Impact of Asian and Global Crises on Indonesian Exports

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ยูเลีย ตรี มาร์ดานี : ผลกระทบของวิกฤตเศรษฐกิจอาเซียนและวิกฤตเศรษฐกิจโลกต่อภาคการส่งออกของอินโดนีเซีย (Impact of Asian and Global Crises on Indonesian Exports) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: จูน เจริญเสียง, 152 หน้า.

การศึกษาครั้งนี้มีจุดประสงค์เพื่อเปรียบเทียบผลกระทบจากวิกฤตการณ์การเงินเอเชียในปี พ.ศ. 2540 และวิกฤตการณ์การเงินของโลกในปี พ.ศ. 2551 ที่มีต่อการส่งออกของประเทศอินโดนีเซียโดยใช้แบบจำลอง Augmented Gravity Model ภายใต้กรอบทฤษฎีการค้าระหว่างประเทศใหม่ของครุกแมน ข้อมูลที่ใช้ในการศึกษาครั้งนี้คือ ข้อมูลการส่งออกของประเทศอินโดนีเซียรายไตรมาสตั้งแต่ปี พ.ศ.2536 ถึง พ.ศ. 2555 โดยแบ่งออกเป็นข้อมูลการส่งออกจากภาคอุตสาหกรรมหลัก ซึ่งได้แก่ ภาคเกษตรกรรม ภาคการผลิตและภาคอุตสาหกรรมเหมืองแร่ รวมไปถึงภาคอุตสาหกรรมรวม ประเทศคู่ค้าหลักของประเทศอินโดนีเซียจำนวน 30 ประเทศคือกลุ่มตัวอย่างในการศึกษาครั้งนี้ ซึ่งคิดเป็นร้อยละ 88 ของการส่งออกทั้งหมดของประเทศอินโดนีเซีย จากผลการศึกษาโดยวิธีประมาณการข้อมูลช่วงยาวพบว่า แบบจำลองตัวแบบคงที่ ณ AR(1) คือวิธีประมาณการที่ดีที่สุดเมื่อเปรียบเทียบกับแบบจำลองกำลังสองน้อยที่สุดและแบบจำลองตัวแบบสุ่ม นอกจากนี้การศึกษาครั้งนี้ยังอธิบายสถานการณ์การส่งออกของประเทศอินโดนีเซียในช่วงวิกฤตการณ์การเงินทั้งสองโดยวิธีการวิเคราะห์เชิงพรรณนา และได้ข้อสรุปว่าวิกฤตการณ์การเงินเอเชียในปี พ.ศ. 2540 ส่งผลกระทบเชิงลบต่อมูลค่าการออกของทุกภาคอุตสาหกรรมของประเทศอินโดนีเซียจากการคำนวณอัตราการเติบโตของมูลค่าการส่งออกของประเทศอินโดนีเซียในช่วงเวลาเดียวกันในปีก่อนหน้าและปีที่เกิดวิกฤตการณ์การเงินเอเชียในปี พ.ศ. 2540

ตัวแปรอธิบายที่ใช้สำหรับประมาณการโดยแบบจำลอง Panel Gravity Model ในการศึกษาครั้งนี้ได้แก่ การส่งออกของประเทศอินโดนีเซียในอดีต ผลิตภัณฑ์มวลรวมของประเทศอินโดนีเซียและประเทศคู่ค้า ปัจจัยการผลิตเชิงเปรียบเทียบ อัตราแลกเปลี่ยนที่แท้จริง ระยะทาง ข้อตกลงทางการค้าส่วนภูมิภาค ภาษา และตัวแปรหุ่นสำหรับวิกฤตการณ์การเงินทั้งสองตามลำดับ ผลการศึกษาครั้งนี้พบความสัมพันธ์เชิงลบระหว่างวิกฤตการณ์การเงินเอเชียในปี พ.ศ. 2540 และมูลค่าการส่งออกของประเทศอินโดนีเซียในแต่ละภาคอุตสาหกรรม ซึ่งไม่ใช่ภาคอุตสาหกรรมรวม แต่อย่างไรก็ตามไม่พบความสัมพันธ์ดังกล่าวสำหรับวิกฤตการณ์การเงินโลกในปี พ.ศ.2551 ผลการศึกษาโดยวิธีประมาณการนี้มีความสอดคล้องกันกับผลการศึกษาโดยวิธีการวิเคราะห์เชิงพรรณนาข้างต้น กล่าวคือ การส่งออกของประเทศอินโดนีเซียมีความอ่อนไหวต่อผลกระทบจากวิกฤตการณ์การเงินเอเชียในปี พ.ศ.2540 มากกว่าวิกฤตการณ์การเงินโลกในปี พ.ศ.2551 นอกจากนี้การส่งออกจากภาคอุตสาหกรรมเหมืองแร่ของประเทศอินโดนีเซียได้รับผลกระทบเชิงลบมากที่สุดจากวิกฤตการณ์การเงินดังกล่าว

คำสำคัญ – วิกฤตการณ์การเงินเอเชียในปี พ.ศ.2540, วิกฤตการณ์การเงินโลกในปี พ.ศ.2540, แบบจำลอง Gravity Model, การส่งออกของประเทศอินโดนีเซีย

สาขาวิชา	เศรษฐศาสตร์และการเงินระหว่างประเทศ	ลายมือชื่อนิสิต _____
ปีการศึกษา	2557	ลายมือชื่อ อ.ที่ปรึกษาหลัก _____

YULIA TRI MARDANI: Impact of Asian and Global Crises on Indonesian Exports. ADVISOR: ASST. PROF.JUNE CHAROENSEANG, Ph.D., 152 pp.

This study was conducted to compare the impact of the Asian and Global crises on Indonesian export using augmented gravity model with New Trade Theory framework. Using quarterly data from 1993-2012, export is classified into three main sectors (agriculture, manufacture, mining-quarrying) and aggregate sector. Top 30 countries of Indonesian trading partner are chosen as sample, which represent 88 percent of total Indonesian export. Panel estimation method employs Fixed Effect Model AR (1) as the best method among OLS and REM. In addition, to enrich the analysis, this study also describes all the information about export situation during crisis through descriptive analysis. According to our descriptive analysis, the Asian crisis gives negative effects on export value in all sectors, based on export value growth calculation on the crisis period to the same period in the previous year. Primary sector is the most sensitive sector in term of export value.

The panel gravity model composed by lagged Indonesian export, total GDP of Indonesia and trading partner, Relative Factor Endowment, Real Exchange Rate, distance, Regional Trade Agreement, language, and crisis dummy. The model has proved a strongly negative relation between the Asian crisis and export value on each sector except the aggregate sector. This result was supported by the descriptive analysis, where export is more sensitive during the Asian crisis. From the estimation results of each sector, mining sector is suffering from the worst effects of the Asian crisis.

Field of Study: International Economics   Student's Signature ....
                and Finance   Advisor's Signature ....

Academic Year: 2014

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CHAPTER I

INTRODUCTION

1.1 Background and Statement of Problem

Since the mid-1960s, the process of industrialization in Indonesia has been initiated and even more intensified as pinpointed by the approximate annual growth rate of 10 percent in the domestic manufacturing sector in the subsequent three decades. In turn, during such period, this phenomenon also contributed to the economic growth of Indonesia around 7.6 percent whereas domestic inflation rate was circumscribed below 10 percent as well as the existence of huge trade surpluses. Unfortunately, those prospective states of Indonesian economy all were deteriorated by the advent of the Asian Financial Crisis in 1997 which was radiated from Thailand as its currency system inevitably switched from a fixed- to a flexible-exchange rate regime by a speculative attack. The situation was proved disastrous as the national currencies of Malaysia, the Philippines, South Korea, and including with Indonesia all were weakened.

The Indonesian embroilment with the Asian Financial Crisis in 1997 could potentially be clarified by a currency mismatch through domestic private debts denominated in a foreign currency which was a US dollar. However, by labeling this as a debt crisis of Indonesia, it would totally be misleading as the exchange-rate crisis

also counted due to deep depreciation of an Indonesian rupiah against a US dollar within the domestic ring of declining business sentiments and fragile financial institutions.

The consequences of the Asian Financial Crisis in 1997 on Indonesian economy became truly harsh as reflected by lower economic activities represented by the increasing number of insolvent companies and liquidated banks along with higher unemployment rate which was coincided with higher poverty rate as well. Clearly, these unfavorable figures exhibited flaws in the management of Indonesian business sectors and supervision of financial institutions.

The jubilance of Indonesia by its recovery from the Asian Financial Crisis in 1997 did not last long as it was, again, struck by the Global Financial Crisis in 2008 stemmed from the failure of financial innovation involving with subprime mortgages in the United States. To clarify, the collapse of U.S. house prices led to the inability of debtors to service their debts; as a result, domestically, credit event occurred and was translated into the prevalence of risk aversion, the absence of easily accessible financing sources in financial markets, and lower economic transactions, consecutively. Yet, these unfavorable outcomes were not restricted within the U.S. territory any longer as both developed and emerging countries were all impacted and, definitively, Indonesia was one the victims.

In comparison with the Asian Financial Crisis in 1997, the Global Financial Crisis in 2008 yielded different negative economic impacts to Indonesia. To illustrate, during

the Asian Financial Crisis in 1997, the GDP growth was at the lowest level at minus 13.1

percent in 40 years whereas the inflation rate hiked to 58.3 percent, causing escalation

in national poverty and depreciation of an Indonesian rupiah against the US dollar at

14,900 rupiah per 1 US dollar at the second quarter of 1998. Nevertheless, by the

Global Financial Crisis in 2008, the GDP growth rate of Indonesia dropped to only 4.6

percent, attached with relatively stable inflation rate and the exchange rate of 11,575

rupiah per 1 US dollar, instead. These signified that Indonesia was less severely affected

economically by the Global Financial Crisis in 2008, compared to the neighboring

countries (Malaysia, Singapore, and Thailand).

Due to the fact that, nowadays, many countries are intertwined to one another

within the global economic system via international trade linkages, any undesirable

global influences would be rapidly transmitted or even become an epidemic,

specifically. Hence, the goal of this study is to distinguish and assess the impacts on

Indonesian exports from the two major financial upheavals which are the Asian

Financial Crisis in 1997 and the Global Financial Crisis in 2008. Furthermore, the

uniqueness of the study is by analyzing the impacts of financial crises on international

trade linkages which is in contrast with the previous empirical studies focusing solely

on the impacts on financial sectors as the mainstream.

Methodologically, the impacts of financial crises on international trade were

observed by using the gravity equation with some cases of one specific country in

particular. Regarding the case of Indonesia with the reliance on the gravity model, the

existing empirical works were centered on how international trade flows could be augmented by liberalization through various trade agreements. Consequently, for the utmost insights, the descriptive analysis became another prospective candidate for investigating the impacts of financial crises. Empirically, Tambunan (2010) analyzed the impacts of financial crises on economic growth, employment, remittances, and poverty while Basri (2013) compared the impacts of the two financial crises on all political economic aspects. More importantly, the most directly concerned literatures regarding the impacts of financial crises on Indonesian exports started from Rosner (2000) by examining the volume and the value of non-oil export performance of Indonesia during the Asian Financial Crisis in 1997. Afterwards, Athukorala (2006) confirmed the poor Indonesian export performance in the post-crisis period because of the supply-side reason. Alternatively, Wie (2000), Narjoko and Atje (2007), and Aswicahyono, Hill et al. (2010), discussed the crisis effect on manufacturing sector of Indonesia.

By putting such drawback into consideration, this study attempts to incorporate the Global Financial Crisis in 2008 for comparison and deliberation of its effects on Indonesian exports along the line with the forerunner Asian Financial Crisis in 1997. To further strengthen the beneficial contribution of this study, the analyses by sectors and commodities are implemented both quantitatively and qualitatively to observe the sensitivity of Indonesian exports to the two financial crises for comparison as the final goal.

Stimulating the process of globalization in Indonesia, the average level of Indonesian export propensity at almost 50 percent notified its significance for sustainable development of the nation apart from the traditional economic growth by investment. However, as recently shown by the Global Financial Crisis in 2008, the adverse outcomes could be transmitted through Indonesian exports (Tambunan 2010). Up to this point, it is, thus, worth contemplating on Indonesian exports to realize the predominance between the engine of growth and the transmission channel of financial crises during the periods of the Asian Financial Crisis in 1997 and the Global Financial Crisis in 2008 in this study.

Ultimately, the purpose of this study is to prompt the national government of Indonesia to prescribe policies for minimizing the negative impacts from financial crises on Indonesian exports. For the feasible means for achievement, diversification of domestic sectors, domestic subsectors, and market destinations for Indonesian exports are indispensable, arguing with export specification dictated by comparative advantage. Such measures are consistent with the conclusion from Basri and Rahardja (2010) that export facilitation is the right method supposing that export diversification has been executed as well as reducing import dependency and upgrading product quality.

1.2   Objectives

The primary objective of this study is to assess the impacts of the Asian Financial Crisis in 1997 and the Global Financial Crisis in 2008 on Indonesian exports.

Reinforcing with the primary objective, the secondary objective of this study is to analyze the impacts of the Asian Financial Crisis in 1997 and the Global Financial Crisis in 2008 on Indonesian exports at sectoral and commodity levels.

1.3   Scope

This thesis covered Indonesian export to 30 major trading partners that contributes 88 percent of total exports from 1993 until 2012. Those selected period encompassed two crises period, Asian crisis and Global crisis. To realize the most affected sectors and commodities for Indonesian exports, this study implementing the augmented gravity equation using quarterly data based on New Trade Theory and descriptive analysis in order to show economic and export pattern especially during crises.

Export data is classified into three main sectors; they are agriculture, manufacture, and mining and quarrying. In mining and quarrying sector, oil and gas was excluded since it has very volatile data and this could be misleading. Other sector is also not considered in this analysis because mostly it is only used to record transactions that not specified elsewhere. In addition, three main sectors already represent 98 percent of aggregate export. Therefore, this study cover exports in agriculture, manufacture, mining and quarrying, and aggregate sector.

1.4 Hypothesis

The first hypothesis is that the impact from the Global crisis is larger than Asian crisis on Indonesian export value. The impact of the Global crisis hit the economic fundamentals to most countries in the world, rendered international trade performance sluggish. Risks of global connectivity made countries prepare with the economic downturn caused by the sluggish world demand in the Global crisis. More than 50 percent of Indonesian export shares are dominated by Japan, US, Singapore and Korea which exposed more severe impact of Global crisis. As the major trading partners are economies affected by the Global crisis, the result of economic downturn in those countries would also reduce their demand for imports.

The second hypothesis is that manufacturing industry tends to be more sensitive to both crises than other sectors. This is because some manufacturing exports involved imported raw materials and the crisis effect would differ across industry sector depends on import involvement in production and ability to self-finance. Unlike primary commodities, manufacturing sector has strong dependency in importing raw and supporting materials and credit finance. This external reliance was eventually led manufacture to be easily affected by crisis. Manufacturing sector is the main driver of the Indonesian economy which is accounted for 60 percent of Indonesia's total exports, and 75 percent of the total non-oil and gas export. Because manufacturing

sector had been the largest share, the export fell as a result of the crisis impact reflected in it.

1.5   Organization of the study

To find the impact of different crises on Indonesian export, this study is organized as follows: The first chapter introduces statement of the problem and discussed the objective, scope, hypothesis, as well as organization of this study. The second chapter presents descriptive analysis of the Indonesian economy and export activity during Asian and Global crises. The third chapter brings literature reviews and conceptual framework from previous studies about crisis measurement, crises differences, application and the development of the gravity model. Chapter four describes methodology and data. The fifth chapter analyzes the empirical results of the gravity model and consistency with descriptive analysis. And the last chapter arranged with main conclusion and policy implication related to findings.

CHAPTER 2

INDONESIAN EXPORTS ACTIVITY

This chapter discussed about Indonesian exports. It begins by reviewing Indonesian economic structure by GDP based on production and expenditure. From here can be known how many percent of Indonesian output is allocated, especially which intended for export compliance. Thereafter more about Indonesian export performance is analyzed, starting with major trading partner analysis, export distribution into three main sectors and the aggregate export. Indonesian economic view and export performance in the two periods of crises were also delivered and started with the global economy at that time.

2.1   Indonesian Economic Structure by GDP

Indonesian economic structure according to types of GDP measurement is described here. They are according to GDP production and GDP expenditure. From GDP production can be known from which sector as the driving force of the Indonesian economy and of GDP expenditure can be known the distribution of output users.

2.1.1   GDP by production

Sectors classifications in the economy that commonly used are grouped into three sectors namely primary, secondary and tertiary sector. The primary sector is a sector that depends on natural resources, a combination of agriculture, livestock,

forestry and fisheries, and mining and quarrying. Secondary sector is a combination of manufacturing, electricity, gas and water and construction sectors. While the tertiary sector is a supporting service for primary and secondary sectors, a combination of the four sectors remains.

Indonesian sustainable economic growth in the period before the economic crisis and the increasing level of social welfare played a significant improvement in the structure of the Indonesian economy. Changes in economic structure can be seen from the changes in the composition of economic sectors towards its contribution to GDP (figure 1).

Figure 1 Contribution of primary, secondary, and tertiary sector
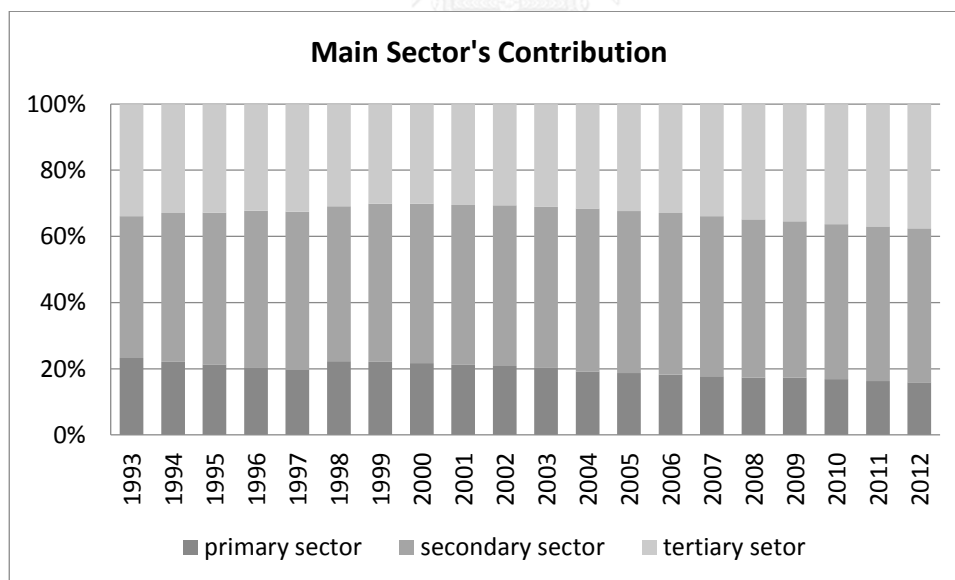
Source: Statistics Indonesia

Figure 1 shows the evident from the declining in the share of the primary sector and the increasing in the share of non-primary sector to GDP from 1993 to 2012 period.

The development of the economic sector's contribution to GDP in the period before the economic crisis (1993-1996) indicated that the dominance of the Indonesian economy began to shift from the primary sector into secondary and tertiary sectors. Contribution of the primary sector rose in 1998, but after that year the share of the primary sector has declined. Indonesian economic structure has been moving in the direction of industrialization, where the role of the primary sector began to be replaced by the role of other sectors. It has increased by 8.67 percent in two decades and has significant contribution in almost every year.

From nine detailed sectors, each main classification had representation in the top ranks. As shown in Table 1 below, the manufacturing industry came from the secondary sector as a driving force of the Indonesian economy, bolstered by trade, hotel, and restaurant from tertiary sector, and agriculture and mining sectors from the primary sector (table 1).

Table 1 GDP production and contribution of each sector (selected years, constant price base year 2000)

	Value in Billions Rp	1995	2000	2005	2010	2012
1	Agriculture, livestock,	202,672.04	216,831.50	253,881.70	304,777.10	328,279.00

	forestry and fishery					
	Contribution	*15.00%*	*15.60%*	*14.50%*	*13.17%*	*12.53%*
2	Mining and quarrying	157,317.00	167,692.20	165,222.60	187,152.50	193,115.00
	Contribution	*11.65%*	*12.07%*	*9.44%*	*8.09%*	*7.37%*
3	Manufacturing industry	336,178.49	385,597.90	491,561.40	597,134.90	670,192.00
	Contribution	*24.89%*	*27.75%*	*28.08%*	*25.80%*	*25.59%*
4	Electricity, gas and water supply	5,479.44	8,393.80	11,584.10	18,050.20	20,080.00
	Contribution	*0.41%*	*0.60%*	*0.66%*	*0.78%*	*0.77%*
5	Construction	96,043.80	76,573.40	103,598.40	150,022.40	170,886.00
	Contribution	*7.11%*	*5.51%*	*5.92%*	*6.48%*	*6.53%*
6	Trade, hotel, and restaurant	227,041.42	224,452.20	293,654.00	400,474.90	473,111.00
	Contribution	*16.81%*	*16.15%*	*16.77%*	*17.30%*	*18.06%*
7	Transport and Comm	61,113.44	65,012.10	109,261.50	217,980.40	265,385.00

	Contribution	*4.52%*	*4.68%*	*6.24%*	*9.42%*	*10.13%*
8	Finance, real estate & business services	144,333.59	115,463.00	161,252.20	221,024.20	253,022.00
	Contribution	*10.68%*	*8.31%*	*9.21%*	*9.55%*	*9.66%*
9	Services	120,732.45	129,753.80	160,799.30	217,842.20	244,870.00
	Contribution	*8.94%*	*9.34%*	*9.18%*	*9.41%*	*9.35%*
	GDP TOTAL	1,350,911.67	1,389,769.90	1,750,815.20	2,314,458.80	2,618,940.00

Source: Statistics Indonesia

Before the Asian crisis, the growth of the secondary sector had always been above the economic growth. But when the crisis struck in the period 1997/1998, the growth of secondary and tertiary sectors was under economic growth. When the Global crisis occurred in the period 2008/2009, the secondary sector slumped again below the average rate. Primary sector was relatively more stable during the Asian crisis since its growth was only minus 1.40 percent. However, in the secondary and tertiary sectors, they face a sharp decrease in the growth rate by minus 16.51 and minus 17.07 percent, respectively. It was due to the demand for these products group were less elastic

because they were used for the daily needs and survival of local communities. Interval

growth did not exceed plus or minus 5 percent over the period 1994-2012 (figure 2).

Figure 2 Growth of primary, secondary, and tertiary sector
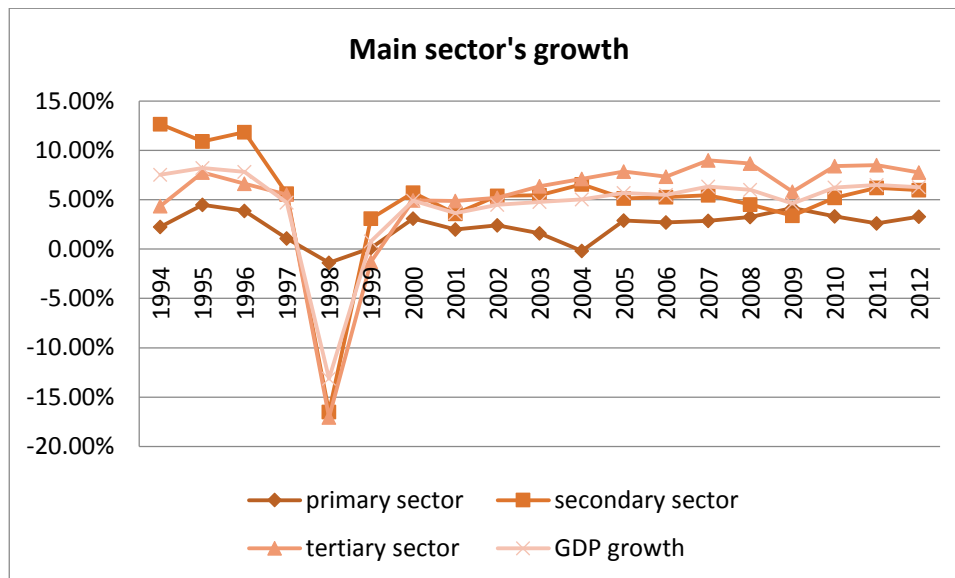
Source: Statistics Indonesia

2.1.2 GDP by Expenditure

GDP by expenditure involved institutions that used production output. The output flows can be identified from the contribution of each component to GDP. They consists of final consumption expenditure (household consumption expenditure and general government final consumption expenditure), gross capital formation (gross fixed capital formation and inventories) and net export (export of goods and services minus import of goods and services).

Citing data from the US Commerce Department through the Census Bureau on 2014, Indonesia is the fourth country with the largest population in the world. Compared with three other countries that occupy the top biggest three (China, India, and the US), it appears that Indonesia has a GDP distribution structure that is similar to

them, the dominance of final consumption expenditure. In the last decade, the average contribution of final consumption expenditure in these three countries exceeded 50 percent. But lately China has begun to seriously think about suppressing the rate of population growth and enhanced development of infrastructure. It can be observed from the proportion of final consumption expenditure and gross capital formation that is interchangeable (unstat.un.org data). As well as China, Indonesia also experienced a decline in the final consumption expenditure distribution; instead increased contribution was slowly happening in gross capital formation. Indonesian consumption patterns due to the large number of the population make the structure of the Indonesian economy was relatively more resistant to any shocks.
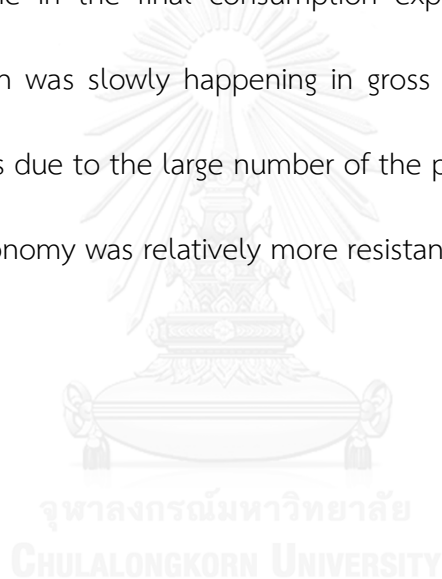
Figure 3 The Growth of GDP Expenditure Component
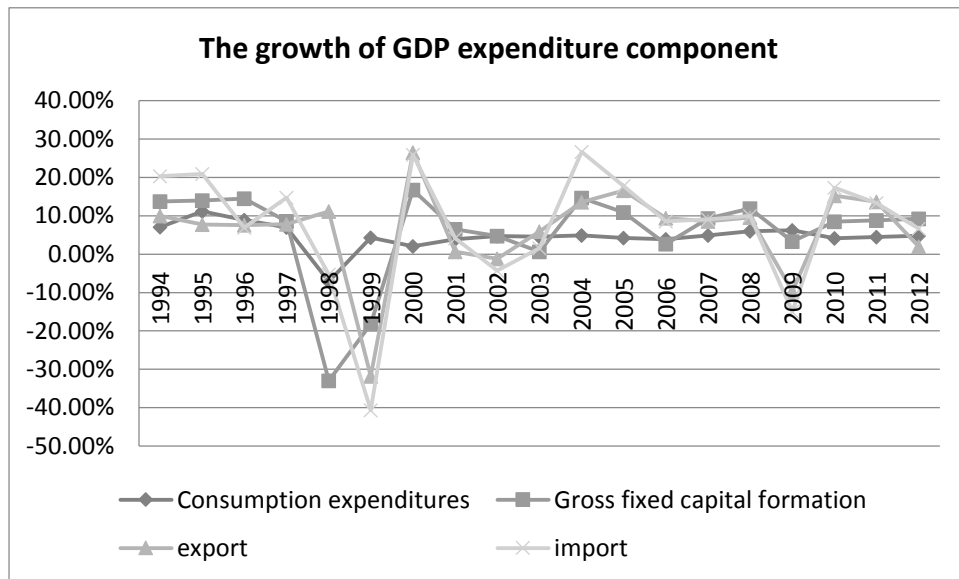
Source: Statistics Indonesia

Compared to other components, consumption expenditure that consists of household and government final consumption was relatively stable (figure 3). People continued to strive to meet their needs for survival. In addition, the consumption patterns of Indonesian people who tended to be consumptive also provided benefits to continue driving economic growth. This was maintaining the level of productivity of the company in producing goods and services. Strengthen of private consumption spurred producers to increase the amount of production. The addition of the production quantity had a positive impact on the efficiency of the company, creating jobs, and increased money supply from the turnover rate. These make domestic purchasing power in Indonesia remains strong.

Besides consumption expenditure, to encourage economic growth Indonesia also relied on other strategies to increase foreign direct investment (FDI) inflow as well

as the share of exports in international trade. Both of these activities were considered to accelerate the process of economic growth in a country, whether in developed countries or in developing countries such as Indonesia.

Export benefits are fostering cooperation, integration, maintaining political relationships and support from other countries, in addition to increasing foreign exchange, and creating jobs opportunity. For employers, besides increase profits, they can also run optimal production tools through export. They do not have to worry about production excess and commodities price decline, because they can sell the surplus products abroad. The international trade entrepreneurs were also able to learn more efficient production techniques and modern management.

Figure 4 Distribution of GDP Expenditure

Distribution of GDP Expenditure

	HH Final Cons	Gov Final Cons	Investment	Export	Import
■1995	54%	7%	26%	38%	36%
■2000	62%	7%	20%	41%	30%
■2005	60%	8%	22%	45%	37%
■2010	57%	8%	24%	46%	36%
■2012	55%	8%	25%	48%	38%
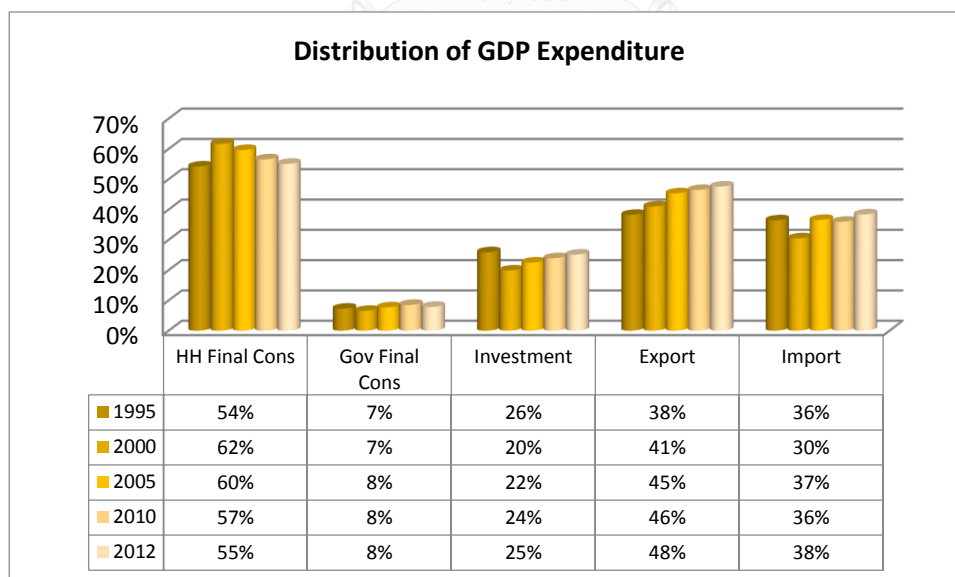
Source: Statistics Indonesia

Indonesia has a wide opportunity to continue developing export. It can be viewed on the export share of total GDP value continued rising from the year selected (figure 4). From production output in local constant price base year 2000, the amount of goods and services exported was around 45 percent of the total output of the entire field of business. Details of export classification will be explained in the next topic.

2.2   Indonesian Trade Patterns

The previous section has mentioned share of each component on GDP expenditure. This section discusses in detail regarding exports description by major trading partner and by structure, represented on sectors and aggregate. The trends of export sector during crisis are shown as well.

2.2.1   Export by Major Trading Partner

This section discussed what happened to exports in terms of major trading partners. Trade agreement with major trading partners was also mentioned here. Countries' selection was based on the main destination countries export share in the past decade; they were Japan, China, and the United States. Figure 5 illustrates five major trading partners since 1996. The figures shows that China instantly shifted the role of other trading partners could be seen in 2006.

Figure 5 Five Major Trading Partner in Aggregate Sector 1996-2012
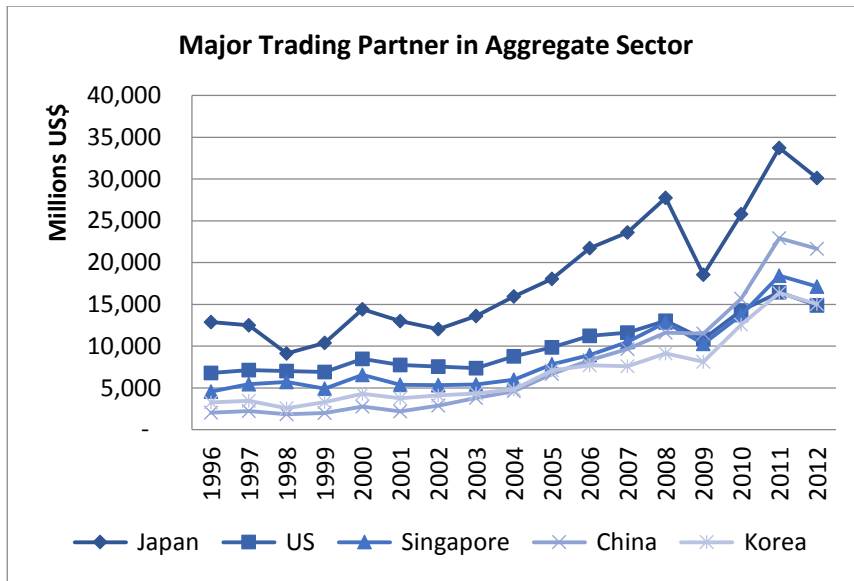
Source: Statistics Indonesia

Japanese role in the Indonesian export has always occupied the highest share. Recently, China dominates Indonesian export, replaced Singapore and US. Chinese market provides opportunity to Indonesian export due to the large population and rapidly increasing in consumption level of Chinese people. This implied China need to import variety products in large quantities to meet the needs of their society.

2.2.1.1 Japan

As one of the largest destination countries for Indonesian export, it would be preferable to see Japanese trade patterns to the world over the last few years. In 1998, Japanese international trade had been slowing down during the Asian crisis. Japanese export growth to the world indicated that during the Asian crisis in 1998 recorded minus growth 7.8 percent. Japanese absorption of the imported product declined

steeply than its export. While the decline in export growth in 2001 was due to the impact of US economic downturn, since US is one of Japanese major trading partner.

From 2001 to 2008 (before the Global crisis) Japan recorded an increase in the average export growth, 10.8 percent per year. Although the global financial crisis has been accelerated since mid-2008, the performance of exports in 2008 was recorded an increase of US $ 67.1 billion. And in 2009, Japanese economy contracted again, after last experienced in 2001. This time contraction during the Global crisis was sharper than the Asian crisis. It was indicated by Japanese export-import to the world which recorded minus 28 percent. Yet Japanese export performance recovered was observed in 2010 when exports raised US $ 189 billion (32.57 percent). The Japanese economy was still sensitive to the business cycle world. As long as the global economy was tumbled, most likely Japan would also experience a severe recession.

Figure 6 Japanese export-import growth to the world
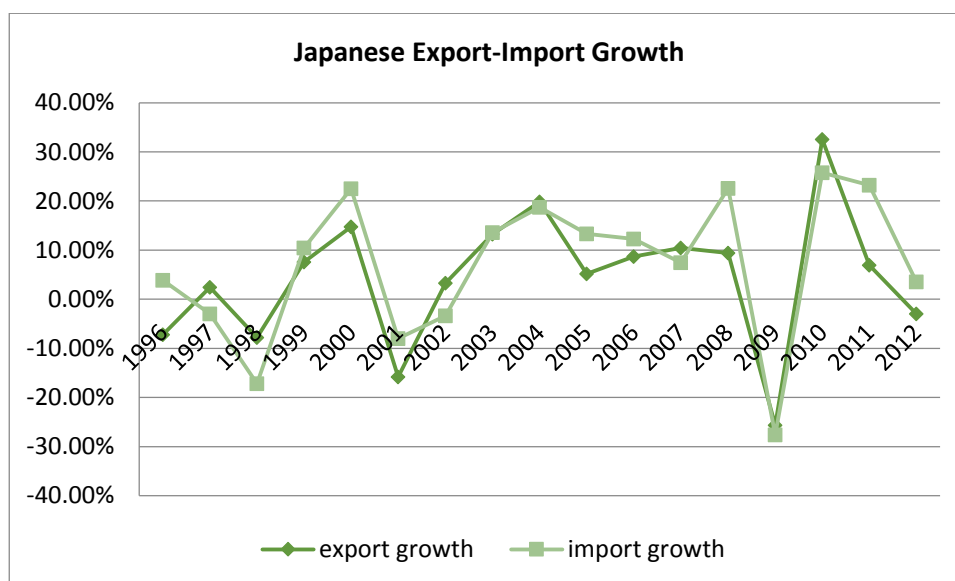
The drop in Japanese international trade during the Asian crisis also appeared on Indonesia-Japan trading value. Trade between Indonesian and Japan started decreasing in 1997 and reached its lowest peak in 1998 with minus 27 percent for Japanese import to Indonesia and minus 58 percent for Japanese export. In addition, the sharp decline in export-import Indonesia-Japan also occurred during the Global Crisis. This time, decline in Indonesian exports to Japan was greater than imports from Japan.

Table 2 Indonesia – Japan trading relationship

Year	Export to Japan (mn US S$)	Export to Japan percentage (%)	Import from Japan (mn US S$)	Import from Japan percentage (%)

1995	12,288.49	-	9,968.23	-
1996	12,888.80	5%	9,058.56	-9%
1997	12,505.05	-3%	10,168.63	12%
1998	9,116.02	-27%	4,292.35	-58%
1999	10,397.18	14%	4,845.24	13%
2000	14,415.19	39%	7,594.46	57%
2001	13,010.18	-10%	6,407.07	-16%
2002	12,045.32	-7%	6,239.50	-3%
2003	13,603.49	13%	7,185.17	15%
2004	15,962.11	17%	9,080.04	26%
2005	18,049.14	13%	9,214.10	1%
2006	21,732.12	20%	7,372.34	-20%
2007	23,632.79	9%	9,059.83	23%
2008	27,743.86	17%	12,572.84	39%
2009	18,574.73	-33%	9,323.20	-26%
2010	25,781.81	39%	15,926.17	71%
2011	33,714.70	31%	17,737.04	11%
2012	30,135.11	-11%	20,284.89	14%

Source: UNCTAD

Hence, economic contraction during the Asian and Global crises had negative impact on Indonesian trading patterns with Japan. Decline in Japanese import from Indonesia during the Asian crisis was not solely because of the Indonesian supply problem, but also a decline in Japanese demand from the world. Weakness in Japanese demand during two crises periods had affected Indonesian export revenue.

The cooperation between Indonesia and Japan relationships has been running since 1958. More than a thousand Japanese MNEs operated in Indonesia. Absorb more than 32 thousands workforce, Japan has been the number one country that provides employment since then. Japanese export share reached 16 percent during 2010 until 2013 and this made the Japanese as the largest importer of Indonesian product.

In the years 2005-2010, the average exports share of industrial products was 68.38 percent of total non-oil exports, but in general the share of industrial products tended to decrease and followed by export growth of the mining sector. Group of wood and wood product dominated manufacturing exports to Japan. In addition, insulated wire was also a mainstay commodity groups.

Japanese import on the agricultural products increased by 30 percent on the first quarter of 2011 from the last quarter 2010 (quarter-to-quarter). This was caused by an earthquake in Japan on March 2011. During the post-earthquake, Japanese export experienced slowdown. On the second quarter of 2011, export growth was only 3.6 percent, compared to last year period.

Economic cooperation between ASEAN-Japan was started in 1973. Diplomatic relations between Indonesia-Japan began in April 1958 with the signing of the peace treaty as well as the signing of the war agreement as a form of compensation for the loss caused by the Japanese in Indonesia during the war. Indonesia-Japan Economic Partnership Agreement (IJ-EPA) was signed in August 2007 (Setiawan 2012). It was the first bilateral agreement between Indonesia and Japan and put Indonesia in line with competitors in the Japanese market, especially in countries that already had EPA agreement with Japan. IJ-EPA provided an opportunity to conduct import export trade between Indonesia-Japan with a low tariff.

Indonesian Ministry of Trade in 2011 has shown that there was no significant change in manufacturing sector export pattern before and after the IJ-EPA applied. However, Setiawan (2012) brought empirical result that IJ-EPA improved Indonesian export. He conducted an analysis on the impact of IJ-EPA on Indonesia and Japan. ARIMA estimation method was used to assess the effect of IJ-EPA towards both countries: the exports contribution to national income and its growth. The results indicated that Indonesia received greater benefits than Japan in the contribution of exports to national income. The exports growth rate was doubled. IJ-EPA tariff scheme had an influence on the increasing in Indonesian exports value to Japan which amounted for an average of $ 2.7 billion per year. This figure was a direct contribution to Indonesian national income. The growth of Indonesian exports to Japan increased

by an average of 5.23 percent each year as a result of the IJ-EPA, which was 1.58 times compared with a did-not-joined IJ-EPA case.

In the manufacturing sector, fish products, cocoa, textiles and furniture were competitive products in the Japanese market after the implementation of the IJ-EPA. The magnitude of the change in the exports of those main products was driven by increasing in Indonesian competitiveness. However, changes in Japanese import from Indonesia for garment products were driven by the composition of the dominant commodity.

A declined in furniture export growth was due to the exchange rate appreciation, world market demand declining, and non-tariff barriers, especially in Japan as one of the biggest importer of furniture products in the world.

2.2.1.2 China

The revolution that took place in the global business has transformed trade association radically. In 1995, China relied heavily on imports of capital goods (machinery and equipment) and semi-finished goods. On export, China depended on finished goods, such as garments and shoes. Although China in 2012 was still a major exporter of finished goods, in the following years, the export of capital goods has increased three times as a GDP contributor. Chinese exports of intermediate goods also rose sharply. Thus, Chinese position in the production and international trade

distribution has evolved rapidly since this country went into a high-tech manufacturing industries.

The magnitude of Indonesian exports to China continued to increase. However, imports from China to Indonesia was still higher than Indonesian exports to China. As showed on the figure 7 below, since 2000 revealed that Indonesia tended to import more goods from China than export. The condition was definitely an advantage for China.

Figure 7 Bilateral Trade Indonesia-China
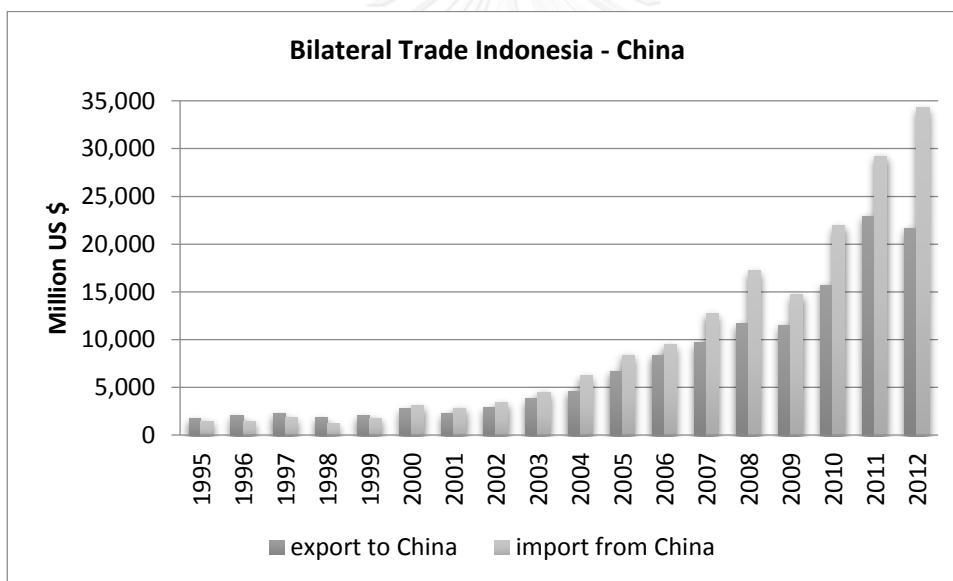
Source: UN comtrade

Indonesia with other ASEAN member has trade agreement with China, namely ACFTA (ASEAN-China Free Trade Agreement). It was signed in 2002 and began tariff reduction in 2004 for agriculture. Since then, the gap between export to China and import from China became wider. Based on FAO data, Indonesia encountered trade

deficit with China in some commodities such as fruits and vegetables. Their invasion was suppressed domestic and export market for those commodities and continues to fall. Volume of imported fruit from China was rose for almost ten times from 1999 to 2004 (Tambunan and Suparyati 2009), while export volume of fruit commodities decline 19 times for the same period. It also took place on vegetables, where Indonesia import from China increased 235 times in 2004 from 1998.

ACFTA implementation gave chance to improve export with human resources basis. Most commodities that potentially dominated Chinese and ASEAN market were commodities based on natural resources, such as CPO, rubber, and paper. While commodities based on industry was a potential market to improve export diversification.

Beside opportunity, the application of ACFTA was also became threat to the sustainability of domestic industry, indicated by the large import share of Indonesia from China (61 percent in 2012). Entrepreneurs considered the imposition of ACFTA in Indonesia eroded local production and also affected the welfare of Indonesian workers. With economies of scale and human resources abundance, China was relatively having eminence on industrial product than other countries. However, labor-intensive industries in Indonesia took the challenge to be competitive with Chinese products.

The increasing trade relations between Indonesia and China, especially since the ACFTA, made China as one of Indonesia's key major trading partners recently. This

can be seen in the figure 5 where China became one of the third largest export destinations after Japan and the United States. However, started in 2009 Chinese managed to shift the position of the United States and occupied the second position after Japan.

Beside number of articles on the turmoil and the negative impacts of ACFTA on Indonesia exports, but there were some claims that ACFTA was still generally had positive impact on Indonesian trade. Marks (2012) evaluated the impact of ACFTA on trade data from 2010. His suggestive result pointed out that Indonesia experienced positive trade balance from ACFTA. Ibrahim, Permata et al. (2010) on quantitative calculation of the CGE model obtained net trade creation of Indonesian international trade. It was amounted to 2 percent and Indonesian total export growth increased by 1.8 percent. Trade impact of ACFTA was to increase exports from ASEAN countries to China. It was experienced by Indonesia, Malaysia, Singapore and Thailand. By sector, the biggest advantage possessed by textile and clothing products, machinery and equipment electrical, and other industries. There was a significant increase in intra-industry trade (Yue 2004). All results indicated that ACFTA provided an opportunity for Indonesian export commodities to increase.

Another finding was the existence of the commodity structure of China and ASEAN countries (including Indonesia). They did not compete but tended to be complement, made China relatively easy to penetrate ASEAN markets (Ibrahim, Permata et al. 2010). The influx of Chinese products could be managed as an

opportunity to increase production. This caused by the availability of imported capital goods with a relatively cheap price.

Main agricultural commodity export to China is rubber. Since 2010, it was recorded 86 percent of total agricultural exports to China. Role of rubber increased sharply from the period before 2000, at which time only 45 percent contributions. It was inevitable for two periods of crises, rubber export was disrupted. Within the Asian crisis, the worst growth occurred during four consecutive quarters, starting from the third quarter of 1997, with negative average growth 81 percent compared to the same period in the last year. During the Global crisis, the worst growth in this commodity was much better than the Asian crisis period. Increased consumption of rubber that was happening in China was influenced by the country's economic growth. Improved economy encouraged the development of infrastructure and automotive industries. Especially after joined the WTO in 2001, China put itself as the largest consumer of natural rubber in the world.

Beside the crises periods, rubber export to China was also declined in 2002. This happened due to the weak performance of the rubber industry in China. In general, Indonesia's main export to China over the past 17 years is the export of mining and quarrying sector, namely coal and lignite, and lately nickel and aluminum ores were arisen. Before 2000, China had not yet imported a lot of mining and quarrying commodities. Import of lignite was begun in the third quarter of 2009, but its contribution to total mining products has reached 12 percent (figure 8).

Figure 8 Indonesian Export to China by sector
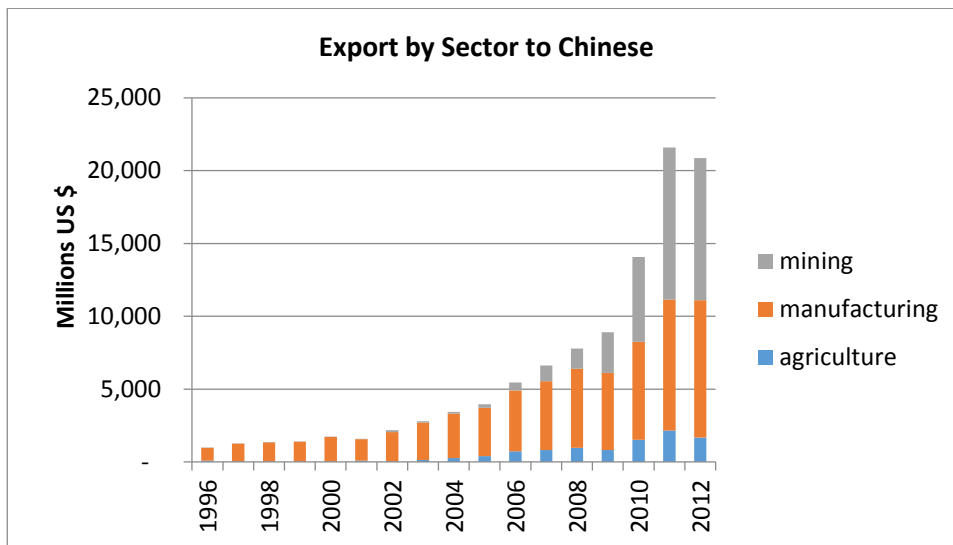
Source: Statistics Indonesia

Over the years, China imported a variety of the mineral materials from Indonesia and other Asian countries. Up to now, Chinese never bought processed raw materials minerals, but more in the form of raw materials. Chinese producers processed imported ore by themselves. This rendered Indonesia loss potential tax revenue greater. And, more importantly, the export of raw mineral has discarded the creation of employment opportunities in the mineral processing industry.

Many imported materials stockpiled set aside for meet the needs of Chinese giant industry in the long run. In the beginning of 2009, the government issued a ban on the mining company on exports of mineral raw materials which enter into force in 2014. It was meant to ensure that Indonesia began to tighten the supply of minerals in the global market. Mineral exports were only allowed for raw materials that have been treated in the smelter industry.

There was also CPO as the main commodity in the manufacturing sector. CPO export growth declined precipitously during the Asian crisis. By quarter-to-quarter growth, began from the last quarter of 1997 to the next two quarter, CPO export growth reached minus 78 percent. Meanwhile, during the Global crisis, the lowest growth was in the third quarter of 2008 with minus 63 percent.

Indonesia has a high dependency on CPO export market, because almost 70 percent of CPO production was produced to meet the needs of the world vegetable oil. The economic crises directly or indirectly affect the Indonesian palm oil trade. The crises reduced CPO demand by European countries, as well as other export destinations countries. It also lowered the price of these commodities in the world market. During crises, people's purchasing power began to decline; particularly in major CPO consuming countries that also affected by the crisis. The economic crisis has lowered the economic performance of China and India, thus also lowered the income of the people in both countries. Purchased of palm oil products for household and industry were decreasing. The implication was a decline in the portion of the demand and supply of CPO as a fundamental factor of global CPO prices. In addition, the CPO price was also influenced by market sentiment and the growth of industrial biodiesel, which closely linked with oil price movements.

2.2.1.3 US

Since the Global crisis was triggered by subprime mortgage crisis in the US and then spread over the world, it was important to notice that US no longer became the second largest Indonesian trading partners since 2009. Recently US became the fourth largest Indonesian trading partners.

Figure 9 Bilateral trade Indonesia-US

Source: UN comtrade

Indonesian trade balance with the US indicated a positive trade balance. Non-oil exports commodities such as rubber, textiles and apparel, footwear and electrical machinery played important role on exports to the US. Indonesian non-oil exports value as a whole were on an upward trend, except in 2009 as the impact of the economic crisis in the US. It began with the increasing exports growth from 2004, and then fell by minus 16.8 percent in 2009. However, exports bounced back in 2010 and 2011, reached 31.49 percent and 15.37 percent respectively.

The US is one of the largest import origins, together with the ASEAN countries, Japan, and China. The Indonesian exports value to the US, the imports value has decreased as a result of the Global crisis that hit the world.

Indonesian export products were hurt by non-tariff barriers in many countries (include US), one of which was the environmental issues. Regulations regarding environmentally friendly products often caused Indonesian export products to be prohibited. It happened on Indonesian paper products that were prohibited since it was allegedly used raw materials of wood from illegal logging. In fact, Indonesia has had a Timber Legality Verification System for the selection of industrial raw materials.

In addition, Indonesian CPO was also denied in the entry list of 53 APEC environmental friendly products. Palm oil export volume to the US in 2011 was 49.4 thousand tons estimated at US $ 51.7 million. Besides CPO, cigarettes were equally damaged. Some destination countries tightened policy on imported cigarettes influx. It hindered cigarettes export, including to US. The US issued technical regulations that ban the production and sale of cigarettes with additives, including clove cigarettes. These technical regulations rendered Indonesia loss 200 million dollars in export revenue. This policy was harmful to Indonesia, as a consequence of cigarette manufacturer. While the main issue in Indonesian agricultural products were the low competitiveness of the product in terms of quality assurance. Trade cooperation with US makes Indonesia to be more conscientious in business aspects, so production capacity and exports to the US would increase.

2.2.2 Export Structure

The classification on a sector group consists of three main sectors (agriculture, manufacture, mining-quarrying) and aggregate sector. The analysis also covers the aggregate sector. The aggregate sector here is the representative of total export, the sum of oil (and non-oil) and gas. According to Ministry of Industry, the share of oil and gas export to total export in 2011 was 20.38 percent. And because of data limitations, hence, oil and gas export will not be brought into sectoral analysis. Before this study starts from the aggregate sector, a picture of Indonesian annual export value growth during the period 1997-2012 is given below (figure 10).

Figure 10 Export Value Growth by Sector
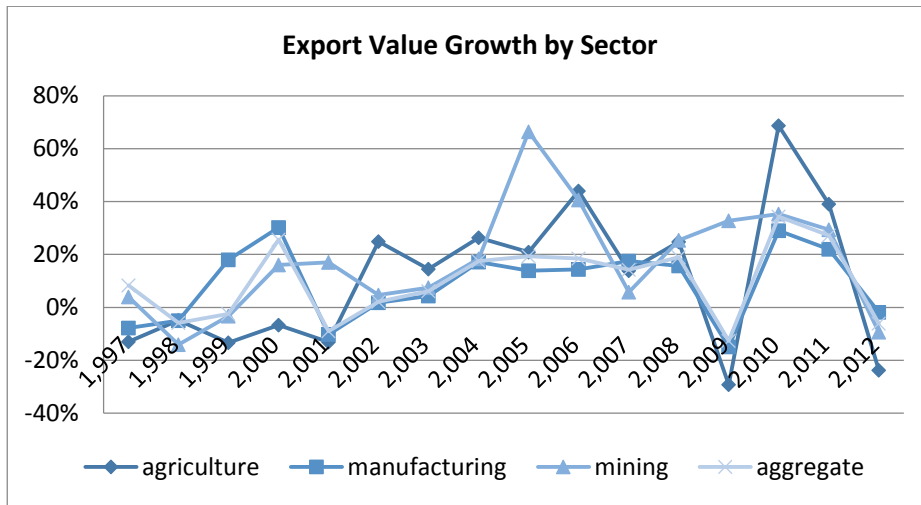
Source: Statistics Indonesia

Manufacturing sector growth pattern was the same as the aggregate growth pattern, because manufacturing sector represented the dominant sector. As can be observed from figure 10, export value growth of manufacturing and aggregate sector was declined in 1998, and a sharper decline in growth occurred in 2009. Whilst agriculture, since 1999 it was experiencing a slowdown and returned to positive growth in 2002. During the Global crisis, mining has a slightly different pattern to other sectors, because this sector was still experienced positive growth in 2009. This was due to the government's announcement of restrictions on the raw mineral export which implemented in 2014. The policy encouraged the importer countries to stockpile raw materials before the export banned applied. Indeed, the value of Indonesia's exports declined more sharply in 2009.

2.2.2.1 Aggregate Sector

In the second quarter of 1998 and the second quarter of 2009, Indonesian export structure had changed. Figure 11 shows that when Indonesian export began to slump, the share of non-oil and gas export was rising. Export growth in oil commodities felt down by 30 since the first quarter of 1998 until the fourth quarter of 1998. It was worse than the declining in non-oil and gas commodities. As happened during the Asian crisis, in the fourth quarter of 2008, oil and gas commodities growth were always below non-oil and gas growth. Oil and gas exports were more sensitive to the global price commodity changes and therefore induced volatility.

Figure 11 Export structure of Indonesia during Asian crisis
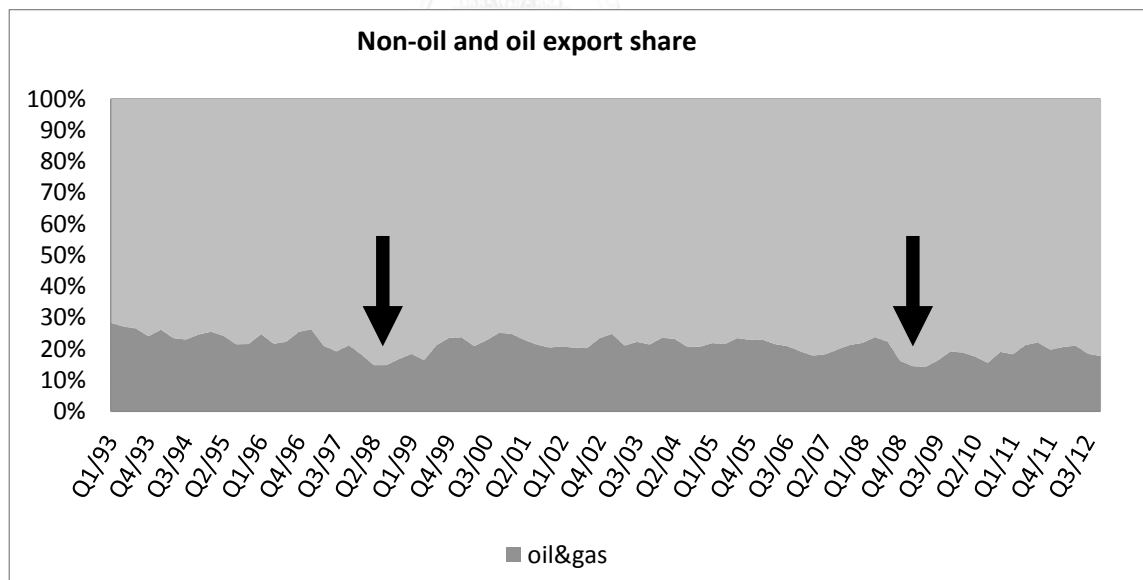
Source: Statistics Indonesia

2.2.2.2 Agricultural Sector

In the beginning of 1993, agricultural exports dominated mining-quarrying. However in 2000, the situation was turned. Mining-quarrying exports dominated agriculture. The government policy during 1969 until 1998 always emphasized on the growth of the agricultural sector in order to achieved food self-sufficiency. However, when this policy has changed, the agricultural growth became marginalized.

Employment data from Statistics Indonesia showed that population over the age of 15 in the agricultural sector was almost 50 percent of labor force in 1990s. Over the time, labor force in agricultural sector reduced into 37 percent. It happened because local farmers were unable to compete with the very cheap price of imported products. These are because of a fall in the commodity price, lack of land, high cost of fertilizer and land maintenance. This led the labor mobility from the agricultural sector to the industrial sector to seek for the higher wage rate.

Figure 12 Five Major Trading Partner in Agricultural Sector 1996-2012
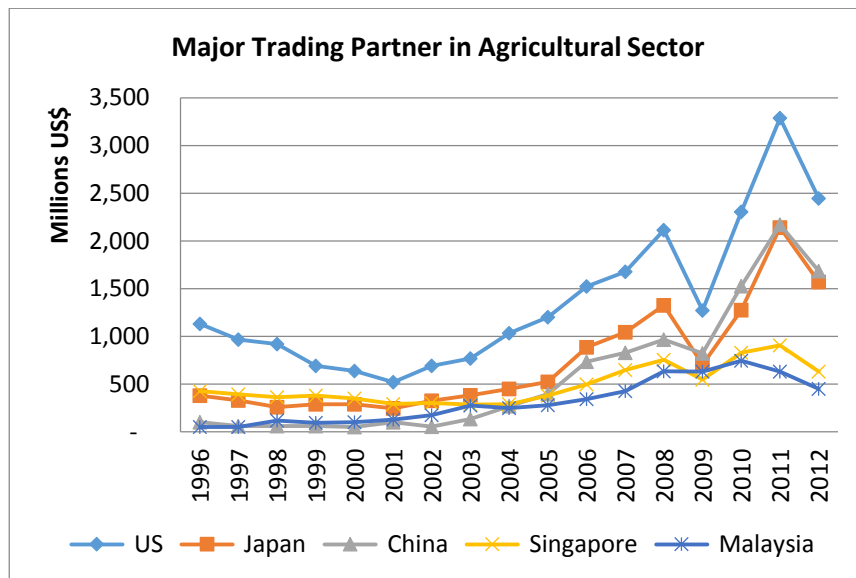
Source: Statistics Indonesia, Author's Calculation

US was the largest major trading partner of Indonesian agricultural exports. China lately became the second largest trading partners. Although agricultural exports from Indonesia to China had increased, but the invasion of imported goods from China to Indonesia were even a lot more.

2.2.2.3 Manufacturing Sector

Manufacturing sector plays an important role in the Indonesian economy. This sector gave the highest contribution to GDP (25.59 percent). While for export contribution, this sector held the highest export share among other sectors (60 percent of total export). Even though manufacturing export value kept rising and left other sectors behind, but its contribution began to reduce after the Asian crisis (figure 13). Considering its contribution to the workforce, manufacturing sector absorbs 12 percent

of the total labor force, which was less than agricultural sector absorption. The manufacturing sector had a strong backward and forward linkage. Therefore, development in manufacturing sector widely affected other sectors.

Figure 13 Indonesian export by non-oil sector
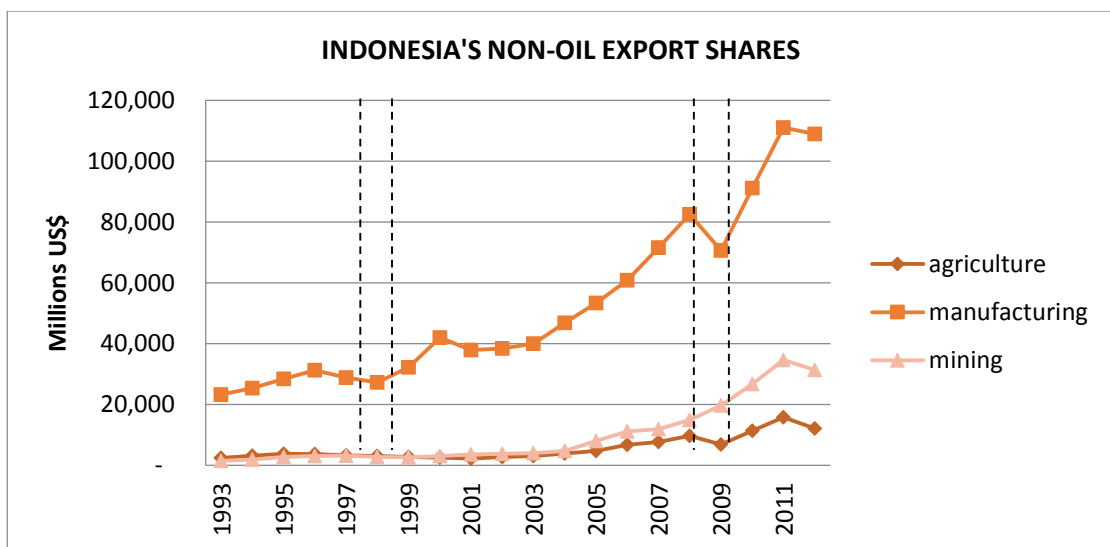
Source: UN comtrade

There were some manufacturing industry characteristics that might have caused problems in financing in Indonesia. Firstly, this sector relied on imported raw materials. Secondly, major trading partners were mostly developed countries. Around 44 percent of the exports was from the major trading partners such as US, Europe, and Japan. This situation made manufacture became sensitive to any external shock, especially when it happened to trading partners. Weak competitiveness in industrial products became the third characteristic. As indicated by RCA and Global Competitiveness Report 2009-2010, it is shown that Indonesian competitiveness was on the 54 rank of 130 countries. The last characteristic was that most industries had

high capacity utilization (above 70 percent). It would less be responsive to any demand increased. Even for chemical, semen and basic metals had utility capacity above 90 percent.

From manufacturing characteristics above, some problems could be arising such as limited fund, capital constraints, and lack of support from financial institutions.

Figure 14 Five Major Trading Partner in Manufacturing Sector 1996-2012

Source: Statistics Indonesia, Author's Calculation

In the manufacturing sector, the US was also a biggest trading partner since it overtook Japan after the Asian crisis 1998. Contribution drop in the Japan share led to a decline in total export by 27.10 percent. Unlike others, exports to Singapore in 1998 increased.

2.2.2.4 Mining Sector

Indonesian mining exports dominated most of raw materials exports. That made Indonesia to become the largest coal producers and exporters in the world. When mining production started to exceed Australia on 2005, Indonesia has become the leading exporter of thermal coal. Most of the mining export demand came from China and India. Associated with global coal reserves, Indonesia has been in the 13th rank with 0.6 percent of the total global coal reserves (based on BP Statistical Review of World Energy). Indonesian coal export ranged from 70 to 80 percent of the total coal production and the rest was absorbed by the domestic market. This commodity contributed about 85 percent of the mining sector revenue. Besides coal, Indonesian natural resources produced 20 percent of world nickel supply.
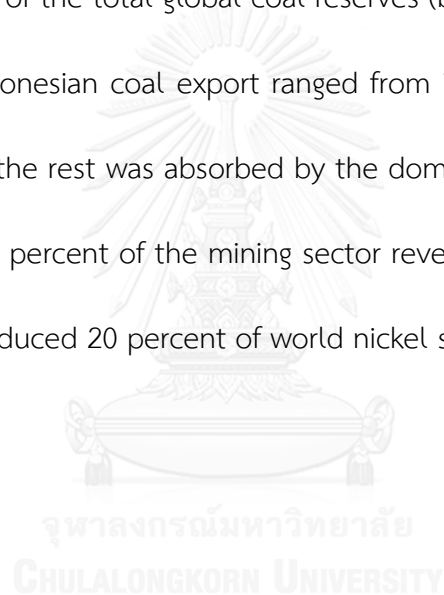
Figure 15 Five Major Trading Partner in Mining Sector 1996-2012

Source: Statistics Indonesia, Author's Calculation

On the mining sector, Spain was the only country in Europe which was among the top five trading partners. Exports to Spain dominated by copper commodity. The role of China as the importer of the mining products appeared to play important role in importing raw materials in 2006. Starting in 2009, exports of mining commodities precipitously rose. In 2009, Indonesian government banned raw materials export which implemented in 2014. The implications of this announcement, the export of raw materials to China and India experienced a sharp spike and kept rising.

2.3   What Happened during Crises

This section discusses how the Asian and Global crises influenced the world economy and the Indonesian economy. The crises were usually easily characterized by sharply declining in economic growth. Other crisis indicators, namely, Rupiah depreciation and inflation, also added for a better description of a crisis situation. More explanation about crises indicator are available in Chapter 3. After obtained general overview of the economy during crises, the discussion about the impact analysis of crises on exports are discussed.

2.3.1   Asian crisis

Monetary crisis that hit Indonesia since the beginning of July 1997 had paralyzed the economic activity. This monetary crisis occurred although Indonesian economic fundamentals considered quite robust, as claimed by the World Bank. Indonesia had relatively high economic growth, controlled inflation rate, relatively low unemployment rate, and surplus in the overall balance of payments. Even though current account deficits tended to be large but it was still under control. In addition, Indonesia also had relatively large foreign exchange reserves, as well as the government's budget surplus. But behind those fundamentals, there were some structural weaknesses such as rigid and protracted domestic trade regulations and an import monopoly. This implied that the economic activity became inefficient and uncompetitive.

At the same time the lack of transparency created financial uncertainty and an influx of foreign funds through a weak banking system. Private sectors borrowed foreign funds that mostly not hedged. Short-term and medium-term private external debt accumulated rapidly from 1992 until July 1997. Approximately 95 percent of the foreign debt increased was from the private sector with the average maturity only 18 months (Nasution 2002). The rupiah had severe pressure because there was not enough foreign exchange to pay for maturity debt and interest (Wessel, McDermott et al. 1997), and the weakness in domestic banking system.

Depreciation rate of Rupiah in 1988 to 1996 was relatively low, ranging from 2.4 percent to 5.8 percent. It was placed under the real exchange rate; led to an overvalued in Rupiah. As a result, the price of imported goods became relatively cheap and domestic products were relatively expensive. People choose imported goods with a better quality. Thus the domestic production was unable to grow. Exports had become less competitive. The imports value increased. Highly overvalued of Rupiah made it became vulnerable to the currency attack and by the speculators. Furthermore governance issues, include the government's ability to overcome the crisis had led to a crisis of confidence.

As a consequence of this monetary crisis, Bank of Indonesia was forced to free the Rupiah exchange rate against foreign currencies on 14 August 1997. This free floating system replaced the managed floating system adopted by the government since October 1978. Thus Bank of Indonesia no longer intervene the foreign exchange

market to sustain the exchange rate, so that the exchange rate was determined by market forces alone.

2.3.1.1 Global Economic View during Asian Crisis

During 1998, Asian economic crisis continued to affect the world economic development due to capital inflows that had not been fully recovered. Financial and real sector in Asian countries were getting worse. This situation had made deep economic contraction, currency depreciation, and high inflation. Crisis spread to developing countries outside Asia, especially when the Russian crisis raised turmoil in the world financial market. Domestic demand declined in developing countries implied negative export performance and reduction in consumer's and investor's level of confidence in developed countries.

Figure 16 Economic Growth 1993 - 2012
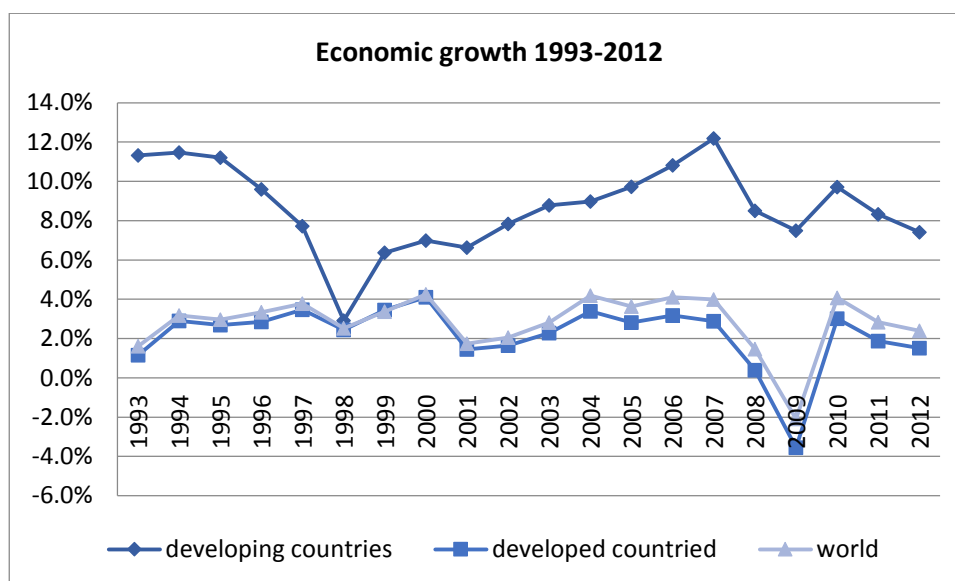
Source: The World bank

As a result, this crisis had spread into the world and caused the world economic growth to slumped down from 3.8 percent into 2.5 percent. Not only developing countries[1], but also the group of developed countries[2] in 1998 recorded economic slowdown.

_____

[1] Classification by The World bank, developing countries represented by East Asia and Pacific (developing only) consists of: American Samoa, Cambodia, China, Fiji, Indonesia, Kiribati, Korea Dem. Rep., Lao PDR, Malaysia, Marshall Islands, Micronesia, Mongolia, Myanmar, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Thailand, Timor-Leste, Tuvalu, Tonga, Vanuatu, Vietnam.

[2] Classification by The World bank, developed countries represented by High Income countries consists of 75 countries

Economic growth in developed countries declined from 3.5 percent in 1997 into 2.4 percent in 1998 (figure 16). Japan, Italy, UK, US and Canada experienced a decline in economic performance. Meanwhile the economic growth in developing countries in East Asia and Pacific declined sharply in 1997 into 7.7 percent and reached 2.9 percent in 1998.

In accordance to the declined in world demand, the growth of world trading volume was experienced a sharp decrease. The primary commodities price were also declined. Figure 16 shows how economic growth in the developing countries plunged during the Asian crisis, compare to the world and developed countries. The sharp decrease in GDP growth clearly observed in developing countries (especially in Asia). Economic growth was rebound and quickly restored in 1999, but still below the level before 1998. This growth continued to rise before fell back in 2008. Asian countries were immediately revived in this regional crisis.

Figure 17 Inflation Rate of Developing Countries, Developed Countries, and The World
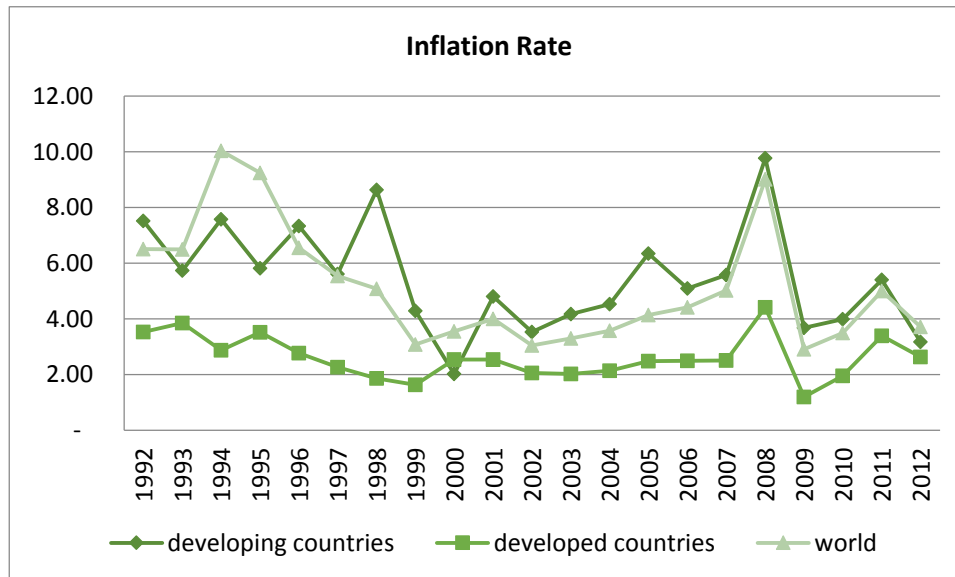
Source: The World bank

The figure 17 shows inflation rate in the developing and developed countries. It could be observed that when the Asian crisis occurred, inflation in the developing countries sharply increased; at almost 9 percent.

2.3.1.2 Indonesian Economic View during Asian Crisis

In terms of GDP growth, the Asian crisis hit Indonesia more seriously than the Global crisis. Several years before the Asian crisis, Indonesian economic growth was around 7-8 percent. In 1997 economic growth began to fall to 4.7 percent and slumped down to minus 13.1 percent in 1998. Based on Indonesian history, that number was the lowest economic growth since 1960. Economic growth strengthened in 1999, characterized improved circumstances. By 2000, economic growth was back to the level on the crisis beginning period in 1997 (figure 18).

Figure 18 Economic growth in Indonesia during Asian crisis and Global crisis

Source: Statistics Indonesia

After Indonesia set free-floating exchange rate regime in August 1997, the Rupiah exchange rate then depreciated rapidly and sharply from an average of Rp 2,450 per dollar in June 1997 to Rp 14,900 in the second quarter of 1998. However, Rupiah then had gained back to around Rp 8,000 in the beginning of May 1999 (figure 19). Rupiah depreciated sharply and caused deep economic contraction. The sharp declined in the exchange rate was accompanied by an impaired access to foreign funding. It caused a decline in production and drastically reduced employment opportunities as a result of high dependency on the imported products of goods and services. Many companies were laid off employees and led to an increase in the unemployment rate. Based on data from Statistics Indonesia, the rate of unemployment was increased by 5.47 percent in 1998. Labor force only rose by 3.49

percent in 1998, but the percentage increase in unemployment soared to 20.81 percent.

Figure 19 Rupiah exchange rate to US $ during Asian crisis and Global crisis
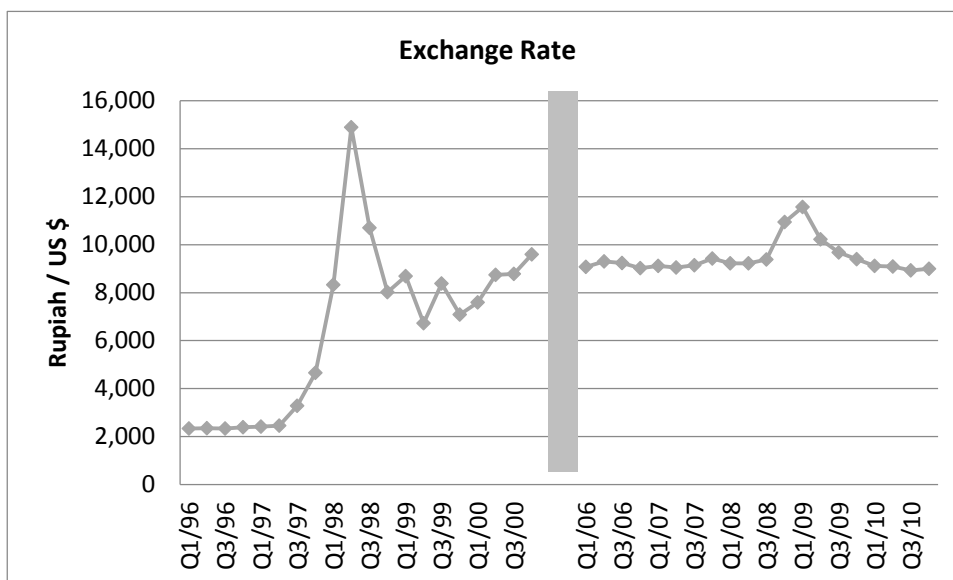
Source: IMF

At the same time, inflation rate rose sharply. Inflation reached 58.3 percent in 1998 after steadily consistent below 10 percent for more than one decade. Furthermore, this rate was the highest inflation rate since 1969 (figure 20). This inflationary pressure mainly came from disturbances on the supply side. It was caused by the production and distribution disruption in principal goods, especially food groups. In addition, the exchange rate depreciation also put more pressure on the high inflation rate. This was because the price of imported goods (pass-through effect) rose sharply. In terms of demand, inflationary pressures were caused by monetary expansion. Bank

of Indonesia focused on saving the Rupiah by raising interest rates due to the pressure of capital outflow. This was conducted in attempting to suppress inflation.

Figure 20 Inflation rate in Indonesia during Asian crisis and Global crisis
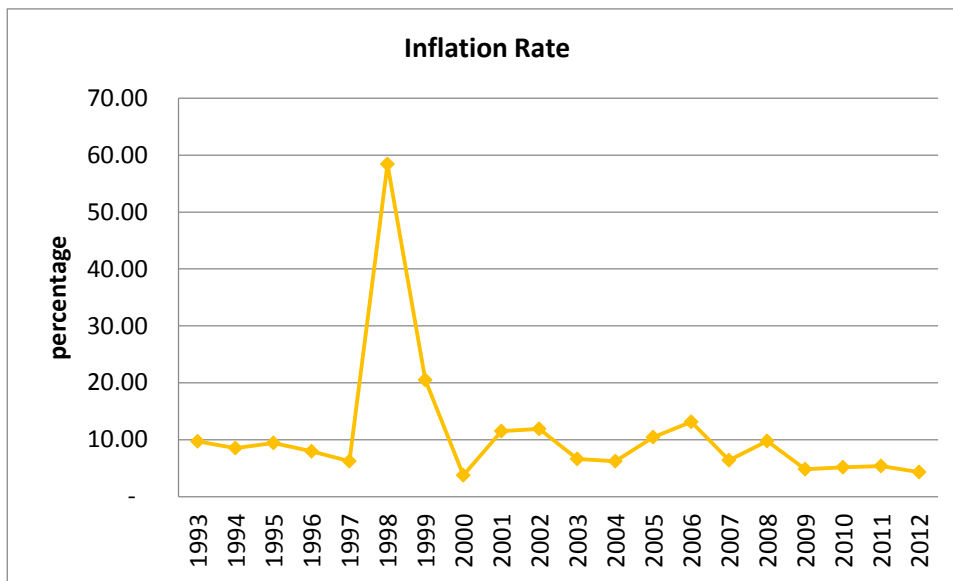
Source: The World bank

High inflation pressures and a fall in income decreased in the Indonesian purchasing power, plummeted community welfare and expanded poverties. The number of the poor people rose up to 49.50 million people (about 24.23 percent of the Indonesian total population). Meanwhile, the level of poverty in urban and rural areas increased up to two-fold, those were 17.60 million people (21.92 percent) and 31.39 million (25.72 percent) respectively. The poverty incidence in 1998 was closer to the poverty conditions in 1978 and 1980. It meant that Indonesian achievement as drawn back into more than 17 years ago.

2.3.1.3 Export Performance during Asian Crises

The impact of the Asian crisis on each sector (agriculture, manufacturing, mining, and the aggregate sector) are explored in the discussion below.

2.3.1.3.1   Aggregate Sector

In order to make balance analysis, descriptive analysis of export performance in this study had involved export quantity and export price. They were very important in explaining the declined in the export performance of major commodities during crises.

Rosner (2000) and Abdurohman and Zulfadin (2002) had analyzed export quantity and price movement in order to evaluate export performance during Asian crisis. They examined some major export commodities by each sector. It was found that except agriculture, all sectors experienced decreasing in export value in 1998. However, export volume of the main commodities in all sectors increased in 1998. Furthermore, export volume in mining sector was increasing sharply, so it dominated the aggregate sector. Their findings indicated that the export value and export volume were diverging during the Asian crisis period. The same result was found on the figure 21. This implied that export price had gone down during crisis period.

A sharp Rupiah depreciation in 1997 was unable to improve export performance, even though previously, Indonesia has experienced a positive relation between real exchange rate depreciation and export value growth. However during

Asia crisis, Indonesia had internal and external obstacles so it was unable to optimized

currency depreciation effect (Rosner (2000) and Duttagupta and Spilimbergo (2004)).

On the external side, a decline in the world trade volume had caused demand, especially in the East Asia, to fall. Furthermore, commodities price tended to be weakened and caused Indonesian export value to fall. Deterioration in export commodities price occured in 1997-1999 was unable to boost export value (figure 21). Export value and export volume moved on the opposite direction. When commodity prices dropped sharply, importers wanted more goods. By volume, non-oil exports were increased. Nonetheless, exports value did not show a good sign, but even decreased. Figure 21 showed that the lowest export value level was recorded in the first quarter of 1999. However, export value growth on year-to-year basis was started to reach negative level in the first quarter of 1998. It continued to decline and touched the lowest growth in the fourth quarter of 1998.

Figure 21 Export value and export volume during Asian and Global crises
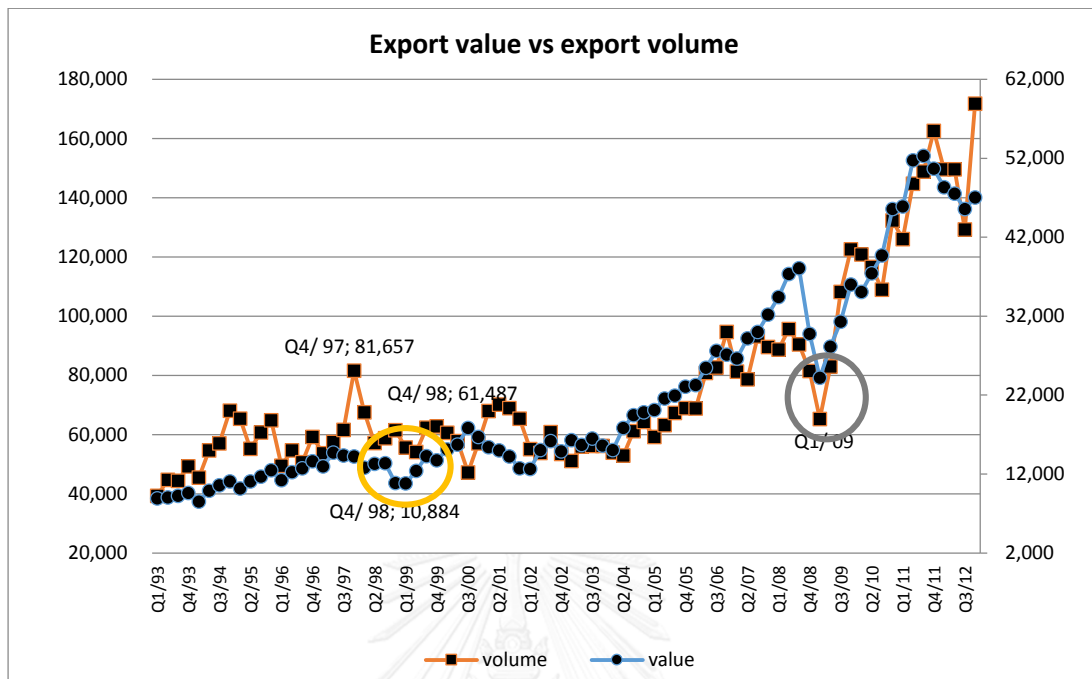
Commodity prices in the world market had declined during the onset of regional crisis period (Basri and Rahardja 2010). Rosner (2000) stated that top twenty commodity prices constructed 42 percent of non-oil export value in 1997, fell by the average of 25 percent since the first half of 1997 until the first half of 1999. He summarized some commodities that experienced price declined during 1997-1999 as follows;

1. Agriculture: rubber, shrimp, fish, coffe, cocoa, tea

2. Manufacturing: palm oil, paper, textile fabric, fibre and yarn, wood pulp, fertilizer, and aluminium

3. Mining: coal, copper, tin, gold, nickel

To prove Rosner (2000) and Abdurohman and Zulfadin (2002) analysis, in this study, the export growth during the crisis period[3] was compared to the same period in the previous year[4]. The obtained results gave the full support of their findings. All export sectors decreased in value and increased in volume during the Asian crisis. Sector that experienced the worst export value growth was the mining sector (minus 16 percent).

Depreciation that occurred in most Asian countries also triggered export price competition in non-oil and gas commodities. Export price plunged than reasonable price level. As Duttagupta and Spilimbergo (2004) stated, "competitive depreciation" among affected countries neutralized the effect on export demand.

On the internal side, the scarcity of the imported raw and supporting materials became companies' obstacle to fulfilled production capacity and export. This barrier usually occurred in industries with high dependencies on imported raw material. At that period, the obstacle was majority caused by L/C rejection and cash collateral requirement on the L/C opening.

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[3] The definition of crisis period will be explained on the Chapter 3: 3.1.1 How to Define, Characterizing, and Measure Crisis

[4] Dataset for this calculation presented on Appendix 2

Besides, difficulties in accessing business capital due to the high cost of loan contributed to a decline in non-oil and gas export performance. Problem in Indonesian financial sector had made local banking system to collapse. Many commercial banks faced the same problem when managed float system altered to free float because they had issued more of the bad loans. Exporters were unable to take advantage of the depreciation because trade finance became unavailable to them. Security factor in the riot-prone country also hampered the distribution process.

As the impact, importers felt unsafe and renegotiated some contracts. Therefore, they shifted their orders to other countries and even worse they cancelled transaction that previously agreed. Order cancellation largely occurred in garment and shoes product. Difficulties in getting containers for exporters also became one impedance factors.

Salvatore and Campano (2010) and Whitt (1999) found that, besides Indonesia, Korea, Malaysia, Thailand, and The Philippines were also hit severely by the Asian crisis. In 1997, their exchange rate had experienced sharp depreciation. Even though depreciation was considered to be able to increase export value, in fact it did not happen to Indonesia when the Asian crisis hit.

However, according to Tambunan (2010), depreciation during the Asian crisis would increase exports (or at least not decrease export) depended on two reasons. Firstly, the proportion of imported raw materials on exported products. Secondly, how much exports capacity production was able to increase during crises periods.

2.3.1.3.2   Agricultural Sector

During the Asian crisis period, Indonesian agricultural export to the world gradually went down, became less than 650 million US $ on the second quarter of 1998. Then, there was a rapid increase in the last period of the Asian crisis to 990 million US $. This was the highest export value until the second quarter of 2004. The same trends indicated on all selected countries. US as the highest agricultural importer was clearly showed the proof. A sharp decrease in export value in the second quarter of 1998 was also shown by Germany, Japan, and Korea. In accordance with annual basis analysis, the export value of agricultural sector had decreased, while the export volume increased.

Classifying agricultural sector into ISIC sub group, this study found that during 1993-2012, field crops had a highest share (64.01 percent), followed by plantation crops (27.24 percent), fishing (3.98 percent), farming of animals (3.05 percent), and forestry and logging (1.71 percent).

As a sector with relatively low imported material, agricultural sector was expected to give high contribution to non-oil and gas export revenue. However, because of the sharp price decline, an increase in agricultural export volume (17.1 percent) was unable to increase export value. Since the first quarter of 1997, agricultural export value has reached minus 12.16 percent, compared to the same quarter in the previous year (year-on-year). Negative growth continued until the second quarter of 1998, and reached the lowest growth throughout the Asian crisis period by

minus 19.65 percent (year-on-year). Meanwhile, agricultural export volume had bounced back in the first quarter of 1998, dominated by field crops.

The main source of export declining in agricultural sector was rubber which dropped by 28.3 percent. A declined in export value was generated by demand drop from Japan, Korea, and US which inflicted a decline in rubber price. Automotive industry had poor performance in those countries and was pointed as the main cause. From the supply side, currency depreciation in Indonesia and Thailand as rubber producers had induced more rubber production for export. This has resulted in over stock and a drop in rubber price. Besides rubber, other commodities had experienced a decline in exports such as tea, tobacco, and farming.

Significant increases in export value were shown in cocoa and pepper products. This was affected by the commodity price and volume increased. An increase in price of cocoa primarily related to a drop in cocoa stock in the world market. Malaysia which previously a main cocoa supplier had shifted its priority exports to palm oil. Moreover, cocoa plants had been damaged in Brazil led to a price increase because of the supply shortage. Cocoa export volume was expanding because this shortage forced foreign trader to chase stock to the production centers.

At the last of the Asian crisis quarter, agricultural export value growth had returned to be positive by 17.64 percent year-on-year. This growth was primarily driven by the strengthened of field crops and plantation crops. In the third quarter of 1998, the growth of those groups was dramatically shot up, either by using a year-on-year or

quarter-to-quarter basis. Each group had 11.38 percent and 35.43 percent year-on-year

growth respectively, and 44.22 percent and 85.41 percent quarter-to-quarter growth.

This positive growth had benefits from exchange rate depreciation. Export revenue

increased as a result of exchange rate depreciation and world demand improvement.

This indicated by the rise in CPO, cacao, and tobacco production. It was also occurred

in fishing, particularly shrimp and sea fish aquaculture, which generally export oriented.

2.3.1.3.3   Manufacturing Sector

Export value growth of the manufacturing sector (year-on-year) reached the

lowest growth (minus 30.6 percent) in the last quarter of 1997. Export value of the

manufacturing group started to decline in the third quarter of 1997. Manufacture of

food products and beverage which gave the highest share of manufacturing sector has

just experienced the minus growth on the first quarter of 1998, and reached the lowest

growth on the third quarter of 1998.

In line with total manufacturing sector, during the Asian crisis period, many

manufacturing products had the lowest growth in the last quarter of 1997. As in the

agricultural sector, analysis based on manufacturing sector annual basis was implied.

The result showed that the export value decreased, while the export volume

increased.

A huge drop in the export value of manufacturing sector was caused by the

decline in demand, especially from East Asia region. Besides, price competition in the

Asian countries that experienced exchange rate depreciation, also had a significant role.

A poor performance in manufacturing export mainly originated from dropped in textile

product with 16.8 percent, plywood 38.4 percent, palm oil 34.7 percent, electrical

equipment and footwear 32.0 percent.

A drop in textile product was mainly caused by a price decline, even though it

experienced an increase in export volume. An increase in export volume in apparel,

was primarily because producers tended to sell their products abroad even with

relatively low price. Besides, it was supported by additional quota in textile export

from US.

As well as textile products, plywood export value declined even though the

export volume slightly increased. Indonesian plywood industry had to face huge

challenge as a result of log exports reopening. This policy rendered some plywood

and other processed wood. Thus manufacturing companies had difficulties in obtaining

log as raw materials.

Unlike textile and plywood, palm oil export value declined because of export

volume slumped down. Even the tap on CPO was re-opened and its price increased,

yet it was still unable to increased export value. Government policies on crude palm

oil (CPO) trading which prioritize domestic stock and domestic oil price became

obstacles for CPO export.

Footwear export also declined especially as a result of a fall in the export

volume. This was caused by a drop in foreign demand since trading partner concerned

about stock continuity and on time delivery. US and Europe as the main footwear consumer products highly emphasized on fashion and season. Here, timeliness became important criteria.

In the midst of the poor export performance in manufacturing sector, there were some commodities with expanding export value, such as chemical, cement, and iron. In these sectors, a huge increase in export volume was able to boost export value.

In 1998, imported raw materials was also declined by 28.5 percent, sharper than 1997 which only declined by 8.1 percent. A decline in semi-finished raw materials for industries, parts, transports and capital equipment became the main source of a decrease in raw materials import. Relatively expensive and other difficulties in imported raw materials made some industries to reduce their imports. Even more some other industries ceased their operations, and this caused the domestic stock to be disrupted and export to reduce.

Among exporters, some of them were owned by foreigners. And around 20 percent of foreign owned manufacturing companies export their output. Ramstetter (1999) and Sjöholm and Takii (2006) stated that Multi National Enterprises (MNEs) generally showed that they had a high propensity to export, and they were major drivers of export in some industries from Southeast Asia and elsewhere. MNEs possessed extensive foreign networks, which can allowed access to foreign markets easier compared with local non-MNEs. MNEs' capability to have closer connections with international firms and strengths to participate in the world trade and investment

made them able to survive during crisis. Previous studies found that MNEs exhibit a better reaction to crises than domestic firms. Many of them stressed upon the financial issues. Narjoko and Hill (2007) mentioned that firms which were foreign-owned, export-oriented, and particularly both, were clearly more likely to recover quickly. Aswicahyono, Hill et al. (2010) also mentioned that export-oriented firms, especially those with foreign equity, survived the crisis; some even prospered with the boost to competitiveness.

2.3.1.3.4   Mining Sector

Mining and quarrying sector experienced contraction by 4.2 percent as a result of declining in domestic and global demand. A drop in quarrying subsector closely related with a drop in construction/building activity. Mining subsector had expanded exports for some commodities, such as nickel, copper, and coal due to increase in world demand and Rupiah depreciation.

Mining export value decreased from 22.4 percent to minus 0.2 percent in 1999. This was caused by a decline in coal and aluminum export value. A decline in coal export price was the major cause of export value to decline although it was experienced volume increase. The price declined related to the other energy prices, such as oil and natural gas. Coal export volume increased because the demand has increased by some East Asian countries for coal power-plant construction. Unlike coal, aluminum export value declined since the price and export volume declined.

Meanwhile, an increase in copper and gold export volume may lead the export value to increase.

2.3.2 Global Crisis

Since US was a super power country and the number one world economic actors, the collapsed of the US supremacy affected many fields and many countries, includes Indonesia. IMF referred to it as 'largest financial shock since Great Depression', which indicated how deep the crisis has occurred.

Since March 2008, there had been a huge number of losses in the world's investment banks, estimated at $160 billion. It was predicted to be continued and reached $ 300 billion, even experts estimated the monetary loss figure reached more than $ 1 trillion (Sihono 2009).

Stiglitz (2009) said that the United States financial crisis occurred as a result of errors in almost all economic decisions, were often called 'system failure'. In line with Stiglitz (2009), Eichengreen (2008) observed the roots of the crisis was from some of the economic policies in that decades. He mentioned this factor beside greed and corruption of the market participants. US dissaving economic policies also made recession in 2001 which then made large quantities loans became easily obtained by US' families.

Even more alarming was the fact that the origin of the crisis was actually a mistake (or rather greed) of financial firms in allocating funds to the sub-prime

mortgage. Financial disaster was then struck after bad debts occurred and crippled a number of giant financial back up. It was started from the collapsed of giant banking Lehman Brothers and giant financial company Bear Stearns. A moment earlier, the US government had also taken over the largest mortgage companies in America; Freddie Mac and Fannie Mae. While Merrill Lynch experienced almost the same conditions up to be acquired by the Bank of America. Lastly, the largest insurance company AIG (American International Group) showed the same critical symptoms.

To overcome the great stormy crisis and save the collapsed giant banks, the US government was forced to do a bailout by the amount of 700 billion dollars to 1 trillion US dollars. This intervention was unable to save the crisis that continues to happen. Bailout policy was not only done by the US government, but also European and Asian central banks. They intervened by injecting funds to stimulate economic liquidity. This was expected to prevent the domino effect of the world-class investment banks collapsed. It immediately triggered a panic wave in financial markets around the world. Capital markets in the United States, Europe and Asia soon experienced panic selling which resulted dropped in the stock price index in the capital market. Domino effect in the world economy as a result of the US financial crisis was indeed a logical consequence of the global economic model that was more open and eliminated boundaries between countries. As a result, all the world economic actors were vulnerably affected.

The subprime mortgage crisis as the beginning of the world financial crisis, also affected the national economy through the trade linkage including trade linkage between Indonesia – US and Indonesia - Asia/ Europe; (Partomo 2007). In general, Indonesian macroeconomic weakened by the US turmoil. But in general, this condition was relatively much better than during the Asian crisis impact a decade ago. The epicenter of the crisis was not in Indonesia, and the exchange rate positions were relatively safe. On the other hand, policies to control inflation through higher rate remained positive effect in maintained stable inflation.

2.3.2.1 Global Economic View during Global Crisis

The Asian crisis was hit developing countries and also affected the group of developed countries, but what happened on the Global crisis was the opposite. Started from the United States and Europe, the crisis was growing all over the world. Most developed countries recorded negative growth in 2009 (figure 4). Economic growth declined in developing countries was not as sharp as declined in developed countries.

Looked back on the figure 26, after the Global crisis had recovered in 2010, the trend of economic growth still declined in 2011 and beyond. This continuous decline could be seen from the trend of GDP growth. This occurred in developed countries, developing countries and the world. Generally speaking, the impact of the Global crisis still has impact now on all countries group. Countries have not been fully recovered

such as pre-crisis. Some countries recorded trade deficit in their balance of payment due to global demand has not fully restored.

Asian countries were estimated to be the major driver of global economic recovery which led by China and India. Rapid economic growth in China and India was predicted to be followed by increases in their consumption and import. When the demand of developed countries was still relatively weak, demand from China and India became the booster of the commodity price increase.

As a result of increasing demand from China and India, other Asian countries exports constantly improved. Export recovery, fiscal stimulus, accommodative monetary policy, and better performance of the external side became a cantilever of rapid Asian economic improvement than other region.

2.3.2.2 Indonesian Economic View during Global Crisis

Though the Indonesian economic growth was slowing down during the Global crisis, however in 2009, it could reach 4.6 percent. This figure was the third highest growth rate in the Asia after China and India. Increasingly slowing growth can be avoided because of the economic structure was driven by strong domestic demand. This was also due to the fact that Indonesian economy was relatively insulated from the weakening of Global economy. In 2010 economic growth was reached 6.2 percent, higher than 2008 (figure 18). This was supported by increases in exports and investment in 2010, after declined during 2008-2009. While the exchange rate and the inflation

rate been successfully suppressed by Bank of Indonesia. Although inflation in 2008 (9.77 percent) was slightly higher than in 2007, but it was much lower than the inflation volatility in 2006. High inflation in 2008 was originated from the pressure in the price of imported goods that continued to increase along with the exchange rate depreciation (figure 19 and 20).

2.3.2.3 Export Performance during Global Crisis

Discussion below explores the impact of the Global crisis of each sector: the aggregate sectors, agriculture, manufacturing, and mining.

2.3.2.3.1   Aggregate Sector

The impact of Global crisis on Indonesian economic growth had occurred through the trade channel. Exports decline, especially in the manufacturing sector, was caused by the drop in the world demand. It was not only experienced by Indonesia, but also in many developing countries, including ASEAN countries. According to the first assessment made by the World bank and the ASEAN Secretariat, in the first seven months of 2009, manufacturing exports declined by almost 40 percent in Indonesia, compared to the same period in 2008: (ASEAN and World bank 2009). According to a UNDP's regional study (Chhibber, Ghosh et al. 2009); exports slumped quite sharply in almost all Asian and Pacific developing countries from mid-2008 onwards, turning negative across the region, especially in Southeast Asia. In terms of value, Japan as the biggest trading partner experienced sharper decline in import absorption during Global

crisis period. The same thing is also indicated by the US, as can be seen in figure 6 and 9.

In line with strong effects of the global economic contraction, Indonesian export value on 2009 was decreased sharply. It had negative growth by 14.4 percent compare to 2008. The world price decline which dropped 34 percent (calculated by export price index) was a predominant factor in oil and gas contraction. While a commodity price decline was a predominant factor in non-oil and gas contraction. Besides, a sharp drop in the global demand was the cause of the ultimate exports decline during Global crisis. Basri (2013) also added that global demand in the end mostly lead to a decrease in exports and commodity prices.

Based on quarter-to-quarter growth, non-oil and gas experienced 22.2 percent contraction in the first quarter of 2009. While in the second quarter of 2009, export performance was strengthened, even though based on annual growth still experienced negative growth. However, export contraction can be suppressed because at the same time demand for the natural resources was remained high, especially from China, India, and Korea. In 2009, mining sector recorded positive growth 45 percent which was mainly supported by coal exports (33.6 percent).

Since January 2009, exports in many countries had started to recover. In Indonesia, in March 2009 exports grew faster than the import growth rate. Export performance was supported by manufacturing export at the end of 2009. This was in line with rapidly economic improvement in developed countries especially in US and

Japan. Besides, some of commodity price were strengthened and support exports improvement in the second quarter of 2009. Global demand recovery was one of the factors that able to bring non-oil export growth into positive growth by 17.6 percent on the last quarter of 2009, compare to the same period in the previous year.

Acceleration in Indonesian export performance during 2009 was also supported by characteristics of export products that based on primary commodities such as palm oil, agricultural product, and mining result (coal and copper). Those commodities became starting point of the whole production process of manufacturing sector.

From domestic side, positive transmission of the global economy positively affected investment activity and consumption behaviors. From the external side, improve in the export performance was estimated to improve global economy and domestic product competitiveness. In the world market, combination of external demand improvement and commodity price increases were able to support export performance.

Indonesian export ratio to GDP was less than 50 percent. Compare to other countries in South East Asia (Malaysia, Singapore, and Thailand), they had greater export ratio (Wie (2000), and Basri (2013)). Major commodity exporters from Southeast Asia, such as Indonesia, were less affected owing to their higher degree of diversification: Meyn and Kennan (2009).

Unlike the Asian crisis, based on quarterly analysis, Global crisis led both export value and volume reached the same trend and the lowest point in the same period.

It was in the first quarter of 2009, which recorded lowest growth minus 29.7 percent for export value and minus 26.5 percent for export volume growth. Meanwhile, for annual analysis, in 2009 all sectors experienced decreases in export volume, mostly contributed from manufacture.

Export value and volume growth during the Global crisis were compared between the crisis period and the previous period. Surprisingly, unlike in the figure 21 where export value seemed to have a sharper decline during the Global crisis, the growth of these calculations yielded the opposite conclusion. Export value experienced positive growth - even only in small number - compared to the same period before the Global crisis. And by calculation, export volume in this period was in line with figure 21, showed negative growth. It occurred for all sectors[5], with

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[5] Dataset of this calculation is on Appendix 2

manufacture has the stagnant export value growth.

Indonesia suffered relatively mild effects from the Global crisis; eventhough in terms of magnitude was greater than Asian crisis. Slowdown in exports and high interest rate contributed to the slowdown in investment growth. With the decline in exports and investment, economic growth in 2009 was generally supported by domestic consumption. Household consumption in 2009 was experienced 4.8 percent growth; even it was slightly under 2008 growth, 5.3 percent. Purchasing power strength,

sufficient amount of the expenditure related to election, and fiscal stimulus to sustained purchasing power were believed as factors that stabilized domestic consumption. It had a huge role in the economic growth in 2009, the share to GDP reached 58 percent. Meyn and Kennan (2009) confirmed about the Indonesian characteristic of consumption-led growth and consumption-led investment. In general, economic performance during Global crisis was also much better than Asian crisis. By now it is well known that Indonesia was much more resilience to the Global crisis than other countries that also affected by the same crisis, as stated by World Bank (2009).

2.3.2.3.2   Agricultural Sector

The main driver of agricultural growth was still dominated by field crops and plantation crops. During the Global crisis period, field crops proportion becomes 2.5 times on average higher than plantations crops. Therefore, the drop in field crops led to a drop in total agricultural sector. From 2003, agricultural export value kept rose from 664 million US $ into 2.8 billion US $ on the third quarter of 2003. The agricultural exports started to plunged in the last quarter of 2008 by 1.7 billion US $.

The agricultural export value year-on-year growth had never recorded a negative value since the second quarter of 2002 until the third quarter of 2008. It was only recorded negative growth from the last quarter of 2008 until the third quarter of 2009, and reached positive growth again until 2011. This productivity was built from farm production increased in Java and Sumatra and external demand.

According to quarter-to-quarter basis, agricultural export value had reached the lowest growth in the fourth quarter of 2008 with minus 43.5 percent. Field crops as the main cause of this change had the lowest growth in the fourth quarter of 2008 by minus 58.92 percent. In line with its value growth, agricultural export volume growth also recorded the lowest growth in the fourth quarter of 2008.

Look at the annual growth, agriculture had positive growth (24.5 percent) on 2008. It was mainly caused by the global food commodity price increased, besides climate support and productivity improvement. However in 2009, the growth was fallen into minus 29.2 percent. A sharp decline in external demand and a drop in commodity price, especially rubber was the main cause of this decline.

2.3.2.3.3   Manufacturing Sector

External shocks significantly affected manufacturing sector. In terms of export performance, the manufacturing growth decreased into 2.1 percent in 2009. Until the third quarter of 2009, manufacturing sector had only 1.5 percent average growth, far from the average growth before crisis, which was around 4 percent growth. Some subsectors with domestic market oriented however helped to restrain the slowdown; especially producing goods with relatively inelastic demand that has been less adversely affected. They were food and beverage, textile, and publishing and printing industries.

Weakened in the external demand because of global economic crisis gave significant effect to the manufacturing sector especially export oriented industry. Moreover, some studies indicated that it was unlike the Asian crisis where foreign MNEs tended to be resilient than local plants (Aswicahyono, Hill et al. 2010). It was because MNEs mostly owned by developed countries that were hit by the Global crisis.

Subsectors which had strong export market were wooden product, textile, and chemical. However, almost all subsectors were experienced contraction by quarter-to-quarter calculation. While subsector that still had positive performance was electronic and communication equipment, as the biggest contributor of manufacturing export growth. From the structure can be observed that food and beverage, basic metals, and chemicals were still on the top of industrial market share.

2.3.2.3.4   Mining Sector

Mining exports was experienced positive export value and volume growth during Global crisis period. This positive growth was supported by an increase in the commodity price in the world market. Market players expected that development in international market brought positive impact to the company performances. Besides, the emergence of the Law on the prohibition of the exports of raw mineral materials prompted some importers to import before the law came into effect in 2014. The export increase in 2010 was quite prominent for the mining sector. It was triggered by commodity prices increase in the last two years after declined in 2009.

Chapter Summary

  This chapter highlighted the Indonesian economic and export structure during two crises periods. The engine of economic growth in Indonesia has begun to shift since the 1990s. The role of the agricultural sector in Indonesia's GDP continued to decline and reinforced the dominance of the manufacturing sector. Unfortunately during the crisis, manufacturing sector as representatives of secondary sector was more vulnerable than others. It was found from the comparison between the growth of the primary, secondary, and tertiary sector with GDP measurement at 2000 constant price. From GDP expenditure terms, Indonesia still relied on the structure of household consumption expenditure component. This component was proved to be more resistant to any shocks. Indonesian bilateral trade flows to the three biggest trading partners were getting stronger by the trade agreement, as indicated by the increase in Indonesian exports to Japan and China after the trade agreement.

  According to the export value versus volume figures, export value and volume showed to decline more on Global crisis period. On the other side, calculation results provided that Asian crisis gave more negative growth to Indonesian export value and positive growth to export volume. This calculation compared the crisis period growth with the previous period. Sharp depreciation was unable to increase the export value which was triggered by other domestic factors, external factors, and worsened political situation. By sector, mining had the lowest export value growth and highest volume

growth, minus 16 and 29 percent respectively. In addition, it was the only sector that was not affected by Global crisis. Indonesian dependencies on the export of primary commodities such as mining and agricultural made Indonesia more sensitive to the global price changes and any changes in import demand for this commodity.

Puzzling result between visualization and calculation leads this study to develop a model which could accommodate other factors affecting export value beside crises. Crises incident could have contributed to the export values, but it was unlikely to have been the only factor. Clearly, broader list of fundamentals to assess the impact of crisis on export value needed to be examined. And for this, the gravity model analysis should be considered.
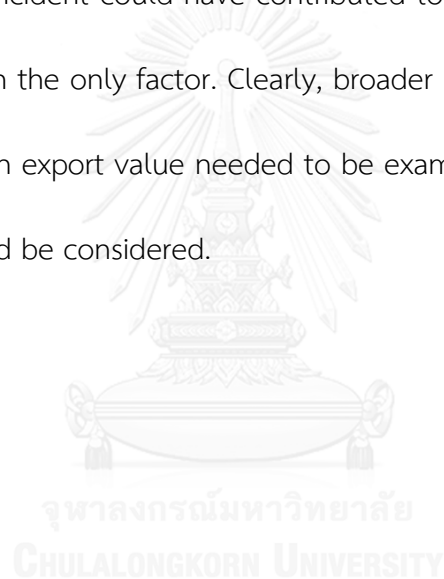
CHAPTER 3

LITERATURE REVIEWS AND CONCEPTUAL FRAMEWORK

In this chapter, previous researches as a reference and basic theory related with this study are presented. Determination, indicators, and underlying factors of financial crises are also included. The brief introduction about international trade theory, the application and structure of the gravity model are arranged in conceptual framework.

3.1   Literature Reviews

This section starts with determination of crisis periods. The consensus of controversy from previous authors regarding definition of crisis is needed in order to launch a dummy variable for this study. Explanations of different crises between the Asian Financial Crisis in 1997 and the Global Financial Crisis in 2008 including their impacts on exports are also covered.

3.1.1 How to Defined, Characterized, and Measured Crises

Some authors discussed about the indicators, crisis periods, definition, and measurement of crises. Specifically, some examined the validity of such indicators in the Asian Financial Crisis in 1997 and the Global Financial Crisis in 2008. Based on their results, crisis periods are captured by a dummy variable according to the gravity model. A country should be vigilant while following crisis indicators. These are potential variables commonly used as crisis indicators:

1. Exchange rate depreciation

Various studies used the exchange rate variable as the indicator of crisis. To characterize the financial crisis of a country, substantial depreciation of its national currency was the signal. According to Salvatore and Campano (2010), Chowdhry and Goyal (2000) and Frankel and Saravelos (2010), bilateral exchange rates of major national currencies against the US dollar were proxies.

Karunatilleka and Britain (1999) noted out that the market of exchange rates should be considered as the indicator of crisis because the effect of excessive speculation during the Asian Financial Crisis in 1997 should not be ignored.

For countries with a fixed exchange rate regime, international reserves were used as the indicator of crisis. It was measured by the number of months that a country could finance their imports using international reserves. Under a fixed regime, a country could lose competitiveness, causing adverse effects on net exports and growth. For those countries having the US as the main trading partner, their competitiveness was sensitive to changes in exchange rate (IMF 1997).

To define the Global Financial Crisis in 2008, Frankel and Saravelos (2010) and Ait-Sahalia, Andritzky et al. (2012) measured this crisis by using changes in domestic nominal currencies in the percentage form to make a comparison with the US dollar from September 2008 to March 2009. For robustness analysis, Frankel and Saravelos (2010) examined alternative period starting from June 2008 to June 2009.

2. Large drop in GDP growth

Although Frankel and Saravelos (2010) stated that GDP growth was rarely used, their results showed significance of this variable in explaining the crises. Freund (2009) supported the importance of GDP growth. Percentage changes in real GDP were measured from the end of the second quarter 2008 to the end of the second quarter 2009.

Real GDP growth also used for the evidence of the Asian Financial Crisis by Salvatore and Campano (2010). GDP is used as a control variable to determine warning indicator. In addition, current account deficit, long-term debt, short-term debt, current account minus FDI presented in a percentage of GDP are also adopted.

3. Stock market fall

Chowdhry and Goyal (2000), Frankel and Saravelos (2010), Salvatore and Campano (2010) used stock prices to show the evidence of the Asian Financial Crisis in 1997.

4. High interest rate

The third indicator of the financial crises is when interest rates rise significantly. The rise of interest rate is the reaction to the decline in money supply because of capital outflow in this case. This situation is termed as "credit crunch" in which indicates that the funds availability in the overall economy reduced (Karunatilleka and Britain 1999).

5. External Short-term debt level

Crisis warning could be serious when the external short-term debt was higher than the level of international reserves as it used to be the case during the Asian Financial Crisis in 1997 in Indonesia, the Philippines, and Thailand (Furman, Stiglitz et al. 1998, Chowdhry and Goyal 2000, Salvatore and Campano 2010).

6. Huge drop in Industrial production

To check leading indicators in the evidence of the Global crisis, Frankel and Saravelos (2010) measured the percentage changes in industrial production. It was measured from the end of the second quarter in 2008 to the end of the second quarter in 2009. Since the GDP composition normally varies across countries, industrial production could be the consistent measure of impacts from crises.

7. Combination of real exchange rate, interest rate, and international reserve

Kaminsky and Reinhart (1999) analyzed the movements of real exchange rate, interest rate, and international reserves, altogether. Since data availability of international reserve was limited, inflation rate could be an alternative, together with real exchange rate.

8. IMF financing

Frankel and Saravelos (2010) suggested using the requests for aid to the IMF from July 2008 to November 2009 as one of the leading crisis indicators. A country was considered more "vulnerable" if they needed an access to IMF funds.

Karunatilleka and Britain (1999) and Salvatore and Campano (2010) test the warning indicators of the Asian Financial Crisis in 1997 within countries that are affected. While Frankel and Saravelos (2010) applied indicators to the 77 countries during the Global Financial Crisis in 2008. Salvatore and Campano (2010) were also applied warning indicators to the Global Financial Crisis in 2008 in Asian countries but it did not give better performance as of the Asian Financial Crisis which when the crisis had been originated internally.

Karunatilleka and Britain (1999) employed the IMF data during July 1997 to September 1998 to observe the falling in the stock market, the depreciation in the foreign exchange, and the rise of interest rate in Asian countries. The data indicates that the period of the Asian Financial Crisis in 1997 started in the third quarter in 1997 until the third quarter in 1998.

Frankel and Saravelos (2010) discovered that on the second quarter in 2008 until the second quarter in 2009 were mostly explained the period of the Global Financial Crisis. This was in accordance with its findings on change in the real GDP level, change in industrial production, aid request to IMF, and nominal local currency changes.

3.1.2 Impact of Financial Crises on Countries' Exports

To find the impacts of crises on exports in selected countries, Eichengreen, Rose et al. (1996) noted that both exports and recession were related to each other.

It was found that financial crisis spread through trade connections. Van Rijckeghem and Weder (2001), also proved that trade and financial crises were linked with high correlation. Then, the question was raised whether they had positive or negative correlation. Asian crisis hit Asian exports significantly due to a large decline of demands from their trade partners (Niu, Li et al. (2000)). Moreover, Boorman, Lane et al. (2000) supported this negative relationship. He mentioned that input constraint as a result of currency depreciation and trade-finance restriction make countries have difficulties in production input limitation, and further will hamper the exports.

According to the well-known J-curve effect of currency devaluation/ depreciation, the decline in export value, which was commonly observed across all crisis-affected countries, was the outcome of sluggish adjustment of both domestic currency export prices and volumes to massive exchange rate depreciation. Huge contraction of domestic demand during the crisis might have encouraged exporters to boost their exports. This is because the exchange rate depreciation to foreign buyers. (Rosner (2000) Ma and Cheng (2005)). Jafari, Ismail et al. (2011) found that exchange rate depreciation would increase trade flows among D8 members.

3.1.3   Differences between Asian and Global Crisis

Aswicahyono, Hill et al. (2010) studied the firm-level data in Indonesia and compared between Asian and Global crisis. It was found that those two crises and their effects were different (Basri 2013).

There are some factors that distinguish the Asian crisis and Global crisis. Basri (2013) discovered that the Global crisis had less impact on Indonesian economy than the Asian crisis because of the following reasons:

1. Crisis origin

The Asian crisis originated from both domestic and external sources. When the crisis hit Thailand in 1997, then the contagion effect was transmitted to Indonesia. However, the fundamental problem of the Indonesian economy at that period was, especially, in the financial sector (Basri and Rahardja 2010). At that period, many commercial banks in Indonesia performed poorly by issuing bad loans. However, the Global crisis occurred externally, especially, from the subprime mortgages in the United States and Europe.

2. Exchange rate regime

Starting from changing monetary conditions during the mid-1997, the Bank of Indonesia altered the exchange rate regime from a managed floating exchange rate to a free floating exchange rate regime. Rupiah had suffered enormously from the pressure of depreciation with the initiation of the exchange rate crisis in Thailand. The crisis then spread to other ASEAN countries. The Rupiah simultaneously experienced intense pressure because of the large capital outflows due to the loss of foreign investors' confidence towards the Indonesian economic outlook. The pressure led to the rise of speculative bubbles, therefore the exchange rate depreciated quadrupled

on the last Asian crisis period. Certainly, the switching in the exchange rate regimes had led to exchange rate fluctuations and therefore affected the global economy. A large swing in the exchange rate had the influence on the economy, especially on the trade balances and outputs. Alteration in the exchange rate regime since the Asian crisis resulted in the greater volatility of Rupiah against the US dollar. The volatility of exchange rates affected macroeconomic stability.

During the Global crisis, the collapse of international financial markets was triggered by the failure of financial markets in the United States that started approximately in 2007. This condition immediately triggered capital outflows from emerging markets. At the same time, the exchange rates in emerging countries also experienced depreciation pressure. Rupiah exchange rate in October 2008 was also weakened sharply, driven by capital outflows and the conversion of Rupiah into dollars portfolio. The depreciation of Rupiah also increased risk in the banking sector. Despite heavy pressure, during Global crisis banking performance was relatively solid and it was expected to absorb several types of risks, including foreign exchange risk, interest rates, and prices of Conventional Based Government Securities.

3. Political situation

The political situation in 1998 was severe by demonstrations and intensified criticisms towards the government of Suharto. Demonstrations occurred simultaneously in major cities in Indonesia, wanted Suharto to lower his position. He

was accused of corruption, collusion and nepotism with his family business. The financial crisis had fully grown into social and political dimensions.

During the Global crisis, the government obtained relatively solid support and was able to control the economic and political situation. Media also have a role in supported the national government to sustain the public confidence in the economy.

4. Policy responses

It can be classified into three types of policy responses which are monetary policy, responses towards banking, and fiscal responses.

A. Monetary policy

Bank of Indonesia overcame the impact of the 1997 Asian crisis by raising the interest rate. The increase in the savings rate prompted private savings and, in turn, reduced the money supply as well as the long-term price control. To maintain financial stability, Bank of Indonesia began to restore access to foreign financing, and changing the auction system of Bank Indonesia Certificates in order to conduct open market operations.

As a result of the Global crisis, the responses from the national government and the Bank of Indonesia were to lower interest rates since January 2009. Decrease in interest rates was to boost consumption and investment. By such actions, the aggregate output rose, but it led to depreciation due to the decreasing in bank liquidity.

B. Responses towards Banking

Restructuring of the banking sector was made to restore the credibility of financial sector through the closure (14 banks in November 1997, and 33 banks in March 1998) and liquidating 16 banks. Banking restructuring was conducted by recapitalizing, fixing the internal condition of the banking, giving greater emphases on the bank supervision, and forming Indonesian Banking Restructuring Agency (IBRA).

The reform policies for banking sector were also conducted in 2008 crisis period. To avoid systemic effects due to failed banks as of 1997, the Bank of Indonesia injected new capital to large failed banks and closed small banks. However, this policy was ineffective because it was not supported by strong fiscal policy. In addition, the responses from the national government and the Bank of Indonesia to the Global crisis raised the guarantee of customer funds from Rp 100 million to Rp 2 billion and changed reserve requirement provision. The policy responses were managed to reduce the turbulence in the financial markets (Bank of Indonesia 2009).

C. Fiscal Policy

During the Asian crisis, the national government restricted fiscal policy to provide fiscal stimulus through the tight budget. The national government performed poor fiscal management which 80 percent of fiscal policy was allocated to tax saving and subsidies rather than direct expenditures. The deficit level increased from 1 percent (51 trillion) to 2.6 percent (137 trillion).

For the Global crisis period, expansionary fiscal policy in the form of tax incentives empowered businesses and households activities, supported the purchasing power and increased consumption. Increase in consumption strengthened aggregate demand and encouraged greater production. This was in line with lower production costs after reduction on corporate income tax and VAT. In addition, relatively low interest rates also encouraged investment. In the meantime, the expansionary fiscal policies had been pushed through budget expenditures for larger infrastructure and non-infrastructure projects. This was expected to encourage investment activities. The higher amount of the national government expenditure also stimulated aggregate demand and GDP.

The direct impact of the Global crisis on the emerging country's balance sheet including Indonesia tended to be limited. This was due to the low exposure of the financial institutions to the assets associated with US subprime mortgages. Unlike the Asian crisis in 1997-1998, during the Global financial crisis, the external sector fundamentals, fiscal and banking sectors became stronger and were able to withstand the Global crisis attack. The political situation was more stable and the national government's efforts to reduce dependency on foreign debts also affected economy.

3.2   Conceptual Framework

This section contains the introduction of international trade theory, the application of the gravity model, and the structure of the gravity model. These studies lead to the development of the model specification in this study.

3.2.1   International Trade Theory

International trade theory usually begins with the theory of absolute advantage initiated by Adam Smith and is normally referred as the foundation of classical free trade. This theory states that a country benefits from international trade by specialization in producing goods with higher efficiency and engaging in free trade with other countries equipped with various specialization (Suranovic 2010). The theory of absolute advantage is based on several key assumptions: production with only labor, equal quality of traded products, zero transportation costs, and barter transactions. However, it is, eventually realized that mutual benefits from free trade do not always require absolute advantages from all participating nations over their trading partners. If it is solely based on the theory of absolute advantage, then it can be no trade at all.

The theory of comparative advantage as the refinement of the absolute advantage theory was firstly brought by David Ricardo in numerical examples, and it is also named as Ricardian model. Product specification is the key factor of this model. Country can produce specific goods and services which have the greatest comparative advantage compared to other countries. Thus, a country can benefit more if they

specify their productions on goods and services that have high productivity and efficiency. Comparative advantage emerges from technological differences (Feenstra 2003).

The emergence of the comparative advantage theory leads to the win-win solution. The theory of comparative advantage of David Ricardo is usually used as the basis to support free trade in the forms of reductions of tariffs, import quotas and other non-tariff barriers. There is a consensus that the free trade is more beneficial than closing borders (Conway 2009).

As time passed, the theory of Ricardo cannot be applied in the more sophisticated world. Others think that the theory of comparative advantage is over-simplified by assuming the world of perfect competition. However, most experts argue that comparative advantage is the fundamental and important theory, underlying the current era of free trade and globalization (Conway 2009).

Heckscher – Ohlin (HO) theory states that factor proportions determine comparative advantage. The HO theory suggests that countries will export based on relative factor abundances. For instance, countries with labor abundance normally produce and export labor-intensive goods while capital-intensive goods are produced and exported by countries with capital abundance. However, in the real world, the fact shows that trade flows are more complicated and do not match with the HO theory. As found by the study of Leontief, US exported more labor-intensive goods

although US is the country with the most capital endowment. This fact was not in accordance with the HO theory. This result was known as Leontief paradox.

Countries with similar preferences for specific products usually trade more. They expect to develop similar industries. This fact resembles in what was proposed by the Linder Hypothesis. The Linder Hypothesis stated that countries with similar economic sizes have similar preferences and trade more. Linder brought empirical evidence on international trade flows to reconcile HO theorem, despite mixed results.

According to the gravity model, countries with similar economic sizes trade more because they trade on differentiated goods based on their similarities. Helpman and Krugman (1985) projected that the comparative Advantage theory could not explain the gravity model. To justify the gravity model, they used differentiated product with increasing returns to scale. New Trade Theory is based on monopolistic competition and increasing returns to scale. In contrast with Ricardian and Heckscher-Ohlin theory that market is in perfect competition.

Classical international trade theory abandoned return to scale, which is one of the factors determining international trade. Increasing returns to scale changes the patterns of comparative advantage. New Trade Theory brings together the determinants of comparative advantage which is the difference in relative factor endowments, overall size between trading countries, and similarity in economic sizes (Baltagi, Egger et al. 2003).

The Linder Hypothesis is based only on demands with per capita income and while the theory of new trade has the 'flavor of the Linder Hypothesis', but reflects supply considerations as well (Bergstrand 1990).

3.1.2 The Gravity Model Application

There are various empirical works applying the gravity model to find the impact of crises on exports (Ma and Cheng (2005), Macias, Massa et al. (2010), Abiad, Mishra et al. (2011), Berman and Martin (2012), Kiendrebeogo (2013)). By adding a dummy variable to capture crisis, Ma and Cheng (2005) estimated the effects of banking and currency crises on international trade with the case of 52 countries during 1980-1998. Having observed 179 crises periods for 40 years, different impacts of crises on trade dynamics were found. Crises negatively influenced imports while yielding positive impacts on exports.

Berman and Martin (2012) analyzed the impacts of the Global Financial Crisis on African countries exports to the US by using the gravity equation. The results showed that African exports significantly declined. In addition, exports of primary commodities were affected more than manufactured commodities. Macias, Massa et al. (2010) assessed the impacts of trade finances and foreign aids on exports using the mixed effect method. This method contains Fixed Effect Model (FEM) and Random Effect Model (REM), allowing slope and intercept to vary. They observed 83 developing countries in 1990-2007, and added crises episode during the time period of

observation. The results indicated that trade finances and foreign aids have significant effect on export flows. Furthermore, crises negatively impact trade flows.

Subsequent studies which used the general specification of the gravity model based on the new trade theory are such as Egger (2002), Baltagi, Egger et al. (2003), Macias, Massa et al. (2010), and KG and Aswal (2013).

Egger (2002) used the new trade theory as the framework to determine appropriate estimators for panel data. The study rendered several conclusions. First, the classical gravity models are likely to be miss-specified because they leave the presence of exporter and importer effect (such as viability of contracts and rule of law). Second, the researcher should beware of comparing estimation results between different economics view under different time horizons. Third, the difference between the observed and in-sample predicted trade flows showed a misspecification econometric model. Lastly, the author finds that all New Trade Theory variables are significant.

Baltagi, Egger et al. (2003) performed the interaction effect design on the trade flows between triad (EU 15, Japan, and USA) into 57 main trading partners. Trade cost was added to the equation of the new trade theory. Using Fixed Effect Model, 8 different model variations were used. The interaction effect between exporters and importers, exporters and time, and importers and time were added to the model. It was found that all variables were statistically significant and by omitting one interaction

effect could be misleading. The estimation by the full model supported the new trade theory and the Linder Hypothesis.

By comparing five developing groups in Asia and using the mixed model, Macias, Massa et al. (2010) found that export patterns were based on the new trade theory, and this was in line with Baltagi's finding and the conclusion from KG and Aswal (2013). Their study about India's export to developing and developed countries using dynamic OLS was in accordance with new trade theory. In their findings, trade is positively associated in countries who share similar preferences in terms of economic demand. It was consistent with the Linder's hypothesis for trade.

Adding Similarity Index and real factor endowment variables into the model has showed the proof of intra-industry trade. However, this result can only be proved if they support each other, or at least one of them is significant. Similarity Index captured the relative size of two countries in terms of GDP. When Similarity Index has positive sign, it has the same meaning as negative Real Factor Endowment. Countries with similar economic size and similar factor endowment will presumably trade more. And this similarity built intra-industry trade theorem. According to the consideration above, utilization of Similarity Index on the model is not preferable to avoid ambiguity and reduce redundant variable.

Eichengreen and Irwin (1998) added trade in lagged periods into their gravity model and found that the problem of endogeneity have been solved. Egger (2002) also brought AR (1) into Random Effect Model and also tested the Hausman-Taylor

Model (HTM), and found that the best model was HTM AR (1). Apart from the lagged

trade, Bun and Klaassen (2002) also added lagged of income represented by GDP.

As well as Bun and Klaassen (2002), Abiad, Mishra et al. (2011) also added

lagged GDP into the gravity model. Crisis variables with their lags were also tested and

the results were consistent with the baseline models.

Many studies were conducted to determine the impacts of crises on exports in

various kinds of groups. (Abiad, Mishra et al. (2011), Kiendrebeogo 2013)) found the

differences across product specification in financial crisis episodes. Commodities were

classified into four categories: consumer non-durables, capital and consumer durables,

intermediate and primary goods. Their results indicated that even though primary

goods exports declined but its magnitude was not the largest. However, the impact

was persistent for three years after crisis.

In addition to the observed impact of banking crisis on bilateral exports,

Kiendrebeogo (2013) also analyzed how the banking crisis affected exports in each

sector (agricultural, manufacturing, mining, and other sectors). In developing countries,

manufacturing sector was relatively more suffered than others.

Greene (2013) observed US exports to India and other trading partners by

disaggregating products according to their technologies, namely, civil aircraft,

telecommunications equipment, optical-medical equipment, motor vehicles, and

computers. The results indicated that the US GDP per capita positive and significantly

affect the civil aircraft and motor vehicles exports. For another main gravity variable, distance, was significant in all sectors except in telecommunications sector.

3.2.2 Structure of the Gravity Model

The gravity model was influenced by HO theory, Linder's hypothesis, and Helpman and Krugman. As Deardorff add the possibilities of gravity model theoretical basic for being unequivocal. The gravity model for international trade was firstly brought by Tinbergen in 1962. It was inspired by Newton's law of universal gravitation. The development of the gravity model from the most simplistic to the econometric issues in the gravity model are explained as follows

1. Basic gravity model with similar specification to Newton's law:

$$X_{ijt} = \beta_0 \frac{GDP_{it}^{\beta_1} GDP_{jt}^{\beta_2}}{Dist_{ijt}^{\beta_3}} \qquad (1)$$

Where X_{ijt} is the export from i to j at time-t, or total trade, β_0 is a constant term, *GDP* as the representative of the economic size, $Dist_{ijt}$ is geographical distance between i and j at time-t as proxy for transport costs. Equation (1) can be transformed into natural log form as below.

$$lnX_{ijt} = \beta_0 + \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3 lnDIST_{ijt} + \varepsilon_{ijt} \qquad (2)$$

The main explanatory variables are normally used for measuring bilateral trade in pair of countries. They are the economic size (of trading partners) and the distance

between them. Exports are positively related to their economic sizes and negatively related to the distances.

Anderson (1979) tried to fill the gap of theoretical explanation by the gravity equation in international trade especially in commodity application. The gravity equation was derived from the properties of expenditure system. The goods traded across countries were imperfect substitutes and differentiated by country origin (Armington assumption).

2. The augmented gravity model

Empirical works relying upon the gravity model recently and widely used is the augmented gravity model which consists of OTHERS variables in accordance to the purpose. In equation (3), *OTHERS* represent a symbol for variables such as population[6], GDP per capita[7], exchange rate[8], common language[9], common border[10], common colony[11], common currency[12], country landlocked[13],

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[6] Population may arise in the gravity model on their own: Ma and Cheng (2005), Martínez-Zarzoso and Nowak-Lehmann (2003), Greene (2013), or by GDP per capita.

[7] See, for example Abiad, Mishra et al. (2011), Kiendrebeogo (2013), Greene (2013)

[8] See, for example Egger (2002), Macias, Massa et al. (2010), Kiendrebeogo (2013), Ma and Cheng (2005), Martínez-Zarzoso and Nowak-Lehmann (2003), Greene (2013), KG and Aswal (2013)

[9] See, for example Egger (2002), Macias, Massa et al. (2010), Kiendrebeogo (2013), Cheng and Wall (2005), Greene (2013), KG and Aswal (2013)

[10] See, for example Egger (2002), Kiendrebeogo (2013), Ma and Cheng (2005), KG and Aswal (2013)

[11] See, for example Macias, Massa et al. (2010), KG and Aswal (2013)

[12] See, for example Abiad, Mishra et al. (2011), Kiendrebeogo (2013)

[13] See, for example Ma and Cheng (2005), Greene (2013)

island[14], Regional Trade Agreement[15], etc.

$$lnX_{ijt} = \beta_0 + \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3 lnDIST_{ijt} + \beta_4 OTHERS_{ijt} + \varepsilon_{ijt} \quad (3)$$

Kiendrebeogo (2013) has applied this model to explain how banking crises affected bilateral exports.

3. New Trade Theory Framework

From Anderson's seminal paper, the gravity model was then developed. It can be derived from several structural models, such as the Ricardian model, the HO model, and the new trade theory. The differences among these three structural models are: Ricardian model focused on technological differences, HO emphasized factor endowment, and New Trade Theory included Increasing Return to Scale (Helpman and Krugman 1985).

Evenett and Keller (1998) attempted to identify two major differences in the HO and the new trade theory models. They used the sample of almost all industrialized countries.

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[14] See, for example Ma and Cheng (2005), Greene (2013)

[15] See, for example Abiad, Mishra et al. (2011), Kiendrebeogo (2013), Greene (2013), KG and Aswal (2013)

Whether trade flows between countries took place when factor proportions tended to differ (a condition commonly called inter-industry trade in the HO model) or when the factor proportion was similar (intra-industry trade in the new trade theory). The study found strong evidence about increasing return to scale. It provided important backgrounds in the gravity model to explain trade flows.

The application of the new trade theory was brought by Helpman and Krugman (1985). The model was therefore specified as follows:

$$ln(X_{ijt}) = \beta_0 + \beta_1 TGDP_{ijt} + \beta_2 RFE_{ijt} + \beta_3 SI_{ijt} + \beta_5 lnDIST_{ij} + \beta_5 OTHERS_{ijt} + \varepsilon_{ijt} \qquad (4)$$

where $TGDP_{ijt}$[16] is total GDP of countries at time-t, RFE_{ijt}[17] is Relative Factor Endowment measures the differences between capital endowment of countries at time-t in absolute value, while SI_{ijt}[18] is Similarity Index representing similarity in country size.

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[16] $TGDP_{ijt} = \ln (GDP_{it} + GDP_{jt})$

[17] Relative Factor Endowment $(RFE_{ijt}) = \left| ln\left(\frac{GDP_{it}}{POP_{it}}\right) - ln\left(\frac{GDP_{jt}}{POP_{jt}}\right) \right|$

[18] Similarity index $(SI_{ijt}) = \ln\left[1 - \left(\frac{GDP_{it}}{GDP_{it} + GDP_{jt}}\right)^2 - \left(\frac{GDP_{jt}}{GDP_{it} + GDP_{jt}}\right)^2 \right]$

4. Econometric specification

The most basic and most widely used of econometric specification of the gravity model is the cross-section estimation. For the purposes of econometric specification, equation 5 below is the representative of the general gravity model.

$$lnX_{ijt} = \beta_0 + \beta_t + \beta_{ij} + \gamma^{'}_{ijt}Z_{ijt} + \varepsilon_{ijt} \tag{5}$$

where X_{ijt} is the export of country-i to country-j at time-t, Z'_{ijt} is the vector of all independent variables of the gravity model of country-i to country-j at time-t. Intercepts of this model have three parts, they are: common in all years in all country pairs (β_0); common in all country pairs (β_t); and common in all years (β_{ij}).

On the cross-section OLS model, both intercepts and slopes are the same in all country-pairs, $\beta_{ij} = 0$ and $\gamma_{ijt} = \gamma_t$, so that (equation 6):

$$lnX_{ijt} = \beta_0 + \beta_t + \gamma'_t Z_{ijt} + \varepsilon_{ijt} \tag{6}$$

Where β_0 and β_t cannot be separated into each year. The existence of heterogeneity is not allowed in country-pairs trade flows. On the Pooled OLS model, the restriction also applies, where all parameter vector are the same, $\gamma_t = \gamma$, though usually intercept allow to vary over time (equation 7).

$$lnX_{ijt} = \beta_0 + \beta_t + \gamma' Z_{ijt} + \varepsilon_{ijt} \tag{7}$$

Typically, estimating parameters using cross-sectional OLS and Pooled OLS yielded biased results. This was consistent with Cheng and Wall (1999) research with a wide range of the fixed-effect specification of the gravity model for controlling heterogeneity on bilateral trade flows. It concluded that the fixed-effect model was statistically more preferred to others specification (equation 8). Serlenga and Shin (2007) examined the Intra-EU trade also and concluded that OLS generated biased parameters.

$$lnX_{ijt} = \beta_0 + \beta_t + \beta_{ij} + \gamma'Z_{ijt} + \varepsilon_{ijt} \qquad (8)$$

According to Mátyás (1997), pooled OLS models also resulted in biased parameter specification, so it was suggested econometric specification three-way models. Beside time dimension (β_t), he involved time-invariant country specific effect of exporter and importer separately (β_i and β_j). Egger and Pfaffermayr (2003) argued that Matyas model also produced mis-specified parameters.

The panel model allows heterogeneity in the trade relations between countries, because it allows β_{ij} to appear. The estimated equation employed different intercept with the same slope for all countries. The estimated equation is namely the Fixed Effect Model (Cheng and Wall 1999). Imposing $\beta_t = 0$, obtained the FEM panel model:

$$lnX_{ijt} = \beta_0 + \beta_{ij} + \gamma'Z_{ijt} + \varepsilon_{ijt} \qquad (9)$$

Kepaptsoglou, Karlaftis et al. (2010) also concluded that the FEM was the most appropriate model to estimate the gravity model. It was reviewed empirical literature of the gravity model in the past decade, mostly about Free Trade Agreement and highlights the most applicable model from them.

Problems occurred when the FEM did not allow time-invariant variables in the gravity equation. It was absorbed in the FEM. FEM was perfectly collinear with time invariant variables. This rendered to analyze time-invariant variables separately.

$$FE_{Ij} = \alpha_0 + \alpha_1 lnDIST_{Ij} + \alpha_2 LAN_{Ij} + e_{ijt} \tag{10}$$

Cheng and Wall (1999) offered the solution to add the second regression. The individual effect was regressed with time-invariant variables (equation 10). Greene (2013) also used this method to analyze the potential for US exports of advanced technology goods to India using FEM approach. Martínez-Zarzoso and Nowak-Lehmann (2003) applied the same procedure to analyze exports between two Blocs that consisted of 20 countries of Mercosur and 15 EU countries.

5. Endogeneity issue

Problem of endogeneity happened in the gravity model when estimating the impact of crisis on the export value. It was related to reverse causality issue between export value and crisis. Crisis dummy variables could be endogenous by crisis occurrence based on the performance of export. Concerns about reverse causality

could be a serious problem when export of a country only relied on particular sectors without diversification. If exporters had fairly high portfolio on the banks and when there was a demand shock, exporters having payment difficulties and resulted in a banking crisis.

This problem could be solved by: 1) Eliminates the effect of unobserved variable by taking first differences of all variables, 2) Autoregressive process on export behavior (need to use the lagged period of the dependent variable to capture the dynamic nature of export). This method is known as GMM (Generalized Method of Movement), developed by Blundell and Bond (1998). This study was used second method, by adding lagged of export value as explanatory variable to overcome endogeneity issue (Bun and Klaassen (2002) and Kiendrebeogo (2013)). Abiad, Mishra et al. (2011) used lagged of trade and GDP to test for robustness. Martínez-Zarzoso and Nowak-Lehmann (2003) and Ma and Cheng (2005) also included lagged of exchange rate beside lagged of export into gravity equation. Besides endogeneity, dynamic model was selected as the way to overcome autocorrelation.

$$lnX_{ijt} = \beta_0 + \beta_1 X_{ij(t-1)} + \beta_2 lnGDP_{it} + \beta_3 lnGDP_{jt} + \beta_4 lnDIST_{ijt} +$$
$$\beta_5 OTHERS_{ijt} + \varepsilon_{ijt} \qquad\qquad (11)$$

Lagged of the dependent variable was added into model specification of this study to overcome endogeneity and autocorrelation problems.

6. Zero value trade flow

Another problem of the econometric issue in the gravity model is zero value trade flow. Zero export value is a problem because the gravity model runs in logarithmic form or natural log by having zero logarithm undefined. There are several ways to address zero value problems (WTO and UNCTAD 2012): 1) Omitting/ drop off period with zero value observations. This might be done if zero values are distributed randomly caused by missing data or random rounding error. 2) Adding small value before transform into logarithm, if only the real value is zero or if it is systematic rounding errors. Omitting zero value in this case would imply a loss of important information and bias result. 3) Run model in value. For gravity model, the last solution is almost inapplicable because gravity model should be transform into linear model. Estimation on level is not supported by theoretically gravity equation that presents multiplicative form.

The problem of zero value usually appears when estimating the gravity model on sector levels rather than the aggregate levels. Some countries could only have transactions on particular commodities and left commodities on other sectors empty. How zero value export treated is a subjective manner. In summarize, small value is added before natural log transformation (Kiendrebeogo 2013).

Chapter Summary

Based on literatures, this study finds measurement and determination of the crises period that are helpful in the placement of the crisis dummy variables. In general, studies found the crisis effect in a country's export was mixed. Some cases underlying characteristics differences between the Asian crisis and the Global crisis, which allows for differences in the impacts. In Indonesia the differences are the origin, exchange rate regime, political situation, and policy responses.

For the application of the gravity model, the new trade theory is a refinement of trade theory. The new trade theory in the gravity model now is more widely used. Core independent variables in the gravity model by the new trade theory are the total GDP, relative factor endowment, Similarity Index, and distance. Previous literatures mostly used the Fixed Effect Model as the appropriate method to examine the gravity model of trade flow. The concept of the earlier works in accordance to the model is delivered in the next chapter. From the literatures, studies which mostly influence the formation of the model in this study are Kiendrebeogo (2013) and Helpman and Krugman (1985).

CHAPTER 4

METHODOLOGY AND DATA

The essential part of this chapter is addressed to illustrate the estimation process and model specification that bring the application of the gravity model into this study. It is followed by the details about the dependent and independent variables include expected sign and the reasons behind, also all the information pertained to the data processing.

4.1   Estimation Process

Panel data regression is used in this study. Using quarterly data, period chosen for this study ranges from 1993 to 2012, which covered two crises period. A panel data analysis has merit information about cross-section and time-series analysis. Combination of cross-section and time-series data analyses gives more informative data, more variability, less collinearity among variables, more degrees of freedom and higher efficiency (Baltagi (1995)). Panel data analysis can ensure empirical analysis in which is not possible to use only cross-section or time series data. Panel data estimation consists of three types: pooled OLS, Fixed Effect Least-Squares Dummy Variables (LSDV) or Fixed Effect Model (FEM), and Random Effect Model (REM) or Error Component Model (ECM).

Pooled OLS model is the simplest estimation method. All observations and estimated regression are pooled, regardless of the space and time dimension of the pooled data. Using Fixed Effect Least-Squares Dummy Variable (FEM), all observations are pooled and assume that each country has constant slope coefficients, but allow the intercepts vary across countries. LSDV or FEM allows interaction effects among dummies and regressors. Diverse combinations across countries and time could be obtained; however, degrees of freedom must be sacrificed.

Unlike FEM, Random Effect Model or Error Component Model (REM) allows each country to have its own intercept value. It assumes that intercept values are random drawing from bigger population with mean value as a constant. The individual intercepts are delivered from deviation of the constant mean value. For REM, this does not cause the higher degrees of freedom.

To judge which estimators are reliable between FEM and REM, Hausman test is applied. The null hypothesis that underlying the Hausman test is that both FEM and REM are not differs substantially, signifying that REM is more preferable. The test statistic developed by Hausman has an asymptotic χ^2 distribution. By testing the model, the best estimation model based on the available dataset is able to be chosen and eventually yields the right analysis. The result of Hausman test is included in the Appendix 3.

REM is usually used when destination countries are selected randomly from a larger population. However, in this paper, thirty countries as the biggest Indonesian

export destinations are determined, so FEM become more appropriate (Greene 2013). Country list as Indonesia's export destinations is provided in the Appendix 1. When the number of cross section data (N) is small and time series data (T) is large, FEM is preferable according to Gujarati and Porter (2009). Due to considerations above, this study only analyzes by Fixed Effect.

4.2   The Gravity Model Specification

To determine whether crises affect exports, the combination between equation (4) and (11) from Chapter 3 is used. The second regression as a function of time invariant variables and individual effects is also performed (equation 10). Panel data is run for aggregate exports and across sectoral level (agriculture, manufacture, mining-quarrying, and aggregate sector). Basic equation as fundamental methodology is brought here.

$$ln(X_{Ijt}) = \beta_0 + \beta_1 TGDP_{Ijt} + \beta_2 RFE_{Ijt} + \beta_3 SI_{Ijt} + \beta_5 lnDIST_{Ij} + \boldsymbol{\beta_5 OTHERS_{ijt}} + \varepsilon_{ijt} \qquad (4)$$

Equation 4 is based on the gravity model by the new trade theory which is essential by providing better performance than the basic gravity model. This study is preferred not to use Similarity Index (SI) for simplicity to reduce redundant variables and avoid ambiguity.

To overcome endogeneity, adding lagged of export can be one solution since current export has a strong relation with the previous export.

$$lnX_{Ijt} = \beta_0 + \beta_1 X_{Ij(t-1)} + \beta_2 TGDP_{Ijt} + \beta_3 RFE_{Ijt} + \beta_4 lnDIST_{ijt} + \beta_5 OTHERS_{ijt} +$$

$$\varepsilon_{ijt} \qquad (12)$$

The TGDP, RFE, and distance on the equation 12 come from the basic gravity model based on New Trade Theory framework. OTHERS in this equation consist of Real Exchange Rate (RER), Regional Trade Agreement dummy (RTA), Language dummy (LAN), and Crisis dummy (Crisis). Complete explanation for each variable is explained in the next session. Since FEM is more preferable than Pooled OLS and REM for some reasons, time-invariant variables have to be eliminated from the main gravity equation. The selected model in this study has two time invariant variables (distance and language). Based on the previous elaboration, the first model to be presented in this study is equation (13) as follows:

$$ln(X_{Ijt}) = \beta_0 + \beta_1 ln(X_{Ijt-1}) + \beta_2 TGDP_{Ijt} + \beta_3 RFE_{Ijt} + \beta_4 lnRER_{Ijt} + \beta_5 RTA_{Ijt} +$$

$$\beta_6 Crisis_t + \varepsilon_{ijt} \qquad (13)$$

To obtain the estimation value of time-invariant variable, country-pair fixed effect resulted from the first equation then used as dependent variable on the second OLS regression. Therefore, by omitted distance and language variables from equation (13) and put them as independent variable of the second regression, equation (10) is added;

$$FE_{Ij} = \alpha_0 + \alpha_1 lnDIST_{Ij} + \alpha_2 LAN_{Ij} + e_{ijt} \qquad (10)$$

For comparison, the same gravity estimation models are used to analyze the crisis impacts on exports in sectoral level. Using the same model allow us to compare the magnitude of each sector to find which sector has the most severe impact. Abiad, Mishra et al. (2011), Greene (2013), and Kiendrebeogo (2013) applied the same explanatory variables to analyze export in different sectors and industries.

4.2.1 Dependent Variable

Indonesian export value (in aggregate and sector) to 30 sample countries is used as the dependent variable. This value is expressed in the form of US $ and transformed into natural log form. Although the determinants of export factors differ, this study uses the same explanatory variables as for comparison.

4.2.2 Explanatory Variables

Some relevant studies propose factors that determine exports in crisis periods with the gravity model. Variables used in this study are lagged exports, total GDP, real factor endowments, real exchange rate, distance, Regional Trade Agreement, common language, and crisis.

$$X_{ljt} = f(X_{ljt-1}, TGDP_{ljt}, RFE_{ljt}, RER_{ljt}, DIST_{lj}, RTA_{ljt}, LAN_{lj}, CRISIS_t) \qquad (14)$$

1. Total GDP (TGDP$_{ljt}$)

Total GDP is the sum of GDPs of exporter and importer countries at time-t. Total

GDP is a measure of overall country size as one of key determinants based on the

new trade theory.

$$TGDP_{Ijt} = \ln (GDP_{It} + GDP_{jt}) \tag{15}$$

Where:

GDP_{It} = GDP of exporter country

GDP_{jt} = GDP of importer country

2. Relative Factor Endowment (RFE_{Ijt})

Relative factor endowment measures countries' distance in terms of capital labor

abundance. In accordance to the theory, the lower volume of intra-industry trade

is caused by the larger differences in relative factor endowment. GDP per capita

differences between two countries is used as proxy for relative factor endowment

(Kaldor 1961). Increase in capital-labor ratio increases GDP per capita (Breuss and

Egger 1999).

$$\text{Relative Factor Endowment } (RFE_{Ijt}) = \left| ln \left(\frac{GDP_{it}}{POP_{it}} \right) - ln \left(\frac{GDP_{jt}}{POP_{jt}} \right) \right| \tag{16}$$

Countries that have the same factor endowments as indicated by 0 from the

results.

3. Real Exchange Rate (RER_{Ijt})

Real exchange rate is the nominal bilateral exchange rate between countries deflated by the ratio of their price indices respectively.

$$RER_{ijt} = e_{ijt} \frac{CPI_{jt}}{CPI_{it}} \qquad (17)$$

Where:

e_{ijt} nominal exchange rate of country-i's currency to country-j at time-t

CPI_{jt} Consumer Price Index of country-j at time-t

CPI_{it} Consumer Price Index of country-i at time-t

Economic theory proposes that real exchange rate positively influence currency depreciation and exports. As the currency of exporting country depreciates, the cheaper its products become and higher export flows are counted.

4. Distance (DIST_ij)

Distance is the proxy for transportation cost. Some researches replaced distance with other variables such as common border, common land, etc.

5. Regional Trade Agreement (RTA_ij)

One of the economic integration outcomes is elimination of tariff barriers which helps reducing trade costs. Being in the same member of trade blocs can reduce tariff barriers. This means that market becomes more potential because trade can

prosper. RTA is a dummy variable. It is 1 if importer countries have a trade agreement with Indonesia and 0, otherwise.

6. Language (LAN_{lj})

Language similarity implies that countries have similar culture and possibly similar goods they use. When trading partner countries have the same language, it will reduce social barriers and can trade more easily. LAN is a dummy variable. It is 1 for same or similar language with Indonesia and 0, otherwise.

7. Crisis ($CRISIS_t$)

CRISIS dummy variables are added into the gravity equation to represent Asian and Global crisis for each period. Dummy is put according to the breakpoint. It is 1 for crisis period and 0, otherwise. The onset of the Asian crisis period started when Thailand allowed Baht to float in July 1997 (third quarter of 1997) and ended in the third quarter of 1998. The period for the Global crisis ranged from June 2008 (the second quarter in 2008) to June 2009 (the second quarter in 2009) by the definition of real exchange rate depreciation and change in industrial production (Frankel and Saravelos 2010). CRISIS variable provide valuable information, facilitating the analysis the crises impacts on export performance in this study.

4.3   Data Source and Measurement

Monthly data of exports are obtained from Statistics Indonesia. Four digit Harmonized System (HS2012) classification of Indonesian export values to 30 countries are employed. These 30 countries construct 88 percent of Indonesian exports. To convert data from HS commodity classification into three main sectors (agriculture, manufacturing, and mining) in International Standard Industrial Classification (ISIC), UNSTATS provides correspondence table from HS 2002 to ISIC rev.3.1. Investmentmap.org is also used to complete details for description. Analyses on main sectors exclude the HS code Chapter 98 and 99, which are used to record specific transactions such as low valued transactions and returned goods. Trade for these terms is only recorded on TOTAL (aggregate). Since those obtained data are monthly series, monthly data need to be summarized into quarterly data.

Most quarterly GDP data are obtained from CEIC and OECD database which are available in current and constant prices with different base years. To eliminate price changes, nominal GDP is transformed into real GDP by 2005 as the base year. This study uses the provided GDP deflator. For countries without any GDP deflators, Consumer Price Index (CPI) is the candidate.

In order to build RFE, quarterly population data are needed. For countries without any quarterly population data, it is estimated by using geometric growth of annual population. There are two common ways to estimate population growth; they

are geometric growth and exponential growth. The differences between two estimation methods are not significant.

Real exchange rate is calculated from nominal exchange rate multiplied by CPI of foreign countries and deflated by CPI of Indonesia. Data of nominal exchange rate is the average of quarterly nominal exchange rate from CEIC and OECD database.

RTA is available at the World Trade Organization (WTO) while distance and language variables are obtained from CEPII database. For simplicity, table 3 summarizes measurement and expected signs of variables.

Table 3 Measurement and expected signs of variables

Var	Definitions	Measurement & Data Source	Expec- ted sign	Theoretical Explanations
X_{ijt}	Export from country-I (Indonesia) to country-j at time-t	Total export value. Data source: Statistics Indonesia		

X_{Ijt-1}	Export from country-I (Indonesia) to country-j at time-(t-1)	Total export value. Data source: Statistics Indonesia	+	The current value of trade is strongly related to the previous value. Lagged trade overcome endogeneity
$TGDP_{Ijt}$	Total GDP of country-I (Indonesia) and country-j at time-t	Data source: - GDP: CEIC & OECD - TGP: Author's calculation	+	Positively associated with export flows, as one of the key determinants for trade in New Trade Theory
RFE_{Ijt}	Relative Factor Endowment. 0 for the perfect equality of factor endowment	Data source: - GDP: CEIC & OECD - Population: CEIC, OECD, The World bank - RFE: Author's calculation	+	According to HO theorem, more different is the relative factor endowment of two countries, they will trade more
			-	Some findings argue that countries will trade

				more if they have similarity in relative factor endowment
RER_{Ijt}	Real Exchange Rate of country-I (Indonesia) to country-j at time-t. As a proxy of price.	Data source: CEIC generated from IMF	+	Depreciation makes goods price cheaper for importer countries, so they will buy more, and it will increase trade flow/ export volume
$DIST_{Ij}$	Distance, as a proxy for transportation cost.	Data source: CEPII database	-	Beside shipping and time, distance will increase transportation cost. The shorter the distance, the lower transportation cost and it will increase bilateral trade flow

RTA_{lj}	Regional Trade Agreement, dummy variable	1 for same trade membership, 0 otherwise. Data source: WTO	+	When exporter and importer countries are being the same member or trade blocs will alleviate tariff barriers
LAN_{lj}	Language, dummy variable	1 for same language, 0 otherwise. Data source: CEPII database	+	Language similarity will make trading process easier
$CRISIS_{t}$	Crisis dummy variable	1 for crisis occurred, 0 otherwise.	-	Export propensity was presumed to decline when crisis occurred.

Chapter Summary

This chapter illustrates the estimation process using panel model FEM as the most appropriate econometric specification for this study. To overcome the problem of time-invariant variables that perfectly collinear, it is obliged to create the additional regression equation of the individual effects. The formulation of selected model runs from models specification in the previous chapter and all are rearranged in a string of selected models. The selected model in this study has been considered how to address the econometric issues in the gravity model. To overcome endogeneity, it is necessary to add lags of the dependent variable as the independent variable. The gravity model is selected based on the new trade theory along with using FEM AR (1) estimation which are the amalgamation of Helpman and Krugman (1985), and Kiendrebeogo (2013).

This chapter also presents the details about dependent and independent variables including expected signs and the reasons behind and about all the information pertained to data processing.

CHAPTER 5

EMPIRICAL RESULT

Empirical results of the impacts of financial crises on Indonesian exports are discussed in this chapter, including all explanations and analyses of the augmented gravity model. Afterwards, acceptance and rejection of the previously stated hypothesis are discussed. Moreover, the consistency of estimation results with the descriptive analysis is presented.

5.1 Estimation Results

The gravity model for estimation as given in the Chapter 4 is the augmented gravity model within the framework of the new trade theory using FEM AR (1).

$$ln(X_{ijt}) = \beta_0 + \beta_1 ln(X_{ijt-1}) + \beta_2 TGDP_{ijt} + \beta_3 RFE_{ijt} + \beta_4 lnRER_{ijt} + \beta_5 RTA_{ijt} + \beta_6 Crisis_t + \varepsilon_{ijt} \tag{13}$$

$$FE_{ij} = \alpha_0 + \alpha_1 lnDIST_{ij} + \alpha_2 LAN_{ij} + e_{ijt} \tag{10}$$

Table 4 and table 5 provide the empirical results of two equations above. Using FEM, aggregate and sectoral exports from Indonesia to 30 countries from 1993 to 2012 was estimated.

Table 4 Gravity Model Estimation using Fixed Effect Model

Dependent variables: ln (Indonesian export)

Explanatory Variables	TOTAL	AGRI-CULTURE	MFC	MINING
ln (previous export)	0.26693 (0.02) ***	0.40109 (0.02) ***	0.188 (0.02) ***	0.49305 (0.02) ***
ln (total GDP)	2.15549 (0.08) ***	1.76545 (0.28) ***	2.29741 (0.09) ***	1.52734 (0.53) ***
RFE	0.12475 (0.04) ***	-0.27007 (0.18)	0.29561 (0.05) ***	0.98293 (0.35) ***
ln (RER)	0.02781 (0.01) ***	0.00035 (0.04)	0.03109 (0.01) ***	-0.20724 (0.07) ***
RTA dummy	0.10965 (0.06) *	-0.4794 (0.3)	0.17996 (0.08) **	0.84064 (0.56)
Asian crisis dummy	0.06191 (0.04)	-0.3871 (0.21) *	-0.1747 (0.06) ***	-1.05762 (0.4) ***
Global crisis dummy	-0.02396 (0.04)	-0.20809 (0.22)	-0.01362 (0.06)	0.51457 (0.41)
C	-16.66538 (0.69) ***	-15.09152 (2.25) ***	-17.8549 (0.8) ***	-20.16313 (4.63) ***

R-squared	0.93461	0.80777	0.88680	0.76944
Adjusted R-squared	0.93361	0.80484	0.88508	0.76592
F-statistic	938.15	275.82	514.22	219.05

All non-dummy variables are in natural log. RFE is already in natural log form. ***, **, and * represents statistical significance at 1%, 5%, and 10% level, respectively. Standard error of t-statistics is in parentheses. Source: Author's calculation

Table 5 Independent Effect Regression with Time-Invariant Variable

Dependent Variable: Fixed Effect

Explanatory Variables	TOTAL	AGRI-CULTURE	MFC	MINING
ln (distance)	-0.86009 (0.38) **	0.84919 (0.67)	-0.69469 (0.45)	-1.25987 (1.27)
Language dummy	1.47063 (1.21)	4.72908 (2.15) **	2.33962 (1.42)	3.03769 (4.05)
C	7.39275 (3.35) **	-7.71115 (5.98)	5.89431 (3.96)	10.7701 (11.25)
R-squared	0.36517	0.15198	0.32053	0.12342

Adjusted R-squared	0.31815	0.08916	0.27019	0.05849
F-statistic	7.76554	2.41935	6.36829	1.90078

***, **, and * represents statistical significance at 1%, 5%, and 10% level, respectively. Standard error of t-statistics is in parentheses. Source: Author's calculation

5.2   Analyses

The results of the Hausman test (the Appendix 3) indicated that the hypothesis is rejected, This means that, when compared to the REM, the FEM is the appropriate model for estimation. By using the FEM, the value of R-squared in the total Indonesian exports performs well because the gravity model explains 93 percent of the variation in Indonesian exports during 1993-2012. The value of R-squared in the Indonesian manufacturing sector has the highest value where the FEM gravity equation can explain 89 percent of the total variation in the dataset, followed by agriculture and mining sectors which has the lowest R-squared (77 percent).

From the estimation results, it is proven that Indonesian exports are dynamic as can be noticed by the role of the last-period exports on the current export equation. The large value of coefficient of lagged trade implies high constancy in trade patterns. Besides, small changes in the current trade patterns can end up with large long-term effects. Indonesian current exports are significantly affected by previous export values in a positive manner in both aggregate and all sectors.

The lagged export variable is shown to be positive at 1 percent significant level for aggregate and each sector. It means that 100 percent increase in previous aggregate exports increase the value of Indonesian exports by 27 percent. By sectoral exports, exports by the manufacturing sector in the previous periods yield the lowest contribution to its current exports. To explain, 100 percent increase in the previous manufacturing exports contributes to increase in current manufacturing exports for 19 percent. In contrast, exports from the mining sector in the previous period gives the highest contribution to current exports because 100 percent increase in previous export boost current mining exports by 49 percent, followed by agricultural sector.

In confirmation with the gravity theory, total GDP of countries shows positive and significant results, at 1 percent significant level. For each percent increase in total GDP, it contributes to 2.16 percent increase in total export value. Among all sectors, the mining sector has the lowest estimation result. One percent increase in total economic size of Indonesia and partner countries would be elevated 1.53 percent of mining export value. The highest estimation result is in the manufacturing sector because each present increase in total GDP boosts 2.30 percent of manufacturing export value.

To measure relative factor endowment, GDP per capita as capital labor approach is employed. When the distance of two countries in factor endowment term is low, they are similar in factor endowment. It implies that they trade more, and then the volume of intra-industry trade is increased. This result confirm the Linder

Hypothesis (Linder 1961) and is consistent with Helpman and Krugman (1985). Countries trade more when they are not similar by having the Heckscher Ohlin theory as the background.

For RFE variable, the estimation results show that only RFE in agricultural sector is not significant. Aggregate exports, manufacturing and mining sectors are significant. Each percent of capital endowment difference between Indonesia and trading partner countries increase 0.12, 0.30, and 0.98 percent of their exports, respectively. According to this result, Indonesia tends to export all products and goods, except agricultural sector to countries that had differences in factor endowments. Countries with different factor abundances, they will trade more. Here, the HOS theorem is more valid in Indonesian exports than the new trade theory, signifying that international trade is still based on the traditional trade theorem.

RER significantly affects exports in aggregate, manufacturing and mining sectors, at 1 percent significance level. This indicates that price competitiveness is important. One percent real exchange rate depreciation in Rupiah increases export value by 0.03 percent in aggregate and manufacturing exports. Their export values are significantly sensitive with a change in the real exchange rate as mentioned in the hypothesis that real exchange rate depreciation increases the export values. However, the small coefficient in aggregate and manufacturing sectors suggests that depreciation in real exchange rate currency do not highly support export activities during the estimation periods. In contrast with the mining sector, depreciation is unable to increase

Indonesian export values. One percent depreciation in real exchange rate currency reduces export from the mining sector by 0.21 percent. However, exchange rate fluctuations have no significant impact on the agricultural sector. As mentioned in the Chapter 3, previous researches also gave mix impacts of depreciation and trade flows. Local prices do not always quickly adjust when Rupiah depreciated.

Regional Trade Agreement is significant and gives the sign as expected on total and the manufacturing exports, but it has no significant impact on the agricultural and the mining sectors. RTA has positive relationship with the total and the manufacturing exports, but it does not have any impact on the agriculture and the mining sectors of Indonesia. Recently, problems in the agricultural sector such as lack of technology, infrastructure, human resources, capital constraints, and agricultural land constriction blocked the benefits from RTA for the agricultural sector, unlike the aggregate and the manufacturing sectors. The establishment of bilateral and regional trade agreements between Indonesia and major trading partners proved to increase export income, as mentioned in the Chapter 2. As the manufacturing sector gave the highest contribution to Indonesian exports, significant RTA in the manufacturing export also boosted the aggregate exports.

From the estimation results in table 4, all sectors tend to be sensitive with the Asian Crisis variable, except for the aggregate export. The sign in the aggregate export equation shows the unexpected sign. One simple explanation that comes up with the model is that RER affect exports from the aggregate sectors. This supposes to dampen

the negative effects of the crisis on the aggregate exports. The mining sector was severely affected by the Asian Crisis, followed by the agricultural sector. Export value of the mining sector decreased by 65.3 percent [exp (-1.06)-1*100] when the Asian Crisis hit. RER coefficient on the mining export mutually supported findings in descriptive analysis during the Asian crisis. The values of exports from Indonesian agricultural and manufacturing are negatively affected by the Asian Crisis for 32.1 percent and 16.0 percent respectively. The mildest impact from the Asian Crisis was experienced by manufacturing sector. This could be due to RER factor and the influence of foreign ownership in industrial companies in Indonesia. As mentioned in the chapter 2 about the manufacturing sector analysis, MNE export contribution to total manufacturing exports was relatively significant, which was about 20 percent of total industry exports.

According to the empirical results, the Global crisis did not give significant impacts on any sectors. The Global crisis coefficients show negative signs, except for the mining sector. The coefficient values are smaller than in the Asian crisis because it was originated from internal and external shocks. The Global crisis was purely the external shock. The Asian crisis hit abruptly and recovered quickly, but the Global crisis gave mild impact but still prolonged.

To estimate a time-invariant variable in the FEM model, the second regression is estimated only for these variables with the individual effect as the dependent variable. These results are shown in table 5. The distance variable, as a proxy of

transportation cost between two countries, showed that the further distance implied larger transportation costs. This variable gives the negative sign as expected. It is only significant on the aggregate exports and other sectors. Language as an explanatory variable is only significant on the agricultural sector. Similarity in culture, showed by languange similarity prove to increase export only for the agricultural sector.

5.3   Consistency with the descriptive analysis

From the descriptive analysis, both crisis affected Indonesian exports. The Asian Crisis gave higher negative effects on export values from all sectors, based on the calculation of export value growth in the crisis period to the same period in the previous year. Depreciation during the Asian Crisis was only able to increase the export volume, but was not the case with the export value. A sharp decline in export price in major commodities was the cause of the exports weakness in the Asian Crisis. Depreciation, drop in demand from Asian countries, local financial problems, high dependencies on imported materials and the political situation were factors that hindered Indonesian export performance. When the Global crisis struck, Indonesia had the more established economic system. High demands from China and India also helped Indonesian exports to survive despite the sluggish global demand. However, this finding was also in line with Basri (2013) which stated that the Global crisis gave the mild effect. From the econometric results, the Global crisis did not give any significant impacts on Indonesian exports.

The first hypothesis that the Global crisis severely affected export value was rejected. Indonesia experienced the worst impact from the Asian crisis by large depreciation that occurred in 1997/1998 and was unable to increase export value. Currencies of many Asian countries also depreciated, resulting in price competitiveness in Asia. Commodity prices dropped and export value also dropped. Credit crunch in Indonesian banking sectors caused difficulties in production process. In addition, the political situation in 1998 triggered concerns to trading partners about security and accuracy of delivery schedules. From importer side, China (lately become Indonesian major trading partner) and India had the important role during the Global crisis because they still were recorded as countries with high import demand from Indonesia.

The second hypothesis stated that the manufacturing sector of Indonesia is the most sensitive sectors also rejected. The worst impact was on mining and agriculture sectors because mining and agriculture provided primary commodities that experienced sharp price decline. The results of Abdurohman and Zulfadin (2002) in line with the finding in this study that the primary sector (mining and agriculture) was severely affected by the Asian Crisis because the commodity price decline. This finding was also in line with Rosner (2000). His researches on export volume increased and export value decreased during the Asian crisis was also parallel to the results of this study. That is, in term of volume, the Indonesian mining sector had the highest growth, in term of value, it experienced the lowest growth.

Chapter Summary

According to the description in chapter 2 and the estimation results, all sectors in Indonesia experienced decreasing in exports by the occurrence of the Asian crisis. To clarify, the mining sector was the most sensitive sector in Indonesia while exports from the aggregate sectors were not affected. During the Global crisis, no significant impacts were found on the value of exports from any sectors. The presence of other variables in the gravity model also determined the crisis effects on Indonesian exports. The effects of the crisis on exports could be observed in the descriptive analysis and the gravity model. In general, the empirical findings from the gravity model were consistent with the descriptive analysis in this study.
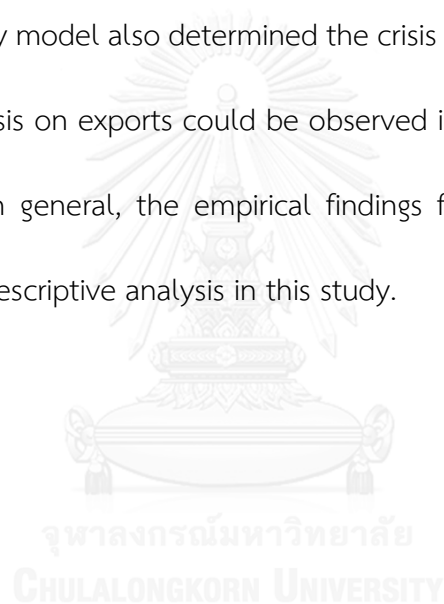
CHAPTER 6

CONCLUSIONS

This chapter presents the conclusions and policy implications. Discussion about the historical background of Indonesian exports structure are discussed. Then the empirical results are summarized with policy implications.

6.1 Conclusions

The economic structure of Indonesia relied mostly on final consumption expenditure. This component was relatively insensitively to shocks. Compared with export, on the production side Indonesian GDP was dominated by the secondary sector, that is the manufacturing sector. In 2010, the GDP proportion of the manufacturing sector in Indonesia was 26 percent and was also the major part of Indonesian exports. Its contribution to the total export was 60 percent.

This study has brought together the impacts of the Asian and Global crises that hit Indonesian exports. Besides, all export sectors were analyzed and compared. Many studies discussed the influence of one crisis on exports only, or specifically discussed the particular sector. This discussion was important since the share of Indonesian exports to total GDP was about 45 percent. If we learn how each crisis hits Indonesian exports by sector then the appropriate policy responses can be initiated and implemented.

The Asian Financial Crisis, which began in the mid-1997, affected currencies, stock markets, and asset prices in several Southeast Asian economies. While the Global crisis that began with the subprime mortgage crisis in the United States, also spread in many countries. Both crises shocked the Indonesian economy, especially in the real sector.

By employing the descriptive analysis, this study found the relationship between economy and export performance during the two periods of crises. During the Asian crisis, GDP by production in all sectors in Indonesia experienced negative growth, especially in 1998. In addition, the same effects are also found on GDP by all components. While economic growth in the Global crisis was not as severe as the Asian crisis. With GDP expenditure, the largest composition of the output user was household final consumption expenditure that was the least sensitive to both crises. However, it also experienced negative growth during the Asian crisis. Decrease in consumption was triggered by soaring inflation with the historically high rate in 1969. Rupiah also depreciated sharply since the exchange rate regime was altered from a managed floating to a free floating regime. Rupiah was at the highest rates at the second quarter in 1998.

For the sectoral analysis, the export growth from all sectors experienced decline at the time of the Asian crisis. This result was calculated from the export value and volume growth during the crisis period towards the same period in the previous year. Even though in terms of value, mining exports showed the highest growth (29

percent). However, in terms of value, mining exports had only minus 16 percent growth. Field crops (rubber), manufacturing of food and beverage products, coal and aluminum as the dominated products of each sector declined sharply when the crisis took place.

Based on the observations from descriptive analysis, impacts between the Asian crisis and the Global crisis on the Indonesian economy and exports were parallel. The impact of Asian crisis on Indonesian economy was more severe than the Global crisis, and the same effect could be observed clearly from the export performance.

The implementation of the gravity model to assess the impacts of the crises on exports was influenced by the several studies and finally settled by the framework of the New Trade Theory to use FEM AR (1). The gravity model in the framework of New Trade Theory was used to describe whether the patterns of trade in each sector were based on similarities or differences in factor endowments. It turned out that the patterns of exports of all sectors (except agriculture - as insignificant coefficient parameters) still confirmed the Heckscher-Ohlin theory.

The selection of FEM as a panel estimation models were based on considerations such as literatures delivered a better performance of FEM than the OLS and REM. These are because of the following reasons. First, the trading partner has been determined. Second, the number of cross section is greater than time series. Third, the most important reason was because supported by the results of the

Hausman test. The inclusion of the lagged value of the dependent variable was to deal with endogeneity.

The estimation results with the gravity model stated that the Asian Crisis was proved to lessen Indonesian exports more severe than the Global crisis. In all sectors, the coefficients indicated significant impacts, except the aggregate sector. Based on the magnitude of the crisis dummy variables, mining sector was the most sensitive sector to the crisis, followed by agriculture, and manufacturing. The coefficient of the real exchange rate has negative impact on mining exports. From the descriptive analysis and previous studies we found that in the mining sector, sharp real exchange rate depreciation during the crisis was caused by the decrease in the export prices of primary commodities as it was due to the falling import demands. Manufacturing and aggregate sectors exports increased due to the real exchange rate depreciation. However, in agricultural sector; the depreciation did not give any influence on exports.

However, all sectors exports were not significantly affected by the Global crisis. Strong demands from China and India along with the effort to recover from the crisis, the Indonesian financial sector were the main cushion against the Global crisis.

Another variable that affected export values was trade agreements. In addition to the pros and cons of the RTA effects, it was proved by some researchers to increase the exports value in manufacturing and total sectors. In accordance with previous literatures that Indonesian bilateral trade agreements with Japan and China as the biggest major trading partners were able to improve export performance of Indonesia.

Meanwhile, the presence of the Trade Agreement in agricultural sector did not affect at all.

Distance as the basic variable of the gravity model was only significant on the total exports and gave the sign as expected. The closer the destination countries were, the more exports to those countries become. Despite the similarity in cultures as represented by language in this study, only the export from the agricultural sector was boosted.

In the descriptive analysis, the impact of the Asian crisis on Indonesian exports was anchored by falling commodities price and excessive depreciation. When it was tested through the gravity model, it could be viewed by the aggregate and manufacturing sectors that depreciation increased their export values. When depreciation weakened the export value of mining sector, this made mining as the most vulnerable sectors during the Asian crisis because depreciation was sharper than in the Global crisis. Indonesian mining and agriculture sectors relied on primary commodities for exports, resulting in the sensitivity to global market price fluctuations.

According to the results, the first hypothesis was rejected by using the gravity model as it turned out that any changes in other variables on the gravity model influenced Indonesian exports. The second hypothesis that the export from the manufacturing sector was the most sensitive sector during the crises was also rejected. Thus, from the empirical results of this study, some policy implications are delivered

in the next subsection in order to cope with the potentially approaching financial crises in the future for Indonesian exports.

6.2   **Policy Implication**

The main results showed that Asian crisis gave the worst impact, compared to the Global crisis. All Indonesian export sectors were affected by the Asian Crisis and the mining sector was the most severe one.

Some policy implications related to crises was recommended. To improve export performance of Indonesia, the following solutions are absolutely necessary because it is not merely as the crisis precaution for commodities and market diversification. The success of diversifying export products and markets are determined by how strong the level of competitiveness of Indonesian products compared to similar products from other countries including the growth of the market in the destination country.

Policy to maintain stability of the Rupiah exchange rate is also important because the mining sector is very sensitive to excessive depreciation. It is noteworthy in the agenda for the national government of Indonesia as well to maintain financial stability, to strengthen domestic banking, and to ease the access to capital and trade finance.

Inevitably, global economic linkages make Indonesia need to strengthen the role of the domestic market for the absorption of local products, so it can be resistant

to external shocks. It was proved from those findings that final consumption expenditure is relatively stable during the crises.

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APPENDIX

Appendix 1. Export destination country

1. America
   1.1. North America
       1.1.1. *United States of America*   *(1)*
       1.1.2. *Canada*   *(2)*
   1.2. Central and South America
       1.2.1. *Argentina*   *(3)*
       1.2.2. *Brazil*   *(4)*
       1.2.3. *Mexico*   *(5)*

2. Europe
   2.1. European Union
       2.1.1. *Netherlands*   *(6)*
       2.1.2. *United Kingdom*   *(7)*
       2.1.3. *Italy*   *(8)*
       2.1.4. *Germany*   *(9)*
       2.1.5. *French*   *(10)*
       2.1.6. *Spain*   *(11)*
   2.2. Russia   *(12)*
   2.3. *Turkey*   *(13)*

3. Asia and Middle East
   3.1. ASEAN
       3.1.1. *Philippines*   *(14)*
       3.1.2. *Cambodia*   *(15)*
       3.1.3. *Lao PDR*   *(16)*
       3.1.4. *Malaysia*   *(17)*
       3.1.5. *Myanmar*   *(18)*
       3.1.6. *Singapore*   *(19)*
       3.1.7. *Thailand*   *(20)*
       3.1.8. *Vietnam*   *(21)*
   3.2. *Hong Kong*   *(22)*

Appendix 2. Dataset for export value and volume growth calculation

period	AGR value (mn US $)	vol (K ton)	MFC value (mn US $)	vol (K ton)	MINING value (mn US $)	vol (K ton)	TOTAL value (mn US $)	vol (K ton)
1996q2	868	617	5,938	4,504	640	23,508	7,446	28,628
1996q3	897	746	6,682	5,177	781	29,496	8,360	35,419
1996q4	945	793	7,118	5,300	646	24,618	8,709	30,711
1997q1	762	705	6,564	4,528	635	27,510	7,961	32,743
1997q2	806	661	7,186	5,975	785	29,804	8,777	36,440
1997q3	842	743	6,204	6,194	704	33,183	7,749	40,120
1997q4	741	686	5,114	5,709	651	49,471	6,506	55,866
1998q1	650	732	6,032	5,270	552	36,781	7,234	42,782
1998q2	647	894	6,060	5,888	526	27,729	7,233	34,511
1998q3	990	1,041	6,547	6,666	498	26,960	8,036	34,667
1998q4	711	856	4,884	5,722	724	28,421	6,319	34,999
1999q1	594	758	5,025	5,966	589	23,323	6,208	30,047
1999q2	638	756	6,918	7,588	536	26,334	8,092	34,678
1999q3	693	844	7,879	8,641	488	30,167	9,060	39,652
1999q4	674	845	7,552	7,720	583	33,185	8,809	41,750
GROWTH	-10%	16%	-11%	17%	-16%	29%	-11%	27%
2007q2	1,822	1,146	15,522	11,253	2,787	50,329	20,131	62,728
2007q3	2,012	1,141	15,579	11,519	2,591	63,934	20,182	76,594
2007q4	2,168	1,383	16,476	13,438	2,346	57,517	20,990	72,338
2008q1	2,218	1,052	17,788	12,461	2,643	57,883	22,649	71,396
2008q2	2,526	1,131	18,027	12,461	3,160	64,094	23,713	77,686
2008q3	2,812	1,052	18,508	10,241	3,646	62,921	24,966	74,214

2008q4	1,869	1,018	15,591	10,691	3,430	54,848	20,890	66,557
2009q1	1,271	853	12,614	9,476	3,109	41,008	16,995	51,337
2009q2	1,538	1,020	14,730	10,639	3,680	57,204	19,948	68,862
2009q3	1,751	1,110	14,779	10,482	5,341	80,493	21,871	92,085
2009q4	2,116	1,409	17,987	13,035	5,532	88,107	25,635	102,550
2010q1	2,322	1,152	16,869	9,738	6,240	93,398	25,432	104,288
2010q2	2,706	1,257	18,444	10,473	5,531	86,249	26,681	97,978
2010q3	2,899	1,250	19,578	11,906	6,174	79,397	28,651	92,553
2010q4	3,336	1,470	23,390	13,601	6,745	92,448	33,472	107,519
GROWTH	3%	-12%	0%	-9%	29%	-1%	4%	-3%

Appendix 3. Hausman Test Result

Hausman Test for equation 13

$ln(X_{ljt}) = \beta_0 + \beta_1 ln(X_{ljt-1}) + \beta_2 TGDP_{ljt} + \beta_3 RFE_{ljt} + \beta_4 lnRER_{ljt} + \beta_6 lnDIST_{lj} + \beta_7 RTA_{lj} + \beta_8 LAN_{lj} + \beta_9 Crisis_t + \varepsilon_{ijt}$ (13)

Table 6 Hausman Test

	total	agriculture	manufacture	mining
Chi-square (p-value)	1198.379***	641.537***	1285.922***	497.437***

VITA

Yulia Tri Mardani was born on 7 July 1982 in the small city in Central Java province, Indonesia. She grew up there and got the Bachelor of Science from Mathematics program in Diponegoro University, Central Java. Worked on Makro wholesale for four years as a leader, she decided to resigned and be a civil servant in Statistics Indonesia, Jakarta. To support her work, she had the opportunity to pursue further study after having four years experience in her office. With scholarship program for ASEAN countries, she went to Bangkok to study in MA program in International Economics and Finance (MAIEF), Chulalongkorn University. The knowledge obtained from her master degree is expected to be useful in supporting her work as a staff in the National Accounts division.