

## THE GLOBAL ECONOMIC CRISIS AND ITS EFFECT ON INDONESIAN AGRIBUSINESS EXPORTS?

Muhammad Firdaus

Department of Economics, Faculty of Economics and Management

Bogor Agricultural University

[firdausfemipb@yahoo.com](mailto:firdausfemipb@yahoo.com)

### ABSTRACT

*The global economic crisis which started from during 2008 was expected to lower the global demand for agricultural products. Data from the Central Statistical Agency, Indonesia, shows that there was a significant decrease in the export value of non-oil and gas products from 2008 to 2010; and a significant increase from 2009 to 2010. Export values of some main exported products such as vegetable and animal oil, rubber, wood, coffee, tea and pepper decreased in almost all destination countries. The panel data method was applied in analyzing the determinants and impacts of the global economic crisis on some of the Indonesian major agricultural exports. This study found that the global economic crisis significantly depressed the commodity price. The volume of some main agricultural exports increased from 2008 to 2009; however, a large drop in commodity price reduced the export value. The panel data model found that the main determinant of Indonesian exports of CPO, rubber and coffee was the export price. The coefficient of economic distance was negative and statistically significant.*

**Keywords:** economic crisis , agriculture, export demand, panel data model.

### INTRODUCTION

The global economic crisis began from the financial crisis, when US housing prices started to fall in the winter of 2006. By the summer of 2007, some American and European banks announced huge losses on their mortgage related securities and investments. The Fed started to raise the interest rate up to 5.25%. This process gradually came to a boil in September 2008 when a major American bank, Lehman Brothers, collapsed. Governments in US and EU launched massive bail-outs and fiscal-stimulus to hamper the impact of crisis on the rest of the economy. However, bank credit continued to be almost frozen, leading to sharp falls in consumer spending and real sector activities. The projections made by the IMF indicated that advanced economies such as US and EU experienced negative economic growth from 2008 to 2009. According to the data from the World Economic Outlook Update 2009 by the IMF, US which grew at 2.2% in 2007, dropped to minus 2.4% in 2009 and some EU countries such as the UK, Netherlands and Germany slowed from about 3% in 2007 to minus 4% in 2009 (IMF, 2010).

The economic downturn in the US and EU countries spread across the world through reduced financial flows such as investment in stock markets, foreign direct investment and through a drop in demand for goods and services such as oil and gas, agriculture, manufactured products and tourism. Thus, the financial crisis not only harmed production in US and EU countries, but also led to drops in exports and production throughout countries which had relied on the US and EU markets for their export growth. However, some countries are expected to have various experiences in impacts of the global economic crisis, depending on economic structure, integration into the global market and strengths of the economy as seen in foreign reserves, fiscal deficits and external debt (Wiggins, Keats and Vigneri, 2009).

The data from the Central Statistical Agency showed there was a significant decrease in export value of oil and gas also non-oil and gas products from Indonesia in 2008 compared to 2009 (14.97%, Table 1). Export values of agricultural products decreased to almost all destination countries. For example, values of Indonesian products in the EU decreased from US \$ 14.1 million in the period of January-November 2008 to US \$ 12.1 million in the January- November period 2009; in the US, from US \$ 11.6 million into US \$ 9.4 million. However, export value significantly increased from January up to March 2009 compared to January up to March 2010 (53.7%). These figures indicate that the global economic crisis has had a significant impact on the Indonesian economy. Some further analyses were required to investigate the impact of the global economic crisis on Indonesian agribusiness. This study was aimed to describe some impacts of the global economic crisis on Indonesian exports. Some major agricultural exports such as estate crops were analyzed using the panel data model to capture the determinants of exports and effects of the global economic crisis.

**TABLE 1. INDONESIA EXPORT VALUE IN 2008, 2009 AND 2010 (US \$ MILLION)**

Year	Total	Oil and Gas	Non Oil and Gas
2005	85,660.0	19,231.6	66,428.4
2006	100,798.6	21,209.5	79,589.1
2007	114,100.9	22,088.6	92,012.3
2008	137,020.4	29,126.3	107,894.2
2009	116,510.0	19,018.3	97,491.7
Change 2008-2009	-14.97	-34.7	-9.6
Jan-March 2009	23,029.2	3,331.6	19,697.6
Jan-March 2010	35,392.3	6,504.3	28,888.0
Change 2009-2010	53.7	95.2	46.7

Source: Central Statistical Agency, 2010

## **THEORETICAL AND EMPIRICAL MODEL**

According to Massa and te Velde (2008), the recession in some advanced economies was expected to reduce growth in the developing world. The transmission of downturn in advanced to emerging economies included the following process. Firstly, it happened through movements of capital. The stock market fell as foreign investors liquidated portfolios fearing future losses from recession. Official aid reduced as advanced economies faced fiscal deficits. Secondly, it occurred through exchange rate depreciation. Countries that faced large outflows of capital or sharply adverse current accounts from falling commodity prices might see their currencies depreciated. The weaker currencies would tend to encourage production of exports and to discourage consumption of imports, however it also tended to raise domestic prices. Thirdly, less demand for exports from emerging economies led to drops in commodity prices then reduced earnings.

A study by Keats and Vigneri (2009) supported that the global economic downturn would lead to less demand for agricultural commodities, although for some foods the effects will be minor given the low income elasticity of demand for staples. Stronger effects might be applied for luxury foods such as meat and dairy, for vegetable oils and for industrial inputs such as cotton and rubber.

The global economic downturn was likely to reduce international prices of agricultural commodities. The World Bank predicted agricultural prices to fall by 21% in 2009, with foods and grains prices dropping more than raw materials prices. Some commodities still experienced a small decrease in 2010 and some are expected to rise back.

Based on the literature indicated, two hypotheses were proposed in this study. The global economic crisis reduced earnings from Indonesian agricultural exports. Determinants of demand for some main agricultural exports were commodity prices, national income, real exchange rates, distance and size of population.

To satisfy the objectives of the study, the secondary data from some sources were the data from the Indonesia Central Statistical Agency, Ministry of Trade, and World Outlook from IMF. The panel data of ten OECD countries (US, UK, French, Italy, Germany, Netherlands, Canada, Australia, Japan and Singapore) and five other major importers of Indonesian estate crops for the period of 2005 up to 2009 were employed. The data were interpreted by using descriptive analysis. The data before

and after the crisis (2005-2008 and 2009) were compared. To capture the effects of the global economic crisis and to determine the determinants of global demand for some Indonesian estate crops, this study used the gravity model. The gravity model was first proposed by Tinbergen (1962) and refined by Linnemann (1966). Tinbergen's original aim was to account for the factors that explained the size of trade flows between two countries. Two factors were the size of gross domestic product of the exporting and importing countries. Linnemann later added the size of the populations of the two trading countries to reflect the role of scale economies. The third factor was the resistance to trade such as costs of transportation, transport time, tariffs, quotas and other trade policies. The model became more popular since the introduction of the theoretical gravity model by Anderson and Van Wincoop (2004). Empirically the gravity model has been used largely in explaining the effects of different policies and other determinants of trade flows with the key variables of economic size and distance. De (2009) conducted a study of India's trade potential for anticipating the global economic and financial crisis. By employing the gravity model, the author found that the trade facilitation has an important complementary role to play in enhancing India's trade after the global crisis.

The empirical gravity model in this study is formulated as follow:

$$X_{it} = \alpha_{it} + Z' \beta + \varepsilon_{it} \quad (1)$$

Where:

$X_{it}$  : Export value of an exported commodity from Indonesia to country  $i$  at time  $t$

$Z$  : Vector of five exogenous variables which are as follow:

1. Price of exported commodity in US \$ (Price);
2. Real Gross Domestic Product of country  $I$  (GDP);
3. Real exchange rate of country on US \$ ( $Er$ );
4. Economic distance from Indonesia to country  $i$  (distance in mile times world oil price), and
5. Dummy of the global economic crisis (1 for year 2009, an 0 for others).

The equation 1 was estimated using both the Fixed-effects model (LSDV) and the Random-effects model. To find the most robust model, the Hausman test was conducted (Hsiao, 2004; Verbeek, 2007). To capture the effect of the global economic crisis, the panel data model employed the two-way error components.

## RESULTS AND DISCUSSION

### **Indonesian Agribusiness Exports Before and After the Global Economic Crisis**

Based on the data from the Ministry of Trade and Central Statistical Agency, the development of Indonesian agribusiness exports from 2005 up to 2009 are presented in Appendix 1. Agribusiness products contributed about 28.6% of non-oil and gas export values in 2009. Vegetable oil and fat was the main contributor. Its share was 12.5% of the total values. Vegetable oil export mainly comes from crude palm oil (CPO). Some other estate crops such as rubber and its fractions, cocoa, coffee, tea and pepper contributed 7.8 % of total values. These commodities then are analyzed by using the panel data model, which are presented in the next section.

Table 1 shows the development of export value of Indonesian agribusiness from 2005 up to 2010. Overall the average growth of export value of agribusiness products was 20.68% annually. The decrease in export value in 2009 caused the growth of export value to become minus 10.61% from 2008 to 2009. Furthermore the data in Table 1 show that export value of agribusiness products increased at a rate of 20.13% from January up to February 2010 compared to January up to February 2009. The comparison among commodities shows that Vegetable and animal oil and fat experienced the highest growth for the period of 2005 up to 2009 (47.96%), followed by Food waste products, milk, margarine and eggs and other food processing products. A significant increase also was experienced by Vegetable and animal oil from January up to February 2010 compared to January to February 2009. Based on these figures, it can be concluded that the global economic crisis had a significant effect on Indonesian agribusiness exports. The export values of agribusiness products decreased from 2008 to 2009 and then increased from 2009 to 2010 significantly.

### **Effects of the Global Economic Crisis on Export of Main Agricultural Products**

The further analysis focuses on exports of some estate crops. There are three estate crops that are categorized as the main Indonesian agricultural products. They are crude palm oil (CPO) which represents the export of vegetable oil; rubber and its fractions (rubber) and coffee. In this study, 15 main destination countries are selected for each commodity. Some OECD countries such as US and Western Europe are always included as the main destinations for each commodity observed.

Table 2 below shows the development of export volume and price of CPO from 2005 up to 2009 in 15 destination countries including India as the main destination and the US as the trigger of the global economic crisis. The volume of exports of CPO increased from 2005 to 2008 in all destinations (13.4% in 15 countries and 81.9% in the US market). From 2008 to 2009, the volume of exports of CPO in 15 countries grew at a higher rate of 21.4% and a still 32.5% in the US market. However, the price of CPO decreased from 2008 to 2009 in all destinations. The price fell from 0.59 US \$ per kg in 2008 to 0.43 US \$ per kg in 2009. The drop in CPO price led to a decrease in export value of minus 11.2%.

**TABLE 2. GROWTH OF EXPORT VALUE OF INDONESIAN AGRIBUSINESS PRODUCTS, 2005-2010**

HS	Commodity	2006-05	2007-06	2008-07	Average 2000-05	2009-08	2010-09 <sup>a</sup>
15	Vegetable and animal oil and fat	22.61	68.48	52.78	47.96	-21.79	32.46
40	Rubber and its fractions	55.23	13.07	22.22	30.18	-35.67	10.19
44	Wood and its fractions	7.85	-6.78	-7.94	-2.29	-18.70	50.21
3	Fish and shrimp	7.91	4.88	14.12	8.97	-13.06	1.51
18	Cocoa	27.99	8.09	37.30	24.46	11.39	3.41
9	Coffee, tea and pepper	16.98	12.63	40.09	23.23	-13.74	-11.97
47	Pulp	20.57	-5.18	33.44	16.28	-39.04	14.89
24	Tobacco	4.97	24.99	19.80	16.59	17.06	30.04
16	Meat and its fractions	13.73	19.96	33.17	22.29	6.67	1.19
52	Cotton	3.03	-10.44	-5.31	-4.24	-20.45	29.67
19	Powder and its fractions	5.90	13.20	27.85	15.65	6.52	48.65
8	Fruits	9.56	23.96	7.93	13.82	-13.54	5.56
23	Food waste products	15.78	90.15	34.01	46.64	-42.88	12.61
21	Other food processing products	24.23	40.86	39.97	35.02	6.76	43.69
31	Fertilizer	13.64	12.46	-25.81	0.10	36.94	53.12
4	Milk, margarine and eggs	-4.50	13.27	111.57	40.11	-28.20	-3.12
	Average	<b>16.17</b>	<b>20.19</b>	<b>25.67</b>	<b>20.68</b>	<b>-10.61</b>	<b>20.13</b>

Note: a. Data on January-February 2010 and 2009

Source: Ministry of Trade and Central Statistical Agency (2010)

The trend of export volume and price of rubber from 2005 up to 2009 in 15 destination countries are presented in Table 3. In this case, US is the main destination of Indonesian rubber, followed by Japan. The volume of exports of rubber grew by

5.41% from 2005 to 2008 in all destinations, but at minus 2% in the US market. From 2008 to 2009, both volume and price of export of rubber in 15 countries decreased. The drop in both volume and price of rubber led to a significant decrease in export value of minus 11.2%.

**TABLE 3. TREND OF EXPORT VOLUME AND PRICE OF INDONESIAN CPO, 2005-2009**

Year	Weight (Ton)	Price (US \$/Kg)	Value (US \$)
2005	8,714,615.2	0.30	2,618,303,088.3
2006	9,744,791.0	0.31	3,055,144,123.3
2007	9,838,661.5	0.50	4,878,718,116.3
2008	12,537,379.3	0.59	7,434,458,193.8
2009	15,221,215.8	0.43	6,600,788,532.4
<b>Growth</b>			
<b>15 countries</b>			
2005-2008	13.4	27.4	42.9
2008-2009	21.4	-26.9	-11.2
<b>India</b>			
2005-2008	25.0	26.3	60.3
2008-2009	14.8	-27.6	-16.9
<b>US</b>			
2005-2008	81.9	30.5	116.4
2008-2009	32.5	-28.9	-5.7

Note: The rests of destination are: China, Netherland, Pakistan, Malaysia, Singapore, Bangladesh, Germany, Ukraine, Egypt, Italy, Spain and South Africa

Source: Ministry of Trade and Central Statistical Agency (2010)

**TABLE 4. TREND OF EXPORT VOLUME AND PRICE OF INDONESIAN RUBBER, 2005-2009**

Year	Weight (Ton)	Price (US \$/Kg)	Value (US \$)
2005	1,738,270.5	1.09	1,887,762,721.5
2006	1,933,162.6	1.56	3,013,733,618.0
2007	2,099,535.9	1.62	3,396,639,075.2
2008	2,024,328.0	2.03	4,116,875,511.4
2009	1,724,476.8	1.27	2,189,476,662.5
<b>Growth</b>			
<b>15 countries</b>			
2005-2008	5.4	24.3	31.2
2008-2009	-14.8	-37.6	-46.8
<b>US</b>			
2005-2008	-2.0	24.2	20.4
2008-2009	-36.8	-37.1	-60.2
<b>Japan</b>			
2005-2008	16.4	27.9	50.5

2008-2009	-31.9	-35.9	-56.3
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Note: The rests of destination are: China, Singapore, Korea, Canada, Germany, Brazil, French, Spain, Netherland, Italy, India, Turkey and South Africa

Source: Ministry of Trade and Central Statistical Agency (2010)

Table 4 shows the development of export volume and price of coffee from 2005 up to 2009 in 15 destination countries. US is the main destination, followed by Germany. Overall the volume of export of CPO increased from 2005 to 2008 in all destinations at the rate of 7.18% and at the rate of 1.11% from 2008 to 2009. The price and value of coffee exports experienced the same trend with CPO. The coffee price decreased from 2008 to 2009 which led to a significant decrease in export value. In the US market, the trend of export volume of coffee from 2005 to 2008 was reduced, because there was a huge drop of export volume from 2006 to 2007. From the figures in Tables 2, 3 and 4, it can be concluded that there were significant decreases in the values of the main Indonesian agricultural exports (CPO, rubber and coffee) from 2008 to 2009. This drop was mainly caused by a decrease in export prices rather than export volumes. As mentioned in the previous section, the global economic crisis led to a lower demand for agricultural products which decreased the world commodity prices.

**TABLE 5. TREND OF EXPORT VOLUME AND PRICE OF INDONESIAN COFFEE, 2005-2009**

Year	Weight (Ton)	Price (US \$/Kg)	Value (US \$)
2005	366,520.8	0.94	344730431.8
2006	345,880.5	1.11	384638732.6
2007	268,016.6	1.43	384008500.2
2008	401,185.9	1.54	619553759.5
2009	405,654.5	1.16	469436244.2
<b>Growth</b>			
<b>15 Countries</b>			
2005-2008	7.18	18.29	24.25
2008-2009	1.11	-25.06	-24.23
<b>US</b>			
2005-2008	-7.4	14.6	4.7
2008-2009	9.0	-15.7	-8.1
<b>Germany</b>			
2005-2008	18.7	23.0	38.7
2008-2009	-12.0	-29.0	-37.5

Note: The rests of destination are: Japan, Italy, Algeria, UK, Belgium, India, Egypt, Malaysia, Philippines, Georgia, Rumania, Australia

Source: Ministry of Trade and Central Statistical Agency (2010)

### **Determinants of Indonesian Agribusiness Exports and Effects of Global Economic Crisis**

The results of estimation of the panel data model for each of the commodities are presented in Table 5. The diagnostic test indicated that the Random-effects model was the most robust one for all commodities observed. For the CPO model, the global economic crisis reduced the exports of Indonesian CPO statistically. This is indicated by the minus coefficient of crisis dummy with p-value less than 0.05. The effect of global economic crisis was also negative on the exports of Indonesian rubber and coffee. The coefficients of that effect have p-value of 0.085 and 0.111 for rubber and coffee.

The estimation of panel data indicated that the main determinant of export values of CPO, rubber and coffee is price. For CPO and rubber, a 1% decrease in export price will reduce export values of 1.50% and 1.56%. This means that export value is elastic to changes in export price. As mentioned in the previous section, the global economic crisis lowered the commodity prices. Thus even though the export volumes increased from 2008 to 2009, the lower prices decreased the export value of CPO, rubber and coffee.

The gravity model used in this study included the distance between the exporter and destination countries. The panel data model showed that economic distance affected the export value significantly. An increase of 1% in transportation cost reduced the export value of CPO (0.03%) and the export value of rubber (0.73%). The effect of transportation cost on CPO was relatively small because of very high demand for Indonesian CPO. Based on UN-Comtrade data, in 2009 Indonesia was the largest exporter of CPO in the world. The effect of the real exchange rate on export value was positive. However, the coefficient of the real exchange rate effect is statistically significant only in the coffee model. This may be related to high competition in the world coffee market. For the other two commodities, CPO and rubber, Indonesia still dominated the world exports. An increase of 1% in the real exchange rate of a destination country would increase by 0.18% the export values of coffee, because of the demand for coffee in that country.

### **TABLE 6. RESULTS OF ESTIMATION OF PANEL DATA MODEL**

Variable	CPO	Rubber	Coffee
Price	1.4950 <sup>a</sup> (.0.000) <sup>b</sup>	1.5607 (.0.000)	.7581 (.0.000)
GDP	-.0311 (.0.872)	.6726 (.0.000)	.2846 (.0.001)
Er	.0610 (.0.630)	.0281 (.0.749)	.1835 (.0.014)
Distance	-.0285 (.0.006)	-.7342 (.0.009)	.4907 (.0.006)
Crisis	-.3222 (.0.018)	-.1268 (.0.111)	-.1354 (.0.085)
R-sq:			
within	0.6194	0.6194	0.6194
between	0.7898	0.7898	0.7898
overall	0.7748	0.7748	0.7748
Wald chi2 (5)	134.91	97.19	129.36
Prob > chi2	0.0000	0.0000	0.0000

Note: a. Estimated parameter

b. *P-value*

### CONCLUSIONS

The global economic crisis had a significant effect on Indonesian agribusiness exports. This was indicated by a significant decrease in export values of agribusiness products from 2008 to 2009 and a significant increase from 2009 to 2010. The change in export values related to a fluctuation in export prices in 2009 and 2010. The effect of global economic crisis on Indonesian exports of CPO, rubber and coffee was negative and statistically significant. The panel data model found that the main determinant of Indonesian exports of CPO, rubber and coffee was export price. The coefficient of economic distance was negative and statistically significant in CPO and rubber models.

**REFERENCES**

- Anderson, J. E., E. V. Wincoop, 2004, Trade Costs, *Journal of Economic Literature*, Vol. XLII, No. 3, pp. 691-751.
- Central Statistical Agency. 2005-2010. *Export Import Data*. Jakarta.
- De, P., 2009, *Global Economic and Financial Crisis*, RTNeT Working Paper Series No.6.
- Hsiao, C., 2004, *Analysis of Panel Data*, Cambridge University Press, UK.
- Linnemann, H, 1966, *An Econometric Study of International Trade Flows*. Amsterdam: North, Holland.
- Massa, I., D. W. te Velde, 2008, *The Global Fincancial Crisis: Will Successful African Countries be Affected?* Background Note, December.
- UN-Comtrade. 2009. World Trade Data.
- Verbeek, M., 2007, *Modern Econometrics*, John Wiley and Sons Inc., US.
- Wiggins, S., S. Keats and M. Vigneri, 2009, Impact of the Gobar Financial and Economic Situation on Agricultural Markets and Food Security, *Overseas Development Institute Working Papers* No. 314, February.

**Appendix 1. Export of Indonesian Agribusiness Products, 2005-2009 (US \$ Million)**

HS	Commodity	Share (%) <sup>a</sup>	2005	2006	2007	2008	2009
15	Vegetable oil and fat	12.53	4,950.6	6,069.9	10,226.8	15,624.0	12,219.5
40	Rubber and its fractions	5.04	3,560.0	5,526.2	6,248.7	7,637.3	4,912.8
44	Wood and its fractions	2.40	3,111.3	3,355.6	3,128.2	2,879.8	2,341.2
3	Fish and shrimp	1.75	1,522.5	1,642.9	1,723.0	1,966.3	1,709.5
18	Cocoa	1.45	668.0	855.0	924.2	1,268.9	1,413.4
9	Coffee, tea and pepper	1.29	787.0	920.6	1,036.9	1,452.6	1,253.0
47	Pulp	0.89	934.2	1,126.4	1,068.1	1,425.3	868.8
24	Tobacco	0.61	323.7	339.8	424.7	508.8	595.6
16	Meat and its fractions	0.55	278.9	317.2	380.5	506.7	540.5
52	Cotton	0.54	755.0	777.9	696.7	659.7	524.8
19	Powder and its fractions	0.32	188.1	199.2	225.5	288.3	307.1
8	Fruits	0.27	206.1	225.8	279.9	302.1	261.2
23	Food waste products	0.25	146.4	169.5	322.3	431.9	246.7
21	Other food processing products	0.24	91.2	113.3	159.6	223.4	238.5
31	Fertilizer	0.23	171.6	195.0	219.3	162.7	222.8
4	Milk, margarine and eggs	0.22	133.4	127.4	144.3	305.3	219.2
<b>Total Agribusiness Products</b>		28.6	17,828.0	21,961.7	27,208.7	35,643.1	27,874.6
<b>Total Non Agribusiness Products</b>		71.4	48,600.4	57,627.4	64,803.6	72,251.1	69,617.1

Note: a. Share on total Indonesian non-oil and gas exports at 2009

Source: Ministry of Trade and Central Statistical Agency