

CHAPTER 1

INTRODUCTION

1.1. Backgrounds

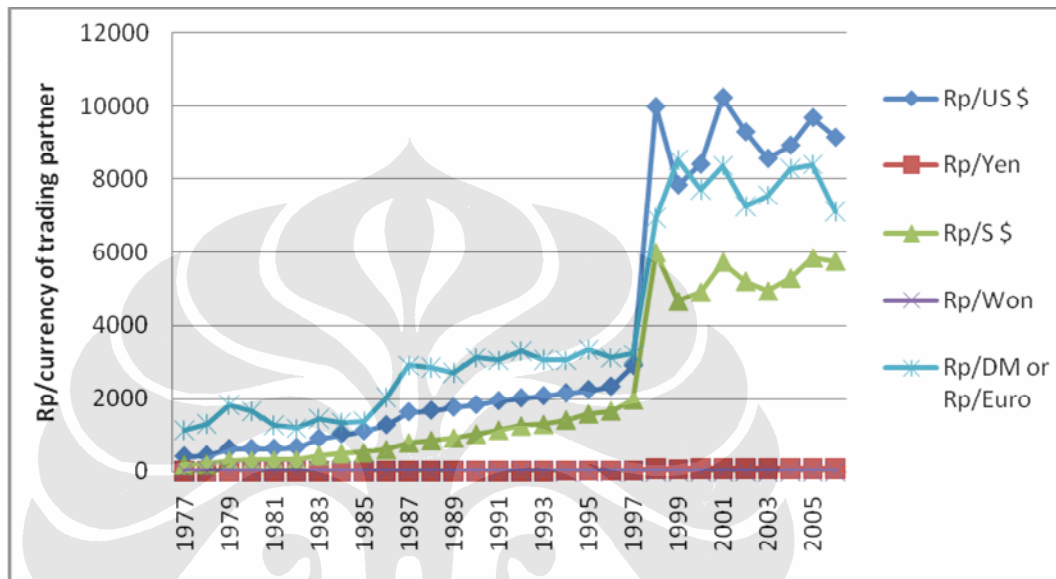
In 1961, Oi was able to explicate an intriguing conclusion. Quoting from his studies, it is argued that price instability is a virtue rather than a vice. However, Hooper and Kohlhagen (1978) reveal a justification for the proponents of stability that exchange rate instability which translates to exchange rate uncertainty does reduce international trade. The previous research has led numbers of studies on this topic. However, most of these studies focus on developed economies and also rarely explicate exchange rate uncertainty's effects on different trade sectors. Hence, this research aims to give contribution in focusing the topic on developing economy. The research's main objective is also to describe different impacts that exchange rate uncertainty imposes on different trade sectors. Indeed, the research will be the first study that reveals sectoral impacts of exchange rate uncertainty in Indonesia.

Real exchange rate can broadly define a country's competitiveness compared to other country. Under the theory of Purchasing Power Parity (PPP), real exchange rate will remain constant. It means that the theory implies no changes of competitiveness among countries across times. However, many evidences lead to the failure of PPP to hold in reality. Therefore, assuming PPP does not hold, real exchange rate may vary overtime and so does a country's competitiveness.

Moreover, fluctuations of real exchange rate may root in fluctuations in nominal exchange rate and in fluctuations of price level ratios. Changes in nominal exchange rate are highly determined by the exchange rate regime adopted by a country. Adoption of fixed-exchange rate regime implies high interventions of central bank in keeping the currency's exchange rate at a certain level, while free-floating exchange rate regime lets the exchange rate to be determined by

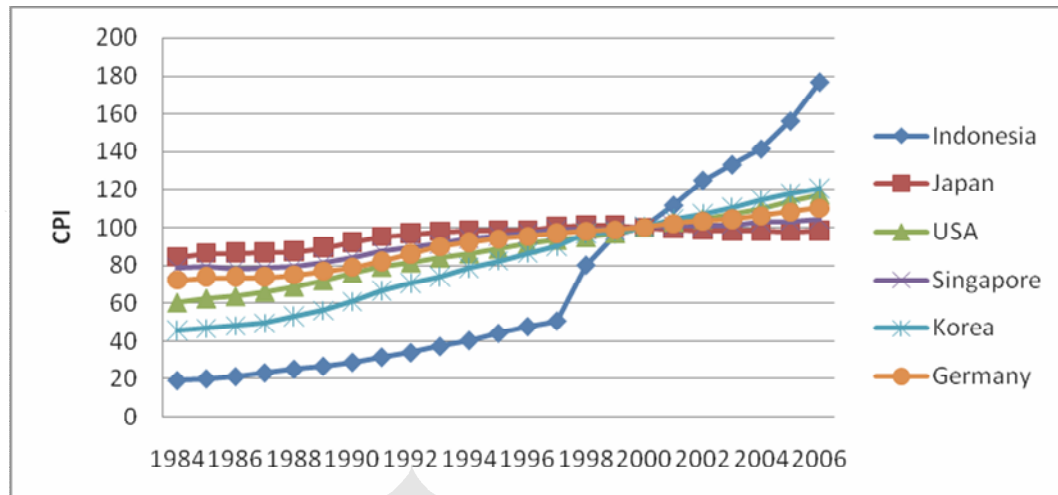
market-mechanism. As we can see from the chart below, nominal exchange rates of Indonesia's currency and its main trading partners seem to fluctuate relatively more rapidly after the adoption of free-floating exchange rate regime in 1997.

Chart 1.1. Nominal Exchange Rate Fluctuations of Indonesia's Currency with Its Main Trading Partners



On the other hand, there are several factors that may cause fluctuations in price level. These factors include condition of macroeconomic such as government expenditure, employment and technology changes. As we can see below, price levels of Indonesia and its five main trading partners also vary overtime.

Chart 1.2. Price Levels of Indonesia and Its Five Main Trading Partners



Many people argue that fluctuations of exchange rate can affect international trade. Fluctuations or variability or volatility of exchange rate can cause uncertainty. Exchange rate uncertainty is argued to have an impact on international trade that it can cause the profit gained from international trade activities to be uncertain as well. This research takes more focus on the impact of exchange rate uncertainty on the volume of bilateral trade.

Reviewing the theories and empirical evidences available, the research *a priori* assumes real exchange rate to be more relevant in affecting trade rather than nominal exchange rate. Given that there are ways in eliminating real exchange rate uncertainty in short term, the research also focuses on the medium term to long term real exchange rate uncertainty. However, the research does not *a priori* take the level of real exchange rate uncertainty to be different under fixed exchange rate regime and free-floating exchange rate regime.

Maskus (1986) and Cho et al. (2002) find that exchange rate uncertainty imposes different impacts on different sectors. On the other hand, there are plenty of arguments and evidences showing that exchange rate uncertainty can have dualism influence on trade. In some cases, exchange rate uncertainty can increase the volume of international trade but in some other cases exchange rate uncertainty is detrimental to international trade. Moreover, most studies focus

on the empirical tests on the case of developed economies and rarely can we find those for developing economies. Yet, Pick (1990) emphasizes the impact of exchange rate uncertainty can be larger in developing economies compared to developed economies since the less-developed condition of developing economies' financial market. Hence, this research takes Indonesia, a developing country, as observation in order to contribute to the development of this topic. This is also the first research in Indonesia that tries to explicate the impact of exchange rate uncertainty toward different trade sector.

In order to represent the population of Indonesia's bilateral trade, the research takes the sample from Indonesia's bilateral trade with its five main trading partners, namely Japan, USA, Singapore, Korea and Germany. Trade sector classification follows the Standard of International Trade Classification (SITC) Revision 3 with 1 digit classification. The data is taken annually from the year 1987 to 2006. This time-series allows for 10 years of the adoption of fixed-exchange rate regime and 10 years of the adoption of free-floating exchange rate regime.

In this research, the variable of exchange rate uncertainty is calculated using the Perée and Steinherr's exchange rate uncertainty measurement. This variable is included as one of independent variables in an expanded gravity model. Gravity model itself is widely used and has been very successful in explaining behavior of bilateral trade. Other independent variables are real GDP per capita, population and distance.

The data is formed as a panel data consists of 800 observations and regressed using various panel-data regression models. The best model is then taken as default in order to explain the impact of exchange rate uncertainty on bilateral trade.

The research finds that that exchange rate uncertainty imposes different impacts on different trade sectors. From 8 trade sectors, exchange rate uncertainty has significant negative impact on two trade sectors while it has significant

positive impact on the other six trade sectors. This pattern is concluded in the table below.

Table 1.1. Impacts of Exchange Rate Uncertainty of Different Trade Sectors of Indonesia's Bilateral Trade

| Impacts of Exchange Rate Uncertainty on Trade Sectors | |
|--|---|
| Negative Impacts | Positive Impacts |
| Beverages and Tobacco | Food & Live Animals |
| Animal and Vegetable Oil | Crude Matter, Inedible |
| | Mineral Fuel |
| | Chemical Products |
| | Manufactured Goods |
| | Machinery and Transportation Equipments |

Differences of exchange rate uncertainty's impacts on different trade sectors occur because of the varying level of openness, industry concentration, foreign direct investment which represents multinational activities and protection level which prevail in different trade sectors.

1.2. Research Problem

Adoption of different exchange rate regimes may produce different fluctuations of exchange rate. Therefore, the level of exchange rate uncertainty may also vary across different exchange rate regimes. Moreover, exchange rate uncertainty may impose different impacts on trade. The research tries to explicate the impacts of exchange rate uncertainty on the volume of trade. Specifically, the research tries to make a sectoral analysis on the impact of exchange rate uncertainty of Indonesia's bilateral trade data.

1.3. Research Objectives

The objectives of the research are:

- a) To know the level of exchange rate uncertainty during the adoption of fixed-exchange rate regime (1987-1997) and free-floating exchange rate regime (1997-2006) in Indonesia;
- b) To know the relationship between Indonesia and trading partners' GDP per capita, Indonesia and trading partners' population and distance between Indonesia and trading partners to Indonesia's bilateral trade;
- c) To know the impacts of exchange rate uncertainty on different trade sectors of Indonesia's bilateral trade.

1.4. Research Significance

The research adds more empirical study on the topic of exchange rate uncertainty and trade especially taking developing economy as an object of analysis. This research is the first research that study sectoral impacts of exchange rate uncertainty in Indonesia. This research finds that exchange rate uncertainty not necessarily always causes negative impacts on international trade.

1.5. Research Hypothesis

The research hypothesizes:

- a) There is no significant difference in the level of real exchange rate uncertainty under fixed-exchange rate regime and free-floating exchange rate regime;
- b) GDP per capita and population are positively related to international trade while distance is negatively related to international trade;
- c) Exchange rate uncertainty imposes different impacts on different trade sectors.

1.6. Research Methodology

The research uses an expanded gravity model in order to explain Indonesia's trade between its five main trading partners. Specifically,

$$\ln TRADE_{ij,t}^s = \delta + \beta_1 \ln GDPPC_t + \beta_2 \ln POP_t + \beta_3 \ln dist + \beta_4^s U_{ij,t} + \varepsilon_{ij,t}^s \quad (1.1)$$

The model estimates that trade (*TRADE*) is influenced by the product of GDP per capita (*GDPPC*) of Indonesia and trading partner, product of population (*POP*) of Indonesia and trading partner, distance between Indonesia and trading partner (*dist*) and exchange rate uncertainty (*U*). Moreover, since the objective of the research is to explicate different impacts of exchange rate uncertainty on different trade sector, the variable of exchange rate uncertainty is formed as a fixed-effects estimator. This means that the variable of exchange rate uncertainty is multiplied by dummy-interactive variables each representing a trade sector.

In this research, Indonesia's main trading partners are Japan, United States of America (USA), Singapore, Korea and Germany. Trade sectors classification follows the Standard of International Trade Classification (SITC) Revision 3 with 1 digit classification. From 10 trade sectors available, the research includes 8 trade sectors to be observed. The excluded trade sectors are the sector of miscellaneous manufactured articles and the sector of commodities and transaction. The sector of miscellaneous manufactured articles is excluded from the analysis due to difficulties in determining the trade sector level of openness and concentration. Meanwhile the trade sector of commodities and transaction is excluded because it has relatively small portion in Indonesia's international trade.

Table 1.2. Trade Sector Classifications

| SITC 1-digit | DESCRIPTION | Code <i>c</i> |
|--------------|----------------------------------|---------------|
| 0 | Food and Live Animals | 1 |
| 1 | Beverages and Tobacco | 2 |
| 2 | Crude Materials, Inedible | 3 |
| 3 | Mineral Fuels, Lubricants etc. | 4 |
| 4 | Animal and Vegetable Oils & Fats | 5 |

| | | |
|---|-----------------------------------|---|
| 5 | Chemical Products | 6 |
| 6 | Manufactured Goods | 7 |
| 7 | Machinery and Transport Equipment | 8 |

The data is formed as a panel data. The time-series variable is year which covers a period of 20 years. The period observed starts in 1987 and ends in 2006. This allows for 10 years utilization of fixed-exchange rate regime and 10 years utilization of free-floating exchange rate regime. The cross section variable is named as coding¹. This variable is a system of code which represents 8 different trade sectors and 5 trading partners. Having 40 individuals of cross-section and 20 individuals of time-series, the data consists of 800 observations.

1.6.1. Data Collection Technique

Data of Indonesia's exports to and imports from five main trading partners is obtained from Badan Pusat Statistik's data. The research obtains data of Real GDP, population, price level, and annual exchange year from the International Monetary Fund (IMF)'s International Financial Statistics (IFS) CD-ROM. Meanwhile, the data about distance between Indonesia and its five main trading partners is obtained from the data provided by Andrew K. Rose.

1.6.2. Data Processing Technique

Using the Stata 10.0 software, the data is regressed under the Ordinary-Least Square (OLS) estimation method. This includes the conditions that the data should be able to fulfill the basic assumptions of OLS in order to produce best-linear-unbiased (BLUE) estimators. Moreover, the panel data is regressed under several panel data regression models. These models are Pooled-Least Square model, Fixed-Effects Model, Random-Effects Model and Generalized Least Square (GLS) model. The best result is then chosen under the following thresholds:

¹ The information about the system of formation for the cross-section variable is available in Appendix.

- a) The method should be able to produce the most credible result under the assumptions specified.
- b) The method should be able to produce a significant model.
- c) The method should be able to produce the most numbers of significant parameters.

1.7. Research Systematic

The systematic of the research is as follows:

CHAPTER I: Introduction

This chapter includes backgrounds of research, statement of problems, research objectives, research contribution, hypothesis, methodology and systematic.

CHAPTER II: Literature Review

This chapter consists of two parts, summary of theories and review of preceding researches on the same topic of the research. The summary of theories range from the theory of pattern of trade, exchange rate, purchasing power of parity (PPP), and exchange rate uncertainty's impact on trade. The review of preceding research includes research about the impact of exchange rate uncertainty of trade in developed economies and some researches of the same topic in Indonesia.

CHAPTER III: Indonesia and Its Main Trading Partners

This chapter elaborates the condition of Indonesia and its main trading partners by the independent and dependent variables used in this research. This means that the chapter gives historical explanations on Indonesia and its five main trading partners' real GDP per capita, population, distance from Indonesia to each trading partner, and bilateral exchange rate between Indonesia and each trading partner. Moreover, a review of Indonesia's trade data is also provided. The review of trade includes aggregate data of Indonesia's trade with all five trading partners as well

as explanations on data based on the trade sector classification used in this research.

CHAPTER IV: Research Methodology

This chapter explains the foundation of the gravity model specified in this research. Next, the chapter also explains the measurement of exchange rate uncertainty used in the research which is the Perée and Steinherr's exchange rate uncertainty measure. Moreover, the chapter explains the sample and data used in the research. The chapter ends with explanation on all the regression method used in the research.

CHAPTER V: Results and Analysis

The chapter has two sections namely the subchapter of results and the subchapter of analysis. The first subchapter shows all the results obtained from the regression process of the model using the sample and data. The second subchapter explains the meaning of the best regression result in economic terms.

CHAPTER VI: Conclusion and Remarks

This last chapter of the research states some conclusions drawn from the whole process of the research especially the results and analysis. The chapter also elaborates the caveats of the research. This last part of the chapter states some remarks of the research based on the information obtain from the research.