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The Impact of Exchange Rate Movements on Industries Trade between Indonesia and China

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Abstract:

This paper empirically examines the impact of exchange rate movements on bilateral trade between Indonesia and China. The study applies Autoregressive Distributed Lag (ARDL) approach to investigate the short- and long-run effects of exchange rate on disaggregated 22 export and import industries using quarterly data from 1998 to 2014. The result indicates that importing industries from Indonesia are highly affected by real exchange rate movement in short- and long run, while exchange rate volatility and China's income play a little impact on importing industries. On the other hand, real exchange rate plays a little role in determining export in both short- and long run for exporting industries to Indonesia, while it is very sensitive to income volatility in both short- and long-run. This paper uses disaggregate trade data at commodity/ industry level on bilateral basis to get more accurate results about the economic relation between the two countries.

Keywords: Exchange Rates, Bilateral Trade, ADRL Model, China, Indonesia.

JEL Classification*:* F14

Paper Classification: Research Paper

Introduction

The emergence of globalization in the world has created changes in many countries' concept, especially the economic ones. Indeed, trade has taken another trend as each country has become open to other countries as commodities and capital flow across borders easily; i.e., the world has become a small country. Hence, exchange rates play a significant role in a country's level of trade, which is critical to almost every free market economy in the world.

Literature Review

Three categories were used to classify the existing literature reviews that study the impact of exchange rates on trade (Baek, 2012). Firstly, papers that used aggregate trade data which assess the effectiveness of currency devaluation through focusing on the use of aggregate export and import data between a country and the rest of the world (e.g., China and the rest of the world)

(Mahdavi & Sohrabian, 1993, Felmingham, 1988 & Bahmani-Oskooee, 1986. Secondly, papers that studied disaggregate trade data at bilateral level Wilson, 2001; Arora, Bahmani-Oskooee & Goswami, 2003; and Bahmani-Oskooee & Ratha, 2004). These papers concentrated on the bilateral trade data between a country and its major trading partners.

Both types were subject to bias. The first suffers from aggregate bias data, whereas the second might have insignificant exchange rate effects with some commodities /industries in a country. This could be more than offset by significant exchange rate effects with others, thus causing a significant exchange rate impact and vice versa. Furthermore, both categories depend mostly on a standard trade balance model. The definition of trade balance, according to that model is the difference between the value of imports and the value of exports and is specified as a function of exchange rate and other determinants (i.e., income).

As the second category failed to detect which sector (import vs. export) is responsible for the lack of any significant exchange rate impacts on the trade balance, Bahmani-Oskooee & Ardalani (2006) solve the problem by using disaggregate trade data at commodity/ industry level on bilateral basis. Simultaneously, in order to evaluate the link between exchange rates and the trade balance accurately, they treated exports and imports separately.

Since 1998, an intensive bilateral relation between China and Indonesia progressed gradually. In fact, the size of trade between Indonesia and China has increased enormously since the implementation of ASEAN–China Free Trade Agreement (ACFTA) in 2010. China has become Indonesia's second main export partner, while it is Indonesia's first main import partner. Both of these two countries have the advantage of having a large population and are rich in resources. China has a huge market, the upper hand in manufacturing and human resources, whereas Indonesia has agriculture, raw materials and services (Wu, 2011).

In the period before both countries signed on the agreement to establish a strategic partnership in 2005, most of the studies were directed to analyze the economic relationship between China and ASEAN countries Cheng & Chia, 1989; Atje & Gaduh, 1999; Soesastro, 2003; Sukma, 2003). Recently, scholars seem to be attracted to study the economic relation between Indonesia and China, in particular Grisvia, Candra, Ghozali & Putu, 2014; Booth 2011, Bruce & Wayne, 2006 as well as Wu, 2011), in which most of these studies used the first and second type of literature reviews.

Therefore, to overcome the aforementioned problems attached with these two types, this paper uses the methodology used in the third type to get more accurate results about the economic relation between the two countries. In other words, this paper aims to study the impact of the exchange rate on export and import at commodity/ industry level on a bilateral basis.

The rest of the paper is organized as follows. The next section is the methodology used in this paper followed by the data description and empirical results. The final section is the conclusion.

Methodology

Standard export and import functions employed in the literature (Houthakker & Magee, 1969; Wilson & Takacs, 1979; Goldstein & Khan 1986; Bahmani-Oskooee & Hegerty 2011; Bahmani-Oskooee, Hegerty & Xu 2013) have assumed that imports (IMP) and exports (EXP) are a function of the following variables; real exchange rate (RER), exchange rate volatility (VOL) and real gross domestic products (GDP).

$$IMP = f(RER,VOL,GDP) \quad (1)$$

$$EXP = f(RER,VOL,GDP) \quad (2)$$

This paper follows Pesaran & Shin (1999) as well as Pesaran, Shin & Smith (2001), and expresses the equation in an Autoregressive Distributive Lag (ARDL). ARDL has many advantages over other models such as error correction model (ECM) and vector error correction model (VECM). Among these advantages is that it examines the existence of relationship between variables where applicable regardless for the level of integration; whether it is I (0) and I (1). Furthermore, it is very simple to implement and interpret this model as it has only a single-equation set-up. Moreover, different lag-lengths can be assigned for different variables as they enter the model.

Following Pesaran *et al*(2001), the study used equation of Error Correction Model (ECM) to test the relationship between variables for the export and import model as follows:

$$\Delta lnEXP_t = \alpha + \sum_{i=0}^{q} \beta_i \Delta lnRER_{t-i} + \sum_{i=0}^{q} \delta_i \Delta lnVOL_{t-i} + \sum_{i=0}^{q} \lambda_i \Delta LnGDP_{t-1} + \sum_{i=1}^{q} \varphi_i \Delta lnEXP_{t-1} + \phi_1 lnRER_{t-1} + \phi_2 lnVOL_{t-1} + \phi_3 lnGDP_{t-1} + \phi_4 lnEXP_{t-1} + \varepsilon_t \quad (3)$$

$$\Delta lnIMP_t = \theta + \sum_{i=0}^{q} \partial_i \Delta lnRER_{t-i} + \sum_{i=0}^{q} \gamma_i \Delta lnVOL_{t-i} + \sum_{i=0}^{q} \rho_i \Delta LnGDP_{t-1} + \sum_{i=1}^{q} \vartheta_i \Delta lnIMP_{t-i} + \tau_1 lnRER_{t-1} + \tau_2 lnVOL_{t-1} + \tau_3 lnGDP_{t-1} + \tau_4 lnIMP_{t-1} + \epsilon_t \quad (4)$$

Where Δ denotes the difference operator, q is the lag order, is the long run coefficient, and the coefficient with summation sign ($\sum$) represents short run coefficient.

Two steps were used in the estimation utilized a parsimonious ECM. The first step was applied, following Akinboade, Ziramba & Kumo (2008), by introducing a lag length of three for the differenced variables. At that point, variables which were non-significant were dropped following Hendry, Moore, Morris, Reinganum & Scotti (1984). The second step includes the identification of the presence of a co-integrating relationship by applying bounds-testing. To do that, a joint significance test of lagged regressors, the F-statistic was used as follows:

$$\phi_1 lnRER_{t-1} + \phi_2 lnVOL_{t-1} + \phi_3 lnGDP_{t-1} + \phi_4 lnEXP_{t-1} = 0$$

Under the bounds test methodology, the null hypothesis of non-co-integration is examined through a joint significance test of the lagged variables: $\log P_{t-1}, \log Y_{t-1}, \tau_3 \log REER_{t-1}$, based on the Wald or F-statistics and is represented as follows:

$$H_1: \phi_1 = \phi_2 = \phi_3 = \phi_4 = 0$$

$$H_1: \phi_1 \neq \phi_2 \neq \phi_3 \neq \phi_4 \neq 0$$

Due to the large sample, the present study uses two set of Pesaran & Shin (1999) for the critical F-values which is represented by upper and lower bound. A conclusive decision can be made regarding the co-integration of the regressors should the computed F-statistic for a chosen level of significance lies outside the critical bounds. The null hypothesis of no co-integration can be rejected only when statistic is higher than the upper bound. Then, the short-run and long-run elasticities may be determined by estimating ARDL ECM.

Data Sources

This study uses a quarterly data from 1998 to 2014. Firstly, data of exports and imports for each industry between China and Indonesia was obtained entirely from China Economic Statistics Database (中经网统计数据库). Secondly, data of real GDP, real exchange rate are derived from EPS global statistics/ analysis platform (EPS全球统计数据/分析平台). Thirdly, the exchange rate volatility was estimated using GARCH model.

Empirical Results

The first step in estimating the ARDL model, which is defined by equations (3 & 4), is to determine the optimum lag length. Bahmani-Oskooee & Kara (2005) mentioned that there is no unique criterion to select the number of lags; therefore, different criteria may suggest a different number of lags. ARDL length was chosen based on the AIC criteria with a maximum of four lags. Although, the significance of the variables was considered, the study performed other diagnostic tests such as serial correlation, heteroscedasticity, normality and structural stability.

According to Lagrange Multiplier (LM) test, there is no serial correlation among the residuals in all cases of our error correction models. Whereas, residual correlation is distributed as and critical value is 3.84 at 5% level, null hypothesis cannot be rejected. Next, Ramsey RESET test was applied to check the model misspecification. The RESET value is less than the critical value of 3.84 at 5% level, which gives no evidence to reject the null hypothesis of no misspecification.

ARDL bounds test is used to check the long run co-integration relationship among variables in equation (3 & 4). Given the calculated F-Statistic and comparing them with upper bound critical value, a long run co-integration exists in 19 industries in export equation and 17 industries in import equation.

Bahmani-Oskooee & Ardalani (2006) pointed out that ARDL bounds test is very sensitive to lag structure for first differenced variables. Therefore, the study follows Bahmani-Oskooee & Tanku (2008) to apply error correction term (EC_{t-1}), which is auxiliary test to examine the co-integration between variables. Table 1 show the results of error correction estimates of both export and import model. The coefficient of error correction term is negative and significant at 5% in all export industries. Similarly, the coefficient of error correction term is negative and significant at 5% in all import industries except in industry 5 and 9. These findings indicate that there is a co-integration between variables in export and import equations.

Table 1: Diagnostic Statistics Associated With Export and Import Models

Product	Export						Import					
	Share (%)	F-value	ECM	t-value	LM	RESET	Share (%)	F-value	ECM	t-value	LM	RESET
01 Live animals & products	0.34%	3.14	-0.27	-3.35	2.66	1.53	1.00%	4.66	-0.36	-3.53	1.48	2.76
02 Vegetable products	2.20%	5.84	-0.59	-4.88	0.36	0.36	1.54%	5.61	-0.50	-4.53	1.43	0.70
03 Fats and oils	0.03%	11.76	-0.89	-6.91	2.95	0.23	12.15%	5.27	-0.40	-4.38	1.03	0.76
04 Prepared foods, etc.	2.70%	15.33	-0.98	-8.22	2.12	0.15	1.56%	3.64	-0.28	-3.11	0.95	0.15
05 Minerals	5.99%	7.01	-0.50	-4.92	2.18	0.29	38.53%	2.27	-0.11	-1.22	0.84	1.06
06 Chemicals and products	9.18%	2.81	-0.26	-3.33	2.81	2.96	12.45%	3.94	-0.14	-2.14	2.05	0.00
07 Plastics and rubber	4.28%	7.71	-0.47	-4.98	2.55	2.74	5.21%	4.39	-0.32	-3.10	0.94	0.68
08 Hides and skins	0.80%	2.12	-0.24	-2.98	2.77	0.71	0.24%	8.90	-0.72	-6.27	0.89	0.46
09 Wood and articles	0.42%	3.20	-0.19	-2.81	1.89	2.83	5.68%	2.70	0.00	-0.24	1.77	0.41
10 Pulp, paper, etc.	0.85%	8.31	-0.22	-3.15	2.58	2.49	5.60%	8.35	-0.52	-4.82	1.58	2.08
11 Textile and articles	12.52%	7.84	-0.23	-2.67	2.21	2.55	3.08%	4.72	-0.26	-3.65	1.25	0.47
12 Footwear, headgear	2.01%	19.90	-1.12	-8.77	2.71	1.06	1.37%	10.79	-0.61	-5.61	1.26	0.27
13 Articles of stone	3.20%	5.77	-0.24	-3.88	2.04	0.62	0.09%	3.97	-0.23	-2.69	1.10	2.57
14 Precious stones, etc.	0.04%	3.41	-0.49	-4.39	2.00	2.96	0.01%	7.63	-0.66	-5.36	0.96	2.49
15 Base metals and products	12.36%	4.32	-0.18	-2.92	1.53	1.74	2.41%	2.30	-0.20	-2.08	2.31	0.38
16 Machinery	31.87%	9.44	-0.29	-3.48	1.53	2.48	6.73%	5.07	-0.20	-3.23	0.93	3.30
17 Transport equipment	3.36%	10.06	-0.68	-5.82	1.70	1.08	1.14%	6.83	-0.55	-5.00	2.45	2.29
18 Precision equipment	2.64%	5.16	-0.30	-3.56	1.60	2.43	0.74%	3.23	-0.14	-2.43	0.86	0.04
19 Arms and munitions	0.00%	5.45	-0.85	-4.45	1.92	2.80	0.00%					
20 Misc. manufactures	5.16%	11.04	-0.63	-6.48	1.71	0.08	0.48%	4.16	-0.25	-3.40	1.55	2.33
21 Works of art, etc.	0.03%	11.51	-1.32	-6.51	1.65	2.38	0.00%	10.40	-0.92	-6.92	0.83	3.38
22 Unclassified products	0.00%	10.05	-0.77	-6.47	1.53	0.16	0.00%					

Notes: (a) The asymptotic upper bound critical value for F-statistics at 10% level of significance is 3.77 [Pesaran et al. (2001, Table CI(iii), p. 300)].
(b) The Lagrange Multiplier (LM) of residual correlation is distributed as X^2 with one degree of freedom. At 5% level of significance, its critical value is 3.84.
(c) Ramsey RESET test for functional misspecification is also distributed as X^2 with one degree of freedom. At 5% level of significance, its critical value is 3.84.

Results of Long Term Analysis

The results of long run coefficient of both exports and imports equation are reported in Table 2. The long run coefficients are the steady state which can be extracted by driving all changes in short run to zero. For import model, the real exchange rate is statistically positive and significant at the 10% level in 19 out of 20 industries. Therefore, real exchange rate has a significant impact on China's imports from Indonesia in the long run, which means that the appreciation of Chinese Yuan against Indonesian Rupiah has a positive impact on China's imports from Indonesia. For export model, the real exchange rate is significant in 13 out of 20 industries and it has mixed sign but most are negative (8 out of 13). It is important to notice that the exports of top four largest China's industries (16, 11, 15, 6), which share 66.1% of total exports to Indonesia, has insignificant relationship with real exchange rate. This suggests that real exchange rate play a little role in determining China's exports to Indonesia in the long run.

The exchange rate volatility found to be statistically significant at 10% in 14 out of 22 export industries from China to Indonesia. Moreover, the major four export industries from China to Indonesia (16, 11, 15, 6, and 5) carry negative and significant coefficient, which indicates that the export of major Chinese industries are sensitive to exchange rate volatility in the long run. Turn to the import model, volatility of exchange rate is significant in 7 out of 20 industries. Looking at the major import industries (5, 6, 3, and 16), volatility coefficient is significant in only one industry (3). This suggests that volatility of exchange has a little impact on importing industries.

China's exports to Indonesia are positively affected by Indonesia's income and it is statistically significant at 10% level in 16 out of 22 industries, while it is negative and significant in two industries. However, in the import model, China's income is found to be statistically insignificant at 10% in 13 out 20 industries. This suggests that China's income does not significantly increase demand for Indonesian products.

Table 2: Long-Run Coefficient of Export and Import Models

Product	Exports						Imports					
	ln RER		lnVOL		lnGDP		ln RER		lnVOL		lnGDP	
01 Live animals & products	2.68	(1.82)**	-0.93	(-2.28)*	-0.66	(-0.40)	1.43	(4.94)*	-0.29	(-1.23)	-0.13	(-1.91)**
02 Vegetable products	-1.02	(-2.46)*	-0.13	(-1.09)	3.43	(7.39)*	1.45	(6.39)*	-0.01	(-0.07)	-0.02	(-0.35)
03 Fats and oils	-1.80	(-2.03)*	0.62	(3.09)*	7.42	(5.13)*	2.26	(8.03)*	-0.41	(-1.79)**	0.10	(1.54)
04 Prepared foods, etc.	-0.86	(-2.04)*	0.264	(2.98)*	4.089	(6.09)*	1.62	(4.03)*	-0.69	(-1.49)	-0.11	(-1.22)
05 Minerals	2.29	(1.95)*	-0.78	(-3.08)*	-0.86	(-0.46)	2.72	(5.55)*	-1.05	(-1.26)	0.12	(0.53)
06 Chemicals and products	0.64	(1.59)	-0.19	(-1.74)**	1.727	(3.86)*	0.93	(2.14)*	-0.19	(-0.45)	-0.16	(-1.30)
07 Plastics and rubber	-1.21	(-2.26)*	-0.14	(-1.22)	5.926	(6.96)*	1.98	(12.59)*	-0.20	(-0.92)	0.11	(1.74)**
08 Hides and skins	-2.71	(-1.19)	-0.01	(-0.02)	7.77	(2.21)*	1.36	(11.84)*	0.08	(0.72)	0.16	(5.96)*
09 Wood and articles	3.25	(1.91)*	-1.14	(-2.26)*	-1.21	(-0.64)	17.37	(0.26)	-9.87	(-0.22)	-6.77	(-0.24)
10 Pulp, paper, etc.	1.70	(1.72)**	-0.54	(-2.16)*	0.347	(0.32)	0.18	(1.91)**	-0.24	(-2.68)*	0.00	(-0.04)
11 Textile and articles	0.75	(0.81)	-0.44	(-1.97)**	1.817	(1.72)*	0.70	(5.08)*	-0.53	(-3.77)*	-0.13	(-3.75)*
12 Footwear, headgear	-0.32	(-1.21)	-0.01	(-0.23)	4.366	(10.12)*	-1.56	(-2.43)*	0.27	(2.04)*	0.06	(0.03)*
13 Articles of stone	-2.45	(-1.89)**	-0.03	(-0.13)	7.306	(3.78)*	3.62	(2.25)*	-1.12	(-2.87)*	-0.05	(-0.76)
14 Precious stones, etc.	6.34	(4.98)*	-0.88	(-2.56)*	-5.38	(-3.83)*	1.57	(4.29)*	-0.81	(-1.53)	-0.10	(-0.73)
15 Base metals and products	0.16	(0.13)	-0.84	(-2.77)*	2.665	(1.82)**	1.99	(8.70)*	-0.45	(-1.43)	0.11	(0.197)
16 Machinery	0.44	(0.60)	-0.36	(-2.55)*	2.196	(2.58)*	0.65	(1.73)**	-0.04	(-0.13)	0.15	(2.49)*
17 Transport equipment	-0.02	(-0.03)	-0.26	(-1.75)**	3.011	(2.80)*	3.57	(5.62)*	-1.25	(-2.14)*	0.24	(1.62)
18 Precision equipment	-1.28	(-1.07)	0.076	(0.32)	6.294	(3.44)*	2.05	(5.14)*	-0.87	(-1.53)	0.05	(0.33)
19 Arms and munitions	-4.64	(-2.18)*	1.08	(1.71)**	4.798	(2.00)**						
20 Misc. manufactures	-1.24	(-2.52)*	-0.02	(-0.20)	6.337	(8.02)*	2.12	(9.51)*	-0.94	(-3.05)*	-0.09	(-1.04)
21 Works of art, etc.	-0.97	(-0.75)	-0.81	(-2.81)*	10.23	(4.87)*	3.70	(8.35)*	0.01	(0.02)	0.37	(3.67)*
22 Unclassified products	20.57	(3.49)*	-3.44	(-2.85)*	-29.8	(-3.14)*						

Note: * and ** denote significance at the 5% and 10% levels, respectively. Parentheses are t-statistics.

Results of Short-Run Analysis

The result of short-run coefficient estimates for both export and import model are shown in Table 3. The result of China's export to Indonesia, the real exchange rate coefficients are insignificant at 10% in 9 industries out of 22. This indicates that short run exchange rate fluctuation affects 59% of China's export industries to Indonesia. Turning to import model, the real exchange rate coefficients are significant in all industries which suggest that real exchange rate plays an important role in determining China's imports from Indonesia in the short run.

Table 3: Short-Run Coefficient of Export and Import Model

Product		Exports				Imports			
		0		1		0		1	
01 Live animals & products	RER	0.12	(0.59)			0.52	(2.86)*		
	VAR	-0.57	(-0.65)			-0.11	(-1.19)		
	GDP	-0.18	(-0.40)			-0.05	(-1.91)**		
02 Vegetable products	RER	-1.60	(-3.47)*	0.91	(2.20)*	0.73	(3.86)*		
	VAR	-0.08	(-1.09)			-0.01	(-0.07)		
	GDP	2.02	(3.86)*			-0.01	(-0.35)		
03 Fats and oils	RER	-1.61	(-1.92)**			0.91	(3.61)*		
	VAR	0.55	(2.86)*			-0.17	(-1.63)		
	GDP	16.60	(1.79)**	12.97	(2.18)*	-0.07	(-1.26)		
04 Prepared foods, etc.	RER	-2.43	(-4.49)*			-0.51	(-0.79)	1.17	(2.23)*
	VAR	0.26	(3.02)*			0.18	(1.14)		
	GDP	4.00	(4.84)*			-0.03	(-1.16)		
05 Minerals	RER	2.86	(2.79)*			-0.09	(-0.19)	-0.86	(-2.05)*
	VAR	-0.39	(-2.58)*			-0.11	(-1.30)		
	GDP	0.97	(0.15)	16.55	(3.69)*	0.08	(1.74)**	-0.05	(-1.20)
06 Chemicals and products	RER	-0.48	(-2.05)*			-1.00	(-3.03)*	-0.43	(-1.65)
	VAR	-0.05	(-1.47)			0.20	(2.34)*		
	GDP	3.81	(2.66)*			0.02	(0.83)		
07 Plastics and rubber	RER	-1.22	(-2.95)*	0.62	(2.39)*	0.63	(2.93)*		
	VAR	0.07	(0.96)			-0.06	(-0.91)		
	GDP	6.85	(2.31)*	4.70	(2.38)*	0.03	(1.84)**		
08 Hides and skins	RER	-0.66	(-1.39)			-0.08	(-0.19)	-1.16	(-2.95)*
	VAR	0.00	(-0.02)			0.06	(0.73)		
	GDP	3.54	(0.67)	6.35	(1.88)**	0.00	(0.06)		
09 Wood and articles	RER	0.63	(1.55)			-0.87	(-2.97)*		
	VAR	-0.22	(-2.26)*			0.12	(1.66)	-0.16	(-2.89)*
	GDP	-0.23	(-0.61)			-0.03	(-2.97)*		
10 Pulp, paper, etc.	RER	-1.29	(-2.94)*			0.10	(1.71)**		
	VAR	0.21	(2.20)*			-0.13	(-3.03)*		
	GDP	0.08	(0.33)			0.00	(-0.04)		

(Continued...)

11 Textile and articles	RER	-1.02	(-2.46)*	-0.51	(-1.66)	0.18	(3.23)*		
	VAR	0.14	(1.54)			-0.06	(-1.61)		
	GDP	0.43	(2.12)*			-0.03	(-1.96)**	0.03	(2.04)*
12 Footwear, headgear	RER	0.71	(1.61)			-0.55	(-1.34)	1.08	(3.40)*
	VAR	-0.01	(-0.23)			0.16	(1.98)**		
	GDP	3.22	(0.93)	5.91	(2.61)*	0.04	(2.31)*		
13 Articles of stone	RER	-0.60	(-2.48)*			-0.33	(-0.68)	0.76	(2.08)*
	VAR	-0.01	(-0.13)			-0.17	(-1.72)**		
	GDP	1.78	(4.41)*			0.00	(0.06)		
14 Precious stones, etc.	RER	3.11	(3.49)*			1.03	(3.44)*		
	VAR	-0.43	(-2.25)*			-0.98	(-2.19)*	0.98	(2.24)*
	GDP	-2.64	(-3.04)*			-0.06	(-0.71)		
15 Base metals and products	RER	0.03	(0.13)			0.40	(1.99)**		
	VAR	-0.15	(-2.62)*			-0.09	(-1.19)		
	GDP	0.48	(2.37)*			0.02	(1.24)		
16 Machinery	RER	0.13	(0.52)			-0.68	(-2.18)*	-0.33	(-1.36)
	VAR	0.00	(-0.08)			0.17	(2.25)*		
	GDP	3.35	(1.30)	6.01	(3.14)*	0.03	(1.97)**		
17 Transport equipment	RER	-0.01	(-0.03)			1.95	(3.64)*		
	VAR	0.11	(0.89)			0.26	(0.68)		
	GDP	11.29	(2.13)*	7.03	(1.84)*	0.13	(1.51)		
18 Precision equipment	RER	-0.38	(-1.21)			-0.89	(-1.78)**		
	VAR	0.02	(0.32)			-0.12	(-1.21)		
	GDP	5.56	(1.45)	9.29	(3.84)*	0.01	(0.33)		
19 Arms and munitions	RER	-5.59	(-1.63)	5.93	(1.85)**				
	VAR	0.92	(1.60)						
	GDP	4.09	(1.86)**						
20 Misc. manufactures	RER	-0.79	(-2.48)*			0.53	(3.37)*		
	VAR	-0.01	(-0.20)			-0.23	(-2.53)*		
	GDP	4.02	(5.40)*			-0.02	(-0.98)		
21 Works of art, etc.	RER	1.63	(0.68)	2.27	(1.08)	3.39	(5.28)*		
	VAR	-1.26	(-2.44)*	0.68	(1.45)	0.01	(0.02)		
	GDP	13.51	(4.36)*			0.34	(3.23)*		
22 Unclassified products	RER	15.79	(3.36)*						
	VAR	-2.64	(-2.67)*						
	GDP	-22.85	(-3.09)*						

Note: * and ** denote significance at the 5% and 10% levels, respectively. Parentheses are t-statistics.

Indonesian income is the most important determinant of China's export to Indonesia, where Indonesian income coefficients are significant in 19 out of 22 industries. Moreover, Indonesian income coefficient carries positive sign except in Precious stones and unclassified products, indicating that a rise in Indonesian income leads to increase demand for Chinese products. It is important to notice that income coefficients in the import model are significant at 10% in 9 out of

22 industries, suggesting that changes in Indonesian income has greater impact on bilateral trade than changes in Chinese income. In both export and import models, exchange rate volatility was found to be insignificant at 10%. This indicates that exchange rate volatility has a little impact on bilateral trade between China and Indonesia.

Conclusion

This study aims at testing the effect of the exchange rate on trade flows (import and export) in the context of disaggregating 22 industry data of bilateral trade between Indonesia and China for the period from 1998 to 2014.

To explore the impact of exchange rate movements on the bilateral trade between Indonesia and China, both in the short and long run, the study uses Autoregressive Distributed Lag (ARDL) approach. In the short run, the findings suggest that exchange rate fluctuations affect 59% of China's export industries to Indonesia and they play a significant role in determining China's imports from Indonesia.

In long run, real exchange rate plays a little role in determining China's export to Indonesia as the export of top four largest China's industries have insignificant relationship with real exchange rate. For China's imports from Indonesia, the results suggest that real exchange rate has a significant impact in 19 out of 20 industries.

China's exports to Indonesia are positively affected by Indonesian income in 19 out of 22 industries in the short run and in 16 out of 22 industries in the long run. On the other hand, an increase in Chinese income will affect only 9 out of 22 industries, which indicates that changes in Indonesian income has greater impact on bilateral trade than changes in Chinese income in the short run. Similarly, in the long run Indonesian products are not affected by changes in China's income in 13 out 20 industries.

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