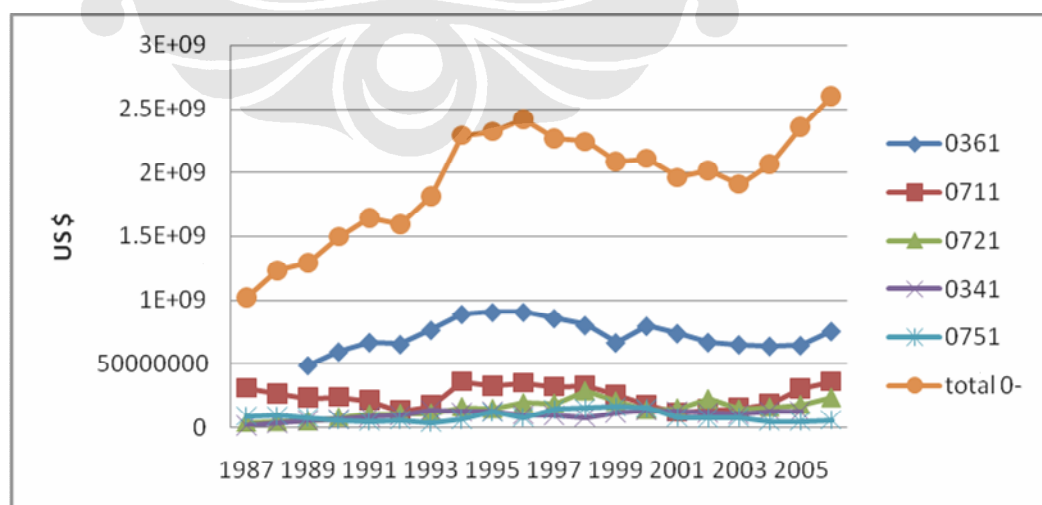
Chart 3.11. Trade of Goods SITC 0-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The main product in Indonesia's exports of food and live animals (SITC 0) is frozen crustaceans (SITC 0361). The value of exports of the product exceeds that of other main products classified as food and live animals. Those products are such as coffee (SITC 0711), cocoa powder (SITC 0721), fish (SITC 0341) and pepper (SITC 0751). However, the fluctuation of aggregate exports of this food and live animals sector cannot be well explained by the fluctuation of its main products. This is probably because the varying products of Indonesia's exports in this sector.

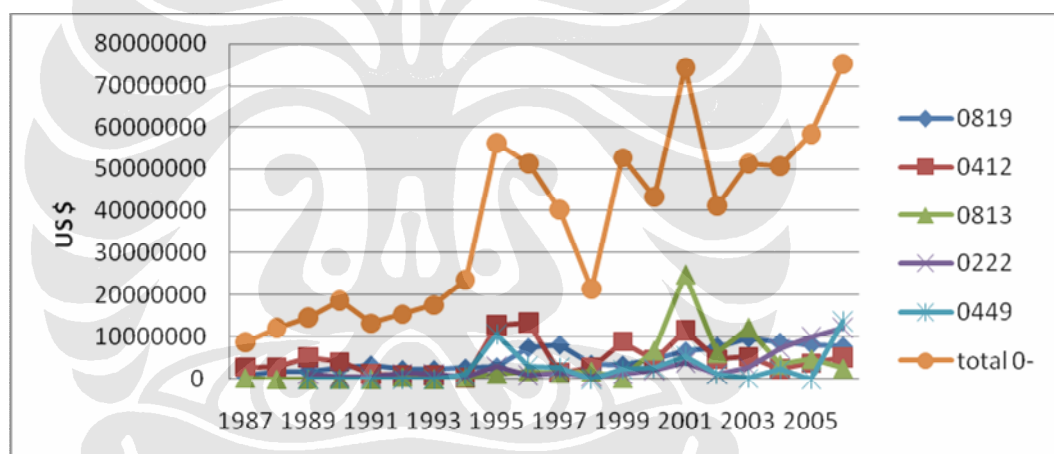
Chart 3.12. Exports of Goods SITC 0-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The value of aggregate imports for this food and live animals sector fluctuate more than the value of its aggregate exports. This fluctuation increased more rapidly as well since 1994. The main products for Indonesia's imports of food and live animals are food waste for animal feed (SITC 0819), rice in the husk or paddy (SITC 0421), oil cake (SITC 0813), milk and cream (SITC 0222), and unmilled maize (SITC 0449). In general, the fluctuation of this sector's aggregate imports cannot be reflected by the fluctuation of the value of imports of its main products.

Chart 3.13. Imports of Goods SITC 0-



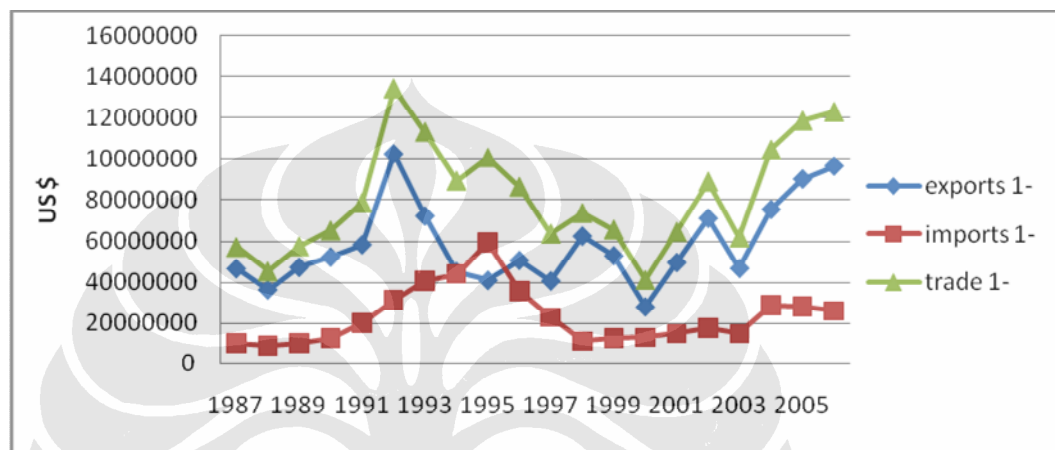
Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

3.6.2. Trade of Beverages and Tobacco (SITC 1-)

The trade of Beverages and Tobacco was relatively volatile throughout the period observed. However, the trend of the trade was mainly formed by the trend of the exports. Therefore, the behavior of export can be relatively appropriate in explaining the behavior of trade in this observation. At the beginning of the observation, the trade seems to have a positive trend. But since 1993, the trade dropped and reached its lowest level in the year 2000. Afterwards, trade of this

sector seems to have an increasing trend although it still experienced a downfall in 2003.

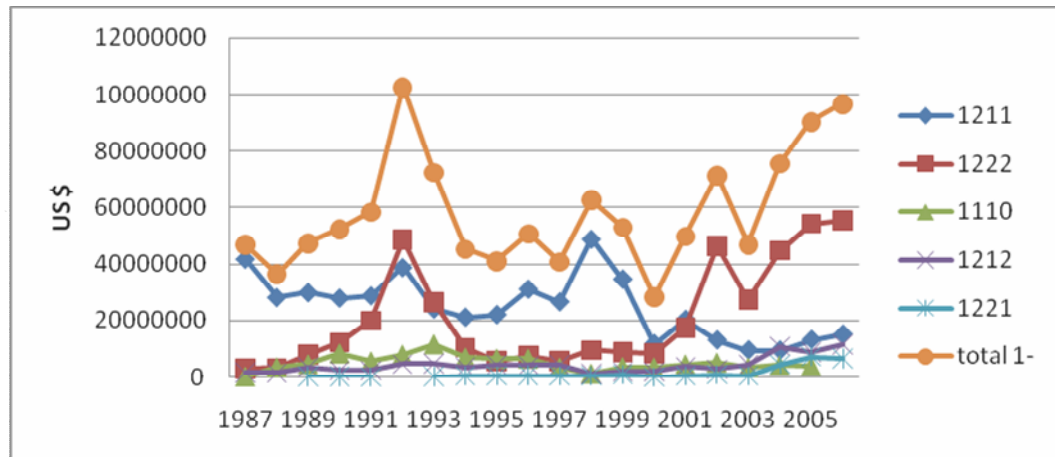
Chart 3.14. Trade of Goods SITC 1-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The value of aggregate exports of beverages and tobaccos was rather volatile throughout the years observed. However, the fluctuation of the aggregate exports can more or less be explained by the fluctuation of its main products. The first two main products that account for almost all fluctuation in the sector' aggregate export values are not-stripped and stemmed tobacco (SITC 1211) and cigarettes (SITC 1222). Relatively lesser fluctuations appeared for the values of exports of other main products of the sector, namely non-alcoholic beverages (SITC 1110), stripped and stemmed tobacco (SITC 1212) and cigars and cheroots (SITC 1221).

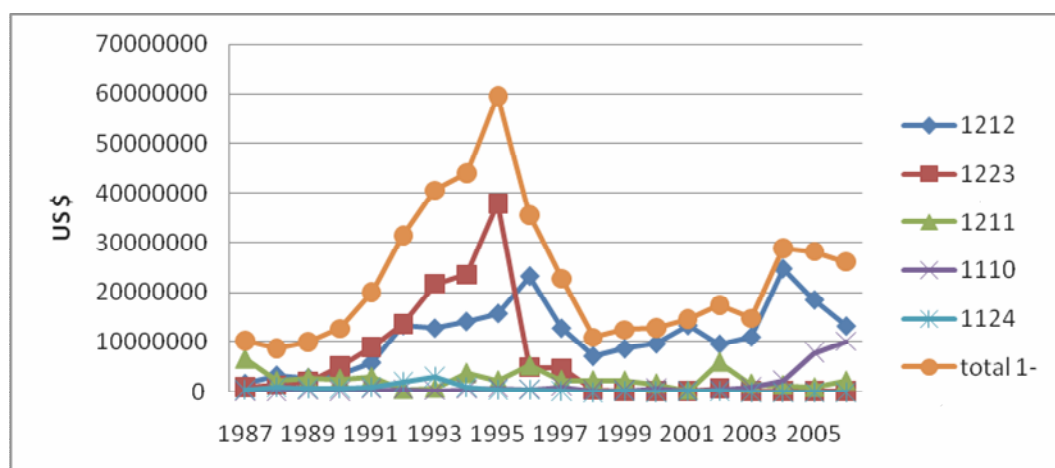
Chart 3.15. Exports of Goods SITC 1-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The value of aggregate imports of beverages and tobacco experienced its peak during the year 1991 to 1997, while it fluctuated rather less rapidly during the rest of the years observed. The fluctuation of the aggregate imports of this sector can relatively be reflected by the fluctuation of its two main products which are stripped and stemmed tobacco (SITC 1212) and manufactured extract and essence tobacco (SITC 1223). The value of imports of other main products was relatively stagnant. These products are not-stripped and stemmed tobacco (SITC 1211), non-alcoholic beverages (SITC 1110), and spirits and liqueurs (SITC 1124).

Chart 3.16. Imports of Goods SITC 1-

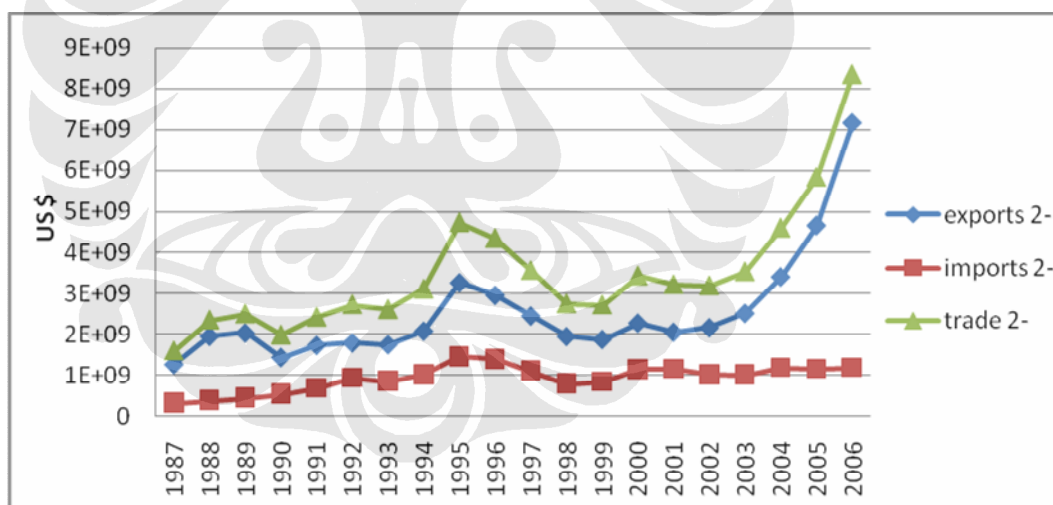


Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

3.6.3. Trade of Crude Materials (SITC 2-)

The trade of Crude Materials seems to track closely the trend of exports of this sector. The trade was relatively stagnant during 1987 to 1994. It increased rather highly 1995 but got a decreasing trend afterwards until 2000. In 2001 to 2003, trade of this sector did not fluctuate much. However, it experienced rapid increase since 2004 which last until the end of observation.

Chart 3.17. Trade of Goods SITC 2-

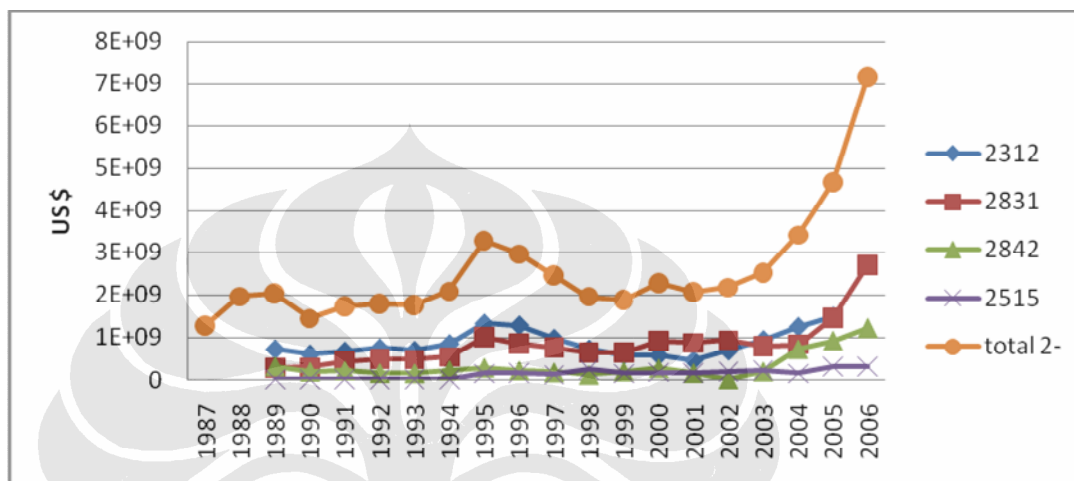


Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The value of aggregate exports of inedible crude materials (SITC 2-) was relatively less volatile during the year 1987 to 2003. However, since 2004 to 2006, this value increased rapidly. In general, the fluctuation of the value of aggregate exports in this sector goes along with the value of exports of its main products. These products are natural rubber other than latex (SITC 2312), copper

ores and concentrate (SITC 2831), nickel mates (SITC 2842), and chemical wood pulp (SITC 2515).

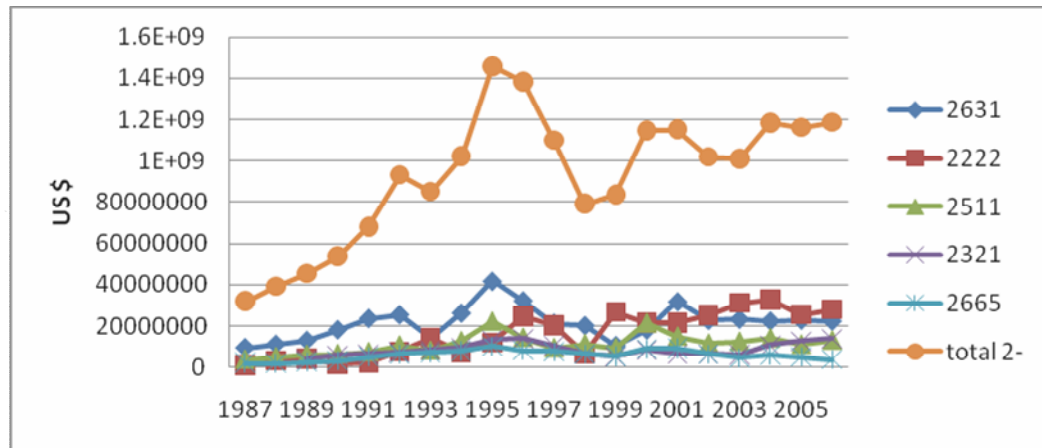
Chart 3.18. Exports of Goods SITC 2-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The fluctuation of aggregate imports of crude materials product was more volatile than that of the aggregate exports. It experienced downfall in the year 1993, 1996 to 1998 and 2002 to 2003. It reached its highest peak in 1995. The values of its main products were relatively small compared to the value of aggregate imports. These products are cotton not carded or combed (SITC 2631), soya beans (SITC 2222), waste paper and paperboard (SITC 2511), synthetic rubber (SITC 2321), and synthetic fibres not carded and combed (SITC 2665).

Chart 3.19. Imports of Goods SITC 2-

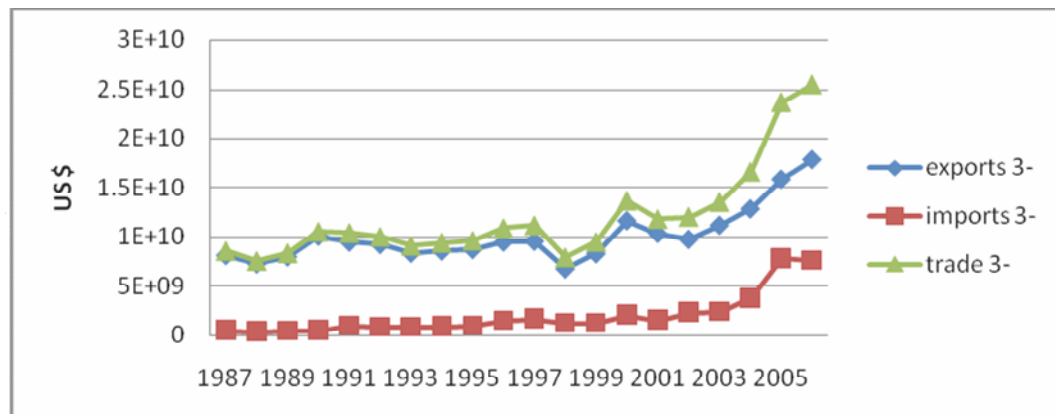


Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

3.6.4. Trade of Mineral Fuels (SITC 3-)

The trade of Mineral Fuels is also highly dominated by the exports of mineral fuels throughout the observations. The trend of the trade was relatively stagnant between the year 1987 and 1997. However, it experienced a sharp decline in 1998. It increased pretty rapidly afterwards especially in 2003 to 2006. The increase in 2004 to 2006 was not dominantly contributed by exports but also by imports.

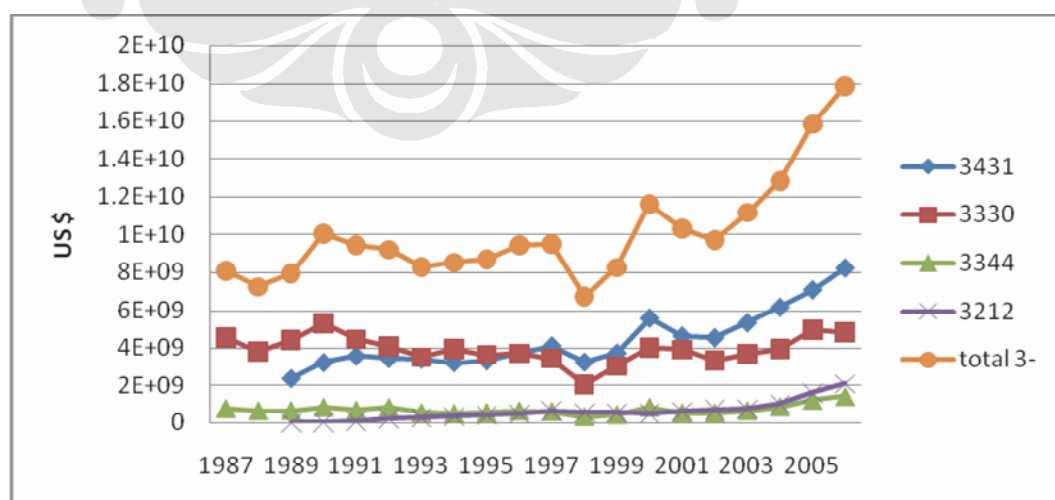
Chart 3.20. Trade of Goods SITC 3-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The value of aggregate exports of mineral fuels (SITC 3) fluctuated less during 1987 to 1997. However, it experienced downfall in 1998. It started to increase in 1999 and initiated skyrocketing in 2003. Its fluctuation can be relatively well explained by the fluctuation of its two main products, namely liquefied natural gas (SITC 3431) and crude petroleum oils (SITC 3330). The values of exports of other main products in this sector were relatively stagnant. They are fuel oils (SITC 3344) and other coal (SITC 3212).

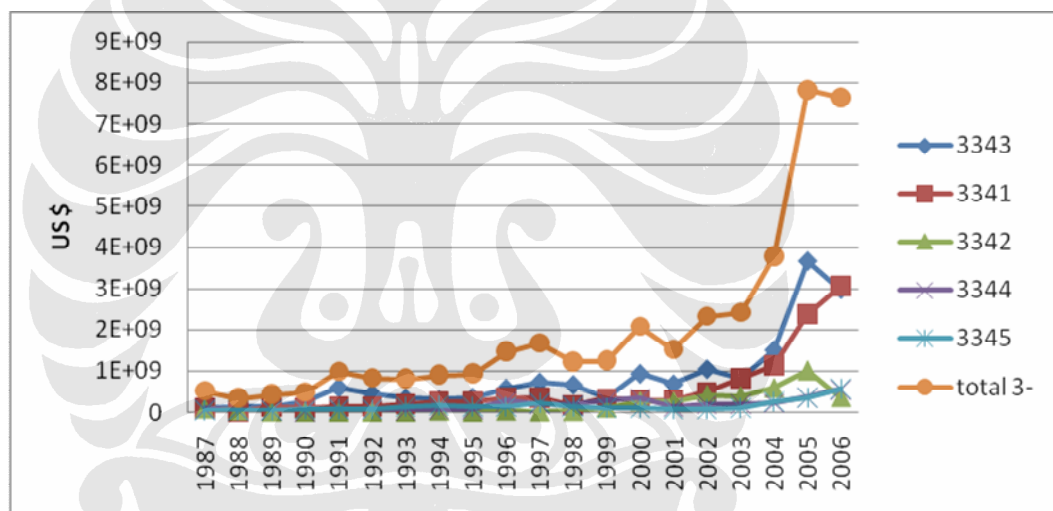
Chart 3.21. Exports of Goods SITC 3-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The values of aggregate imports of mineral fuels were relatively stagnant during 1987 to 1999. It started crawling high since 2000 and increased rapidly since 2004. The fluctuation of the value of aggregate imports can be well reflected by the value of imports of its main products. These products are gas oils (SITC 3343), motor spirits (SITC 3341), kerosene (SITC 3342) fuels oils (SITC 3344) and lubricating petroleum oils (SITC 3345).\

Chart 3.22. Imports of Goods SITC 3-

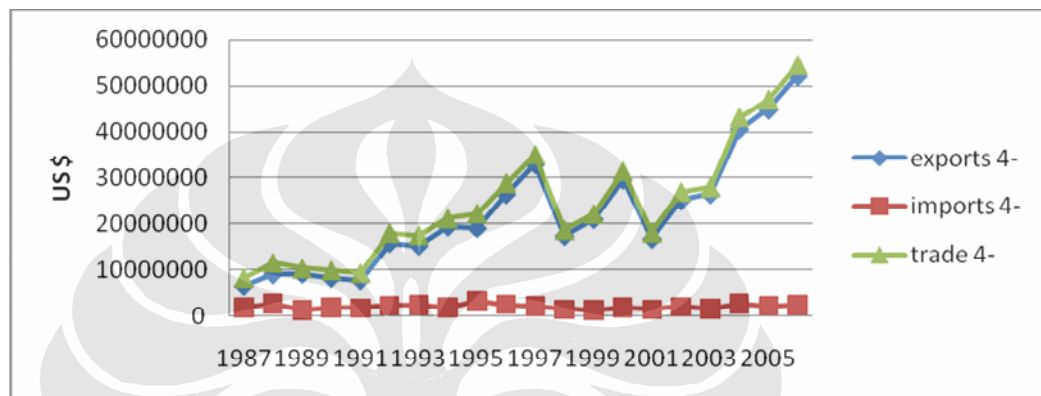


Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

3.6.5. Trade of Animal and Vegetable Oils (SITC 4-)

The trend of trade of Animal and Vegetable Oils almost coincides with the trend of exports of the sector throughout the years observed. The trend seems at a glance less volatile in the period before 1997 with an upward trend. In 1998, it experienced a drastic drop. The trade increased for two years after this drop but experienced another decline in 2001. However, the trend was back to form an increasing trend since 2002.

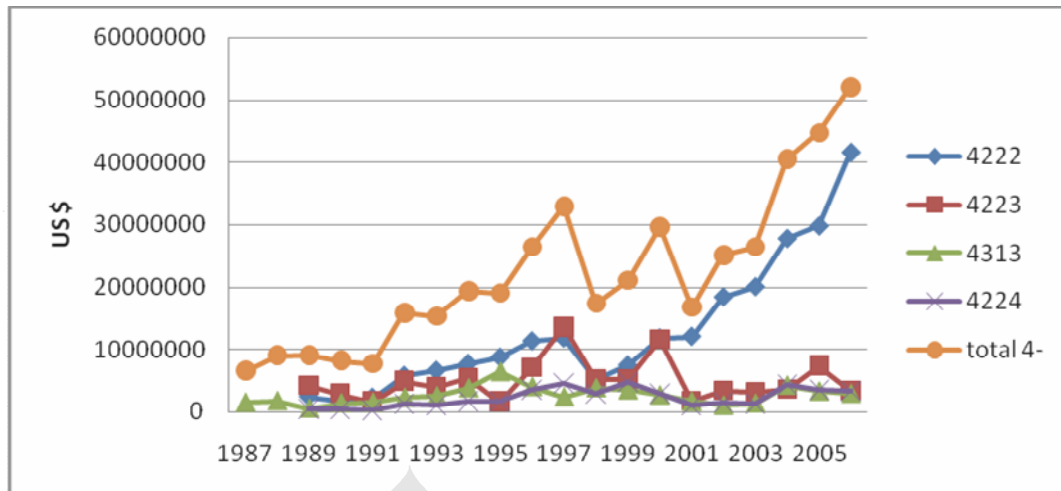
Chart 3.23. Trade of Goods SITC 4-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The value of aggregate exports of animal and vegetable oils (SITC 4-) has been experiencing a positive trend since 1995 although it still faced some downfalls in 1998 and 2001. In the period of 1987 to 2001, the fluctuation of the value of aggregate exports can be well reflected by the two main products of the sector, namely palm oil (SITC 4222) and coconut oil (SITC 4223). However since 2001, the fluctuation of the aggregate exports can be well described by the fluctuation of exports of palm oil solely. Other main products of this sector are fatty acids (SITC 4313) and palm kernel oil (SITC 4224).

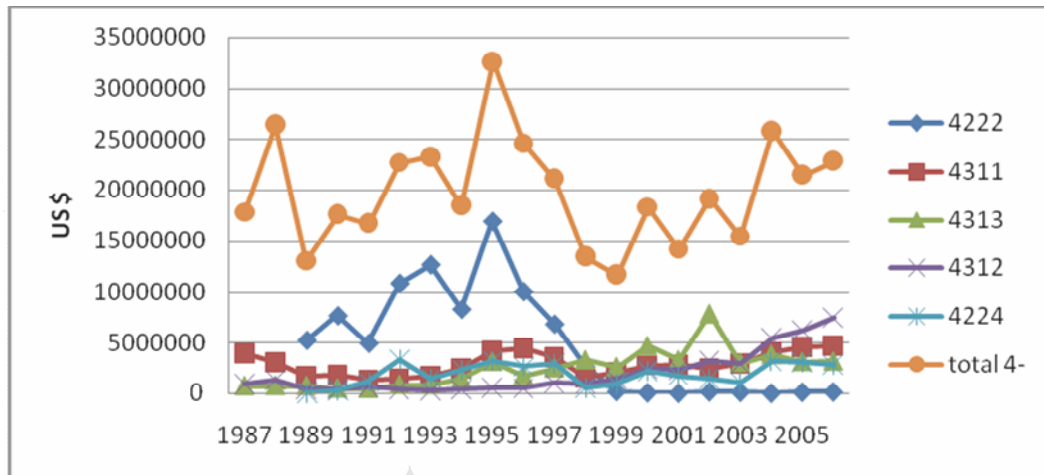
Chart 3.24. Exports of Goods SITC 4-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The value of aggregate imports of animal and vegetable oils is relatively more volatile than that of the aggregate exports. In the period of 1989 to 1999, the fluctuation of the aggregate imports can be well explained by the fluctuation of imports of palm oil (SITC 4222). However, since 2000 the fluctuation of aggregate imports can better be explained by the fluctuation of imports of fatty acids (SITC 4313), hydrogenated animal and vegetable oils (SITC 4312) and oxidized animal and vegetable oils (SITC 4311). Other main product of the sector is palm kernel oil (SITC 4224).

Chart 3.25. Imports of Goods SITC 4-

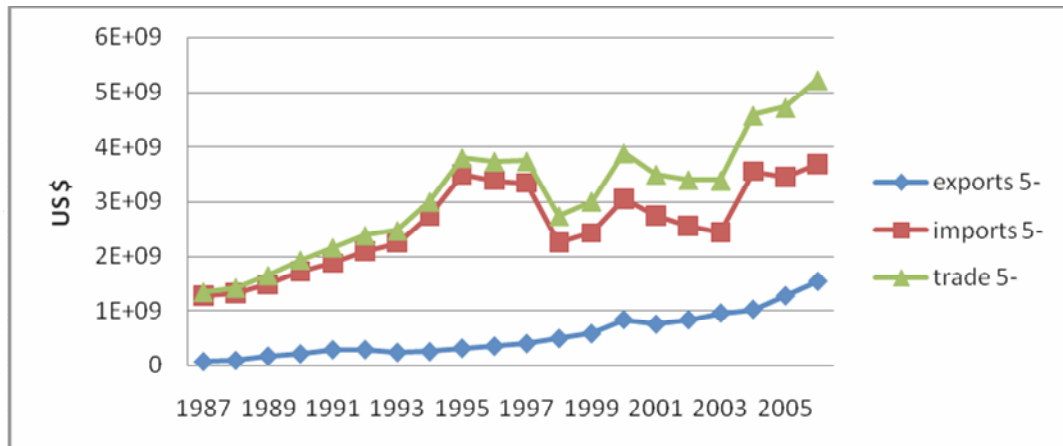


Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

3.6.6. Trade of Chemical Products (SITC 5-)

The trend of the trade of Chemical Products can be better explained by the trend of the imports of chemical products. As we can see from the chart below, the trend of imports tracks closely the trend of trade. Although since the year, these two trends widened as the exports was able to constantly increase while the imports fluctuated rather rapidly. The trend of trade seems to have less fluctuation in the period before 1994 while it seems to have more fluctuations in the period after 1997. However, the trade experienced relatively drastic increase in 1999 to 2000 and 2003 to 2004.

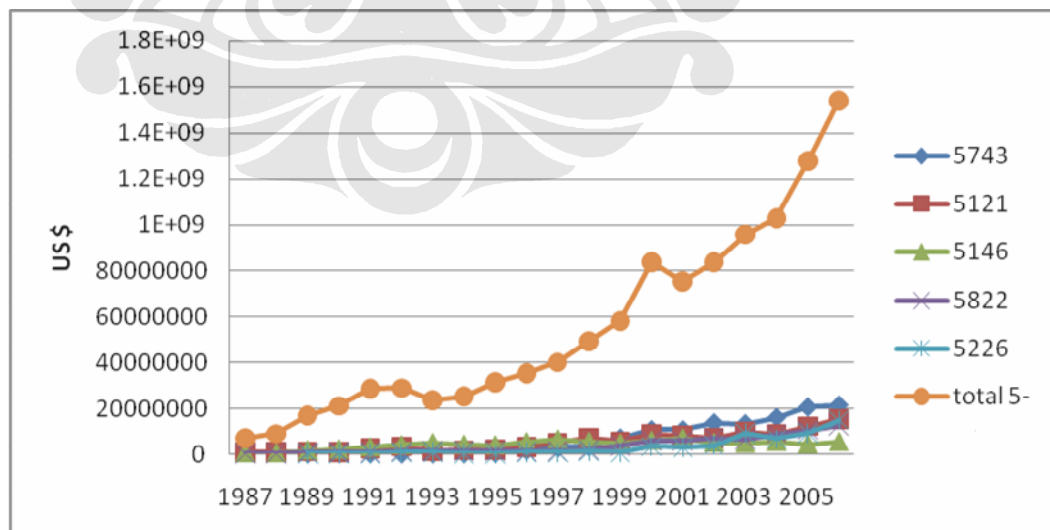
Chart 3.26. Trade of Goods SITC 5-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The value of exports of chemical products (SITC 5-) experienced a positive trend with small fluctuation throughout the years observed. These values of exports of the sector's main products are relatively small compared to the value of the aggregate exports. Therefore, the movement of exports of the main products can hardly be described as the movement of the aggregate exports.

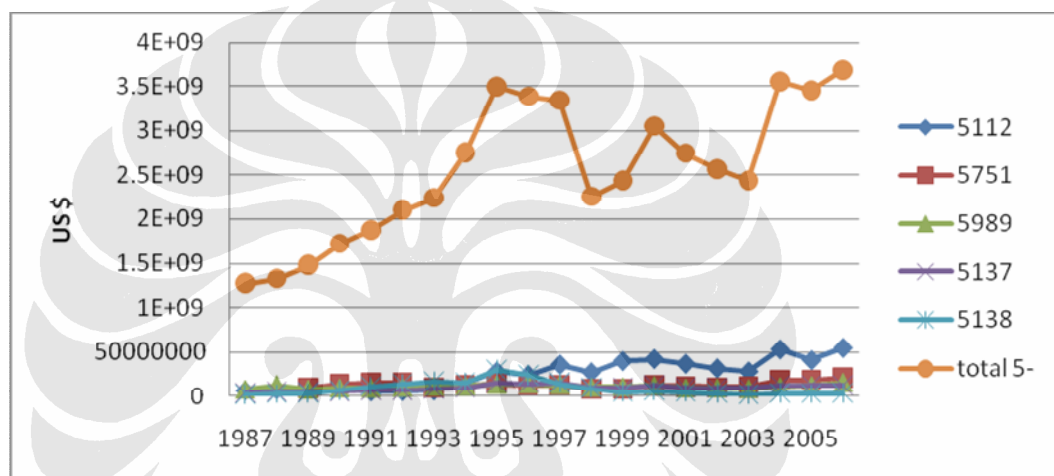
Chart 3.27. Exports of Goods SITC 5-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The value of aggregate imports of chemical products has a more volatile movement than that of the aggregate exports. Although it had positive trend overtime, it experienced some deep downfalls in 1998 and 2003. The values of imports of the sector's main products are relatively small compared to the value of its aggregate imports.

Chart 3.28. Imports of Goods SITC 5-

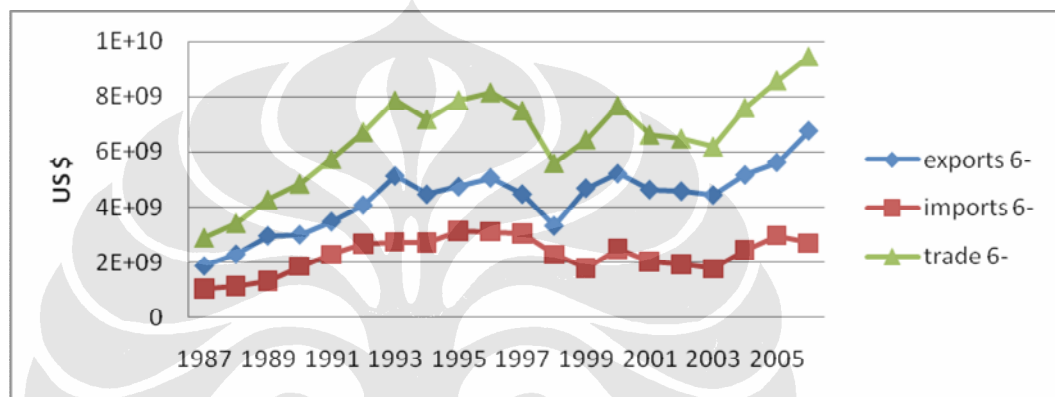


Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

3.6.7. Trade of Manufactured Products (SITC 6-)

Both exports and imports of Manufactured Products share relatively high portions of the total trade. However, the value of exports exceeds the value of imports throughout the observation. The trend of trade seems to be a positive trend overtime. Yet, trade of manufactured products experienced several drops throughout the observation. The deepest decline occurred in 1998, while other declines occurred in 1994 and 2001 to 2003.

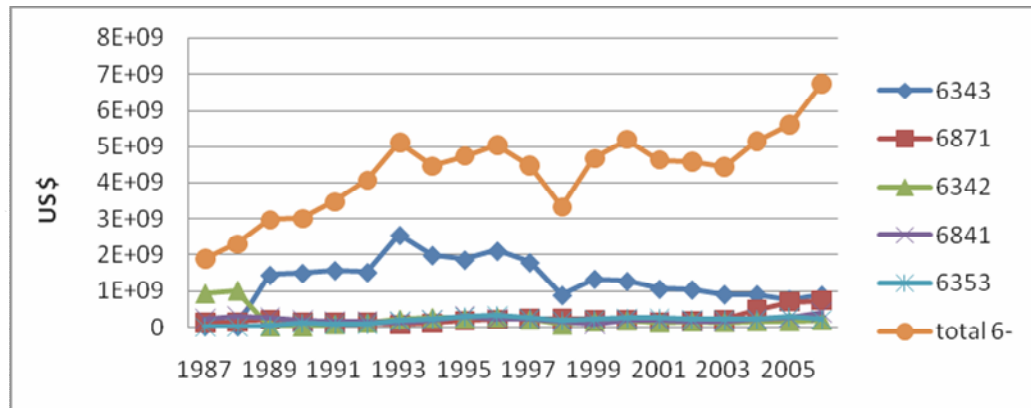
Chart 3.29. Trade of Goods SITC 6-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The trend of exports of goods SITC 6- is in general a positive trend over the time observed. However, the value of exports declined drastically in 1998. More declines happened in 1994 and during 2001 to 2003. In the first two years in the time series, densified wood (SITC 6342) was the main product of this sector. But since 1989 to the end of the observation, exports of plywood (SITC 6343) dominated the total exports of this trade sector. Moreover since 2004, exports of unwrought tin grew relatively high. Other main products of the sectors were unwrought aluminium (SITC 6841) and builder carpentry and joinery (SITC 6353).

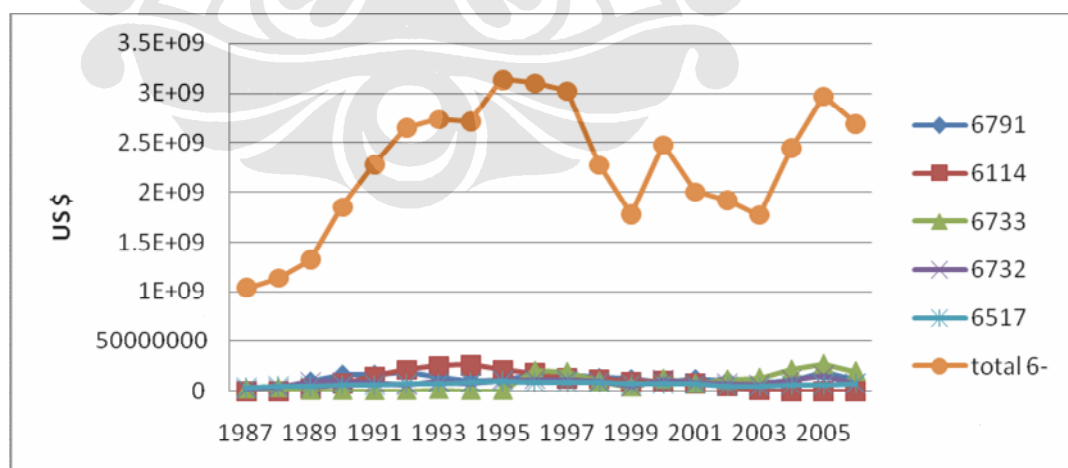
Chart 3.30. Exports of Goods SITC 6-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The trend of imports of goods SITC 6- seems to be less volatile in the period before 1997. In this period, the trend of imports of this sector was an upward trend overtime. The value of import dropped deeply in 1998 and 1999. It dropped again in 2001 to 2003. The value of imports of this sector's main products was relatively small compared to the value of total imports. However, the main products in this sector's imports are such as tubes and pipes of iron or steel (SITC 6791), leather of other bovine cattle (SITC 6114).

Chart 3.31. Imports of Goods SITC 6-

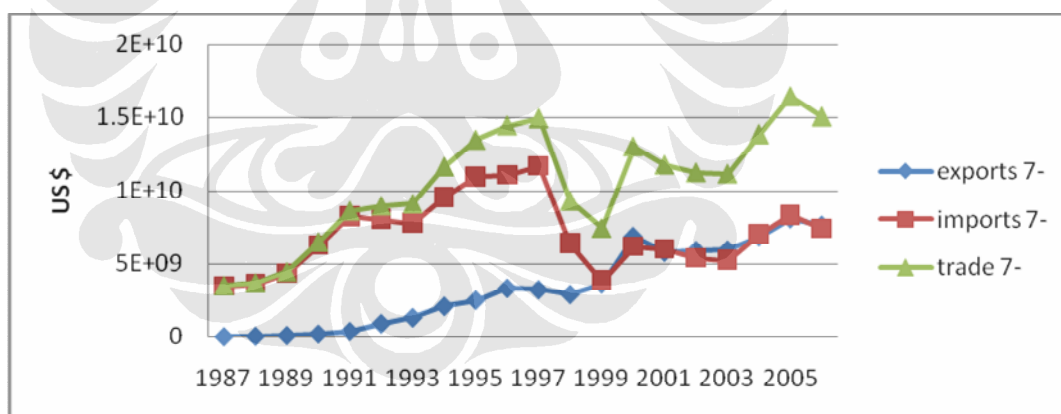


Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

3.6.8. Trade of Machinery and Transport Equipment (SITC 7-)

The total trade of Machinery and Transport Equipment was highly dominated by its imports in the period before 1999. After the year 1999, both exports and imports share relatively high portions of the total trade. The total trade had a positive trend before experiencing sharp decline in 1998. It increased back up again in 2000 but had to face a moderate decline in 2001 to 2003. The value of total trade reached its highest point in 2005 but follow a small decline in 2006.

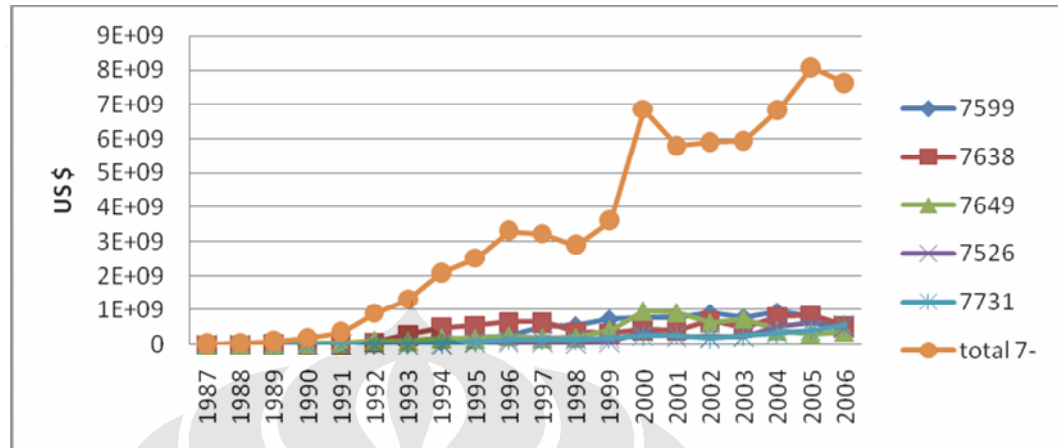
Chart 3.32. Trade of Goods SITC 7-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The trend of exports of goods SITC 7- seems to be positive trend overtime. It experienced a rapid increase in 1993 to 1996 and in 2000. However, it experienced some downturns as well which occurred in 1997 to 1998 and 2001. The values of exports of its main products were relatively small compared to the value of its total exports.

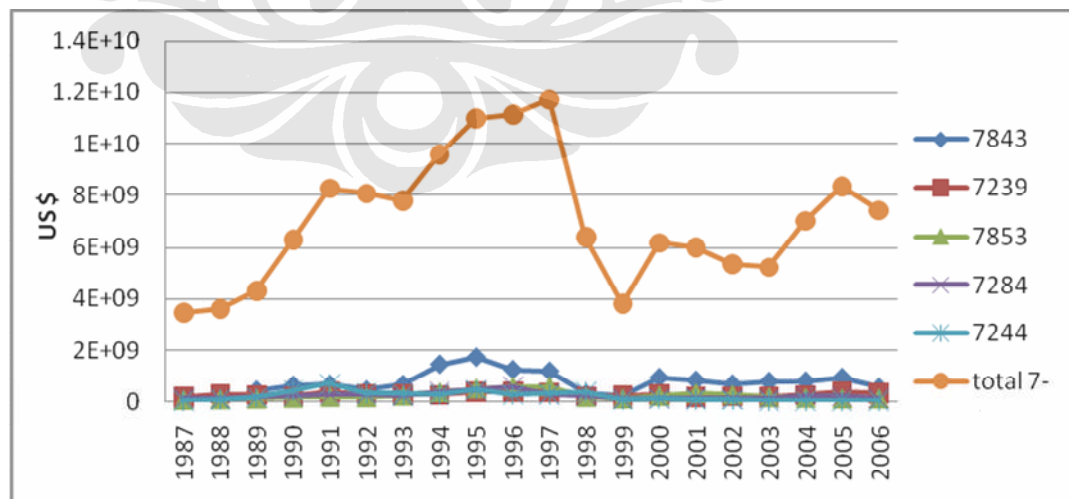
Chart 3.33. Exports of Goods SITC 7-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated

The values of imports of goods SITC 7- reached its highest point in 1997. But this peak was directly followed by drastic decline in 1998 and 1999. The values of total imports increased rapidly in the period 1988 to 1991, 1993 to 1997 and 2003 to 2005. The values of imports of its main products were relatively small compared to its total imports.

Chart 3.34. Imports of Goods SITC 7-



Source: Badan Pusat Statistik (BPS) Statistik Perdagangan Luar Negeri Indonesia, calculated