FOREIGN DIRECT INVESTMENT AND ONE DIGIT STANDARD INTERNATIONAL TRADE CLASSICIFICATION

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Abstract

The relationship between trade and Foreign Direct Investment (FDI) has been indicated as one of prominent development paths toward economic development. However, this relation is not straight-forward due to the complex multinational companies' investment motivation. This paper develops an exploratory research on the FDI-trade relation in one digit Standard International Trade Classification (SITC) for Indonesia with Japan and the United States of America during 1991-2003, using a Granger causality test. The result indicates strong FDI-trade relationship in natural resources and mining industry, showing thatresources endowment is an advantage for Indonesia. It also finds that resource-seeking FDI has predominantly happened during that period.

Keywords: Foreign direct investment, trade, one-digit SITC, granger causality
JEL classification numbers: F12, F14

Abstrak

Hubungan antara perdagangan dan *Foreign Direct Investment* (FDI) diindikasikan sebagai salah satu jalur utama dalam pembangunan ekonomi. Hubungan ini tidak sederhana mengingat kompleksnya motivasi *multinational companies*. Makalah ini membangun sebuah penelitian eksploratif atas hubungan antara perdagangan dengan FDI atas *Standard International Trade Classification* (SITC) satu-dijit untuk kasus Indonesia dengan Jepang dan Amerika Serikat, 1991-2003, menggunakan uji kausalitas Granger. Hasilnya menunjukkan hubungan yang kuat antara perdagangan dan FDI dalam hal sumber daya alam dan industri pertambangan. Hal ini menunjukkan bahwa kepemilikan sumber daya alam merupakan keuntungan bagi Indonesia. Penelitian ini juga menemukan bahwa FDI yang bermotifkan mencari sumber daya telah terjadi selama periode tersebut.

Keywords: Foreign direct investment, perdagangan, SITC satu-dijit, kausalitas granger
JEL classification numbers: F12, F14

INTRODUCTION

Economic liberalisation has been proven as a very effective state direction toward economic development. One of the prominent development paths in this regard is the existence of openness in trade and financial flows, which facilitates a positive impact of foreign direct investment (*FDI*) on trade and conversely trade on *FDI*. The benefit of trade-creating *FDI* and *FDI*-creating trade is very obvious in a sense of economic development such as technology advancement, capital accumulation and la-

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bour productivity enhancement. *FDI*-creating trade is able to provide required capital and improve added value of domestic production, while trade-creating *FDI* is beneficial in term of providing market to increase the production and domestic resources utilisation. In this sense, it is important to understand clearly the relationship between *FDI* and trade for specific purposes such as formulating trade and *FDI* policy and taking position on trade negotiation.

Indonesia as a developing economy has been promoting economic liberalisation for more than three decades. Trade openness as well as financial liberalisation has been growing from time to time. The reform in Indonesia that was starting right after the 1998 economic crisis and the fall of Suharto's regime has been indicating a cautious liberalisation especially in finance to build stronger financial foundations than ever before. It also aims at improving the trust of international investor on fundamental of Indonesian economic. Having such concern, it is even more important for the Government of Indonesia to understand the nature of trade-*FDI* relationship that has been happening in the economy such that it would be able to evaluate its trade and *FDI* related policy.

From theoretical point of view, *FDI* can be seen as international flows in capital as production factor and trade is international flows in goods and services. In this context, Heckscher-Ohlin Samuelson theory states under no capital mobility trade flows from a high capital endowment to a lower one. Then once trade barriers exist, the capital will be moving in and substituting the trade at a certain degree, conversely trade will substitute once there is a barrier of factor movement (Mundell, 1957 cited in Kueh et al., 2006 and Lee, 2007). Based on this postulate, *FDI* has trade substituting impact instead of trade creating effect and trade will substitute *FDI* instead of create it. However, Vernon (1966) cited in Kueh

et al. (2006) and Liu et al. (2001) introduces a product life cycle concept of internationalisation. Under this concept *FDI* will be happened when one product becomes more competitive internationally by being produced abroad, a period after this market was served through export. Then the capital inflows will create trade as export of such final goods to other countries is done. This export is preceded by import of intermediate inputs from home country. In this regard trade has an *FDI*-creating effect and *FDI* has a trade-creating impact as has been going on in China recently (Liu et al., 2001).

The above theories conclude mix relationship between trade and *FDI*, and then are followed by even more diversity result of other studies. These studies basically are looking at the different motives of multinational firms in doing their investment decision. Gray (1998) cited in Liu et al. (2001) notes the different of market seeking *FDI* from efficiency seeking *FDI* in trade creating effect. A market seeking *FDI* tends to be trade, on the other hand an efficiency seeking *FDI* complements import as well as export of the host country. Meanwhile export platform *FDI* (Ekholm et al., 2005) concerns on to which countries exports are created. Exports could be back to home country, to third countries or to both of them (global market).

Similarly, many empirical studies also show a mix result on this relationship for certain country. For example Liu et al. (2001) find a clear two-way causality for China during 1984 – 1998 in which trade (import) causes *FDI* and is followed by *FDI* causes export. Meanwhile Alguacil and Orts (2002) find a positive long-term causality from outward *FDI* to export of Spanish using 1970-1992 data but not in opposite direction. For Latin America using quarterly data from late seventies to 2000, Cuadros et al. (2004) reveal a trade-*FDI* growth link associated to the outward oriented strategies. Seo and Suh (2006) con-

clude that home's country effect of *FDI* could not be certainly predicted and Korean *FDI*'s stocks in ASEAN do not substitute export from or import to Korea. Last, Lee (2007) suggests a positive impact of *FDI* to Taiwanese export performance during 1952 to 2005. Additionally, Ekayanake et al. (2003) also find a mix result on *FDI* – export relationship in Latin America, which only three out of five countries have an export-lead *FDI* phenomenon and one of them with bi-directional relationship.

Some papers have investigated the trade – *FDI* relationship for Indonesia is rarely done. Two studies found are doing such research in an East Asia context. First is done by Nakamura and Oyama (1998), in which they focus on the linkage between *FDI* and trade as well as other macroeconomic determinants of *FDI* from US and Japan into several East Asian economies. The second study is conducted by Kueh et al. (2006) with a focus on *FDI*, import and export in ASEAN region during 1990 – 2005. They reveal a different short run to long run relationship with import tends to substitute *FDI* and export complement to *FDI* in the short run, while conversely import complement to *FDI* and export substitutes it in the long run.

Pontes (2007) presents a non-monotonic relationship between foreign direct investment and trade. The relationship is based on the idea that, although FDI eliminates trade costs on the final good, the investing firm has to bear increased trade costs on an intermediate good.

Knowing the result diversity of previous researches, this research is trying to explore a deeper and more specific trade-*FDI* relationship for Indonesia, which has never been used by those studies. Since motive of multinational enterprises (MNEs) is the one that determines the two-way impact of *FDI* on trade, it surely is beneficial to look at the specific country's *FDI* on specific sector of trade one by one instead of using aggregate *FDI* and trade data for

several countries in one model. By doing so, the result will be more specific and become useful input for a government in formulating *FDI* and trade related policies.

This paper is designed to understand the direction of causality relationship between specific sector trade (one digit SITC number) and one home country's *FDI* inflows to Indonesia. Two home countries, Japan and The United State of America (US) are chosen to represent a largest part of *FDI* inflows and trading volume of Indonesia. The result shows an acceptable relation of trade and *FDI* in which Indonesia has resources endowment advantage. It also indicates the motives of Japanese and the US MNEs in doing investment in Indonesia. The rest of this paper is organised as follow: data and methodology come after the introduction and then is pursued by the empirical result. The discussion including some policy implication of the result will be presented just before the conclusion.

METHODS

Granger causality test is used in this research to understand separately the relationship between *FDI* and import as well as *FDI* and export in a one digit SITC number. The econometric models of Granger causality test for the relationship of *FDI* and Import (*M*) is

$$FDI_t = \Sigma \alpha_i M_{t-i} + \Sigma \beta_j FDI_{t-j} + u_{1t} \qquad (1)$$

$$M_t = \Sigma \lambda_i FDI_{t-i} + \Sigma \delta_j M_{t-j} + u_{2t} \qquad (2)$$

While the econometric models of Granger causality test for the relationship of *FDI* and Export (*X*) is

$$FDI_t = \Sigma \alpha_i X_{t-i} + \Sigma \beta_j FDI_{t-j} + u_{3t} \qquad (3)$$

$$X_t = \Sigma \lambda_i FDI_{t-i} + \Sigma \delta_j X_{t-j} + u_{4t} \qquad (4)$$

The conclusion of causality between *FDI* and M as well as *FDI* and X can be done by

testing the significance of coefficient α, β, λ and $\tilde{\delta}$. The conclusion could be as follows: (a) *FDI* Granger causes import (*M*) or export (*M*) if estimated coefficient δ is statistically different from zero ($\Sigma\delta \neq 0$) and coefficient α is not statistically different from zero ($\Sigma\alpha = 0$). (b) Meanwhile import (*M*) or export (*X*) Granger causes *FDI* if estimated coefficient δ statistically is not different from zero ($\Sigma\delta = 0$) and coefficient α statistically is different from zero, or $\Sigma\alpha \neq 0$. (c) Bilateral Granger causality will be happened if both coefficients are estimated as statistically different from zero. (d) Independence is suggested if both coefficients are estimated not statistically different from zero.

The statistical tests of coefficients' significance are done through an *F* test with the null hypothesis are as follows. (a) *FDI* does not Granger cause import. (b) *FDI* does not Granger cause export. (d) Import does not Granger cause *FDI*. (e) Export does not Granger cause *FDI*.

This causality test has to be preceded by a determination of the lag. It is acceptable that the trade impact of *FDI* and *FDI* impact of trade will be happened in 1 – 3 years after the preceding completed. Therefore the lag is looked at one-year lag, two-year lag and three-year lag.

Since it is assumed that Granger causality will be valid for co-integrated data, the co-integration test is done for the significant causality SITC numbers only. The reason for this is merely to reduce the load of doing such test. In this research we have 10 SITC numbers, are checking four kinds of relationship for two home countries. By doing the co-integration test after the significant causalities are found, the test reduces to only one fifth of what it should be.

Data sources for this research are coming from *UNCTAD FDI* statistic, *UNCTAD* Handbook of Statistic (2004) and Comtrade. Since *FDI* inflows data from Japan and US to Indonesia in *UNCTAD FDI* statistic website is only for the Year of 1991 – 2003, we will conduct the research base on this period. Trade data from Comtrade were downloaded for respective period.

RESULTS DISCUSSION

Given the inward *FDI* available in this essay, we pool the annual data, which is relatively short (1991-2003) in correlation with the trade data of Indonesia. We examine the *FDI* inflows to Indonesia in each time period whether it has a significant causal effect or not with import and export to and from Indonesia. We estimate the *FDI* effect from Japan and US by using the Granger causality test in every one digit of SITC. We also make a further estimation the effect of *FDI* from Japan to the Indonesian trade with the US as well as *FDI* from the US to the trade with Japan.

Before coming to such empirical result, lag determination must be done. Running 1 – 3 years lags of *FDI* inflows from Japan and trade volume with Japan we get the significance result as stated in Table 1. This result indicates that either one-year or two-year lag is suitable since both are showing a significance Granger causality effect. Then we choose a one-year lag because limited numbers of data makes this lag more feasible for the purpose of this research.

As shown in Table 2a, the Granger causality test has rejected the null hypothesis at the 10% level, which determines that import from Japan causes *FDI* from Japan (Hypothesis (1)). This total import from Japan is represented significantly within the SITC. In other way, the Granger causality test for *FDI* – import from Japan has presented a significant result for two SITC in this Hypothesis (2), which are SITC0 and SITC1, tested at 5% and 10% level respectively.

Table 1: Granger Causality Test for Japan to Indonesia *FDI*-Trade Relationship in One-Year, Two-Year and Three-Year Lags

Null hypothesis	Lag(s)	*F*-statistic	Probability
Import from Japan does not Granger cause *FDI* from Japan	1	11.4337	0.00811
	2	9.70230	0.01317
	3	4.78634	0.11543
FDI from Japan does not Granger cause Import from Japan	1	0.93879	0.35791
	2	0.33705	0.72656
	3	3.76027	0.15273
Export to Japan does not Granger cause *FDI* from Japan	1	0.30677	0.59316
	2	0.34602	0.72074
	3	0.94841	0.51686
FDI from Japan does not Granger cause Export to Japan	1	3.65807	0.08809
	2	4.95583	0.05362
	3	3.50519	0.16520

Source: Data estimation.

Table 2a: Granger Causality Test for Indonesia Import - *FDI* from Japan

Hypothesis (1)	SITC Number	*F*-statistic	Probability	Hypothesis (2)	SITC Number	*F*-statistic	Probability
Import from Japan does not Granger cause *FDI* from Japan	0	0.84517	0.38190	*FDI* from Japan does not Granger cause Import from Japan	0**)	550.688	0.04354
	1	0.00429	0.94920		1*)	468.308	0.05868
	2	0.35672	0.56506		2	0.09826	0.76107
	3	111.679	0.31815		3	275.092	0.13157
	4	0.06342	0.80683		4	0.05148	0.82557
	5	113.691	0.31407		5	0.09425	0.76583
	6	0.69265	0.42680		6	0.00486	0.94595
	7	228.208	0.16516		7	0.42162	0.53235
	8	320.729	0.10692		8	0.79949	0.39453
	9	330.721	0.10233		9	0.00272	0.95958
	Total***)	114.337	0.00811		Total	0.93879	0.35791

Notes: *, **, and *** indicate rejecting the null hypothesis at 10%, 5%, and 1% level, respectively.
Source: Data estimation.

Table 2b: Granger Causality Test for Indonesia Import - *FDI* from US

Hypothesis (3)	SITC Number	*F*-statistic	Probability	Hypothesis (4)	SITC Number	*F*-statistic	Probability
Import from US does not Granger cause *FDI* from US	0	0.16591	0.69329	*FDI* from US does not Granger cause Import from US	0*)	442.371	0.06477
	1	0.63993	0.44434		1**)	767.412	0.02175
	2	236.233	0.15867		2**)	576.314	0.03986
	3	228.129	0.16523		3	0.36803	0.55907
	4	293.859	0.12063		4	100.367	0.34260
	5	0.01109	0.91845		5	308.557	0.11287
	6*)	426.592	0.06887		6*)	436.456	0.06627
	7	0.57357	0.46821		7	0.27245	0.61429
	8	102.636	0.33747		8	205.213	0.18580
	9	162.397	0.23446		9	206.228	0.18482
	Total	138.737	0.26906		Total*)	377.656	0.08386

Notes: *, **, and *** indicate rejecting the null hypothesis at 10%, 5%, and 1% level, respectively.
Source: Data estimation.

Meanwhile, the trade relation with the US tells a different story. *FDI* from the US has significantly impact to import from the US for SITC0, 1, 2, 6 and the total import, tested at 10% and 5% level of the Granger test, as shown in Hypothesis (4). In reverse direction, there is one significant result of SITC6 tested at 10% level in Hypothesis (3), which concludes that import from the US Granger causes *FDI* from the US (Table 2b).

     Besides, the Granger causality also tests for the export of Indonesia in relation with *FDI* from the Japan and the US. Hy-

pothesis (5) in Table 3 presents one significant result for SITC 9 at 10% level, showing that export from Japan causes *FDI* from that country. Three results of significance are presented in the Hypothesis (6), specifically for SITC2, 3 and the total export at the same level of 10%. It is quite strange for the trade relation with the US where only one strong significant result is found for SITC2, tested at 1% level in the Hypothesis (8), which means that *FDI* from the US Granger causes export to the US while there is no significant result for reverse Hypothesis (7) (Table 4).

Table 3: Granger Causality Test for Indonesia Export to Japan - *FDI* from Japan

Hypothesis (5)	SITC Number	*F*-statistic	Probability	Hypothesis (6)	SITC Number	*F*-statistic	Probability
Export to	0	174.758	0.31819	*FDI* from	0)	0.04892	0.82988
Japan does	1	0.25299	0.62706	Japan does	1	0.00229	0.96291
not	2	0.16342	0.69546	not Granger	2**)	510.736	0.05018
Granger	3	0.80247	0.39368	cause export	3*)	371.223	0.08612
cause *FDI*	4	126.116	0.29049	to Japan	4	225.573	0.16737
from Japan	5	136.170	0.27323		5	0.24086	0.63533
	6	0.09704	0.76251		6	144.428	0.26011
	7	241.869	0.15432		7	0.11980	0.73721
	8	0.48500	0.50375		8	0.24661	0.63137
	9*)	398.278	0.07709		9	0.00755	0.93267
	Total	0.30677	0.59316		Total*)	365.807	0.08809

Notes: *, **, and *** indicate rejecting the null hypothesis at 10%, 5%, and 1% level, respectively.
Source: Data estimation.

Table 4: Granger Causality Test for Indonesia Export to US - *FDI* from US

Hypothesis (7)	SITC Number	*F*-statistic	Probability	Hypothesis (8)	SITC Number	*F*-statistic	Probability
Export to	0	0.16591	0.69329	*FDI* from	0)	0.03966	0.84658
US does	1	0.63993	0.44434	US does not	1	0.00054	0.99432
not	2	236.233	0.15867	Granger	2***)	106.503	0.00978
Granger	3	228.129	0.16523	cause export	3	0.03579	0.85415
cause *FDI*	4	174.901	0.21862	to US	4	0.47077	0.50992
from US	5	0.05810	0.81492		5	114.445	0.31256
	6	0.11143	0.74616		6	214.643	0.17694
	7	0.41022	0.53782		7	102.130	0.33861
	8	0.21046	0.65728		8	0.00115	0.97375
	9	0.75198	0.40837		9	0.74003	0.41198
	Total*)	0.22951	0.64331		Total	0.00679	0.93612

Notes: *, **, and *** indicate rejecting the null hypothesis at 10%, 5%, and 1% level, respectively.
Source: Data estimation.

Furthermore, this research also concerned whether the relationship will be appeared if there is a cross relationship data between *FDI* from Japan and Indonesian trade with the US. In Table 5 and 6, Hypothesis (9) and (11) show that there are two significant effects of the trade with the US Granger causes *FDI* inflow from Japan. It occurs in SITC 1 for import and SITC2 for export, tested at 10% and 5% level, respectively.

On the other hand, *FDI* from Japan has enhanced trade of Indonesia with the US, which is presented in Hypothesis (10) for import and Hypothesis (12) for export. Here, the significant result was found for SITC0 and SITC2, tested at 10% and 5% level respectively, as shown in Hypothesis (11) while it finds significant Granger causality at SITC6 in Hypothesis (12), tested at 1% level.

Table 5: Granger Causality Test for Indonesia Import from US - *FDI* from Japan

Hypothesis (9)	SITC Number	F-statistic	Probability	Hypothesis (10)	SITC Number	F-statistic	Probability
Import from US does not Granger cause *FDI* from Japan	0	0.00683	0.93592	*FDI* from Japan does not Granger cause import from US	0*)	4.32660	0.06726
	1*)	4.74721	0.05729		1	0.22058	0.64977
	2	0.11669	0.74049		2**)	5.70396	0.04067
	3	0.57844	0.46638		3	0.45087	0.51879
	4	1.44867	0.25844		4	0.13868	0.71822
	5	1.67925	0.22727		5	0.01443	0.90702
	6	0.28095	0.60891		6	0.01463	0.90640
	7	0.05520	0.81951		7	2.12634	0.17878
	8	0.33014	0.57965		8	0.24916	0.62964
	9	1.60420	0.23710		9	0.96990	0.35044
	Total	2.68252	0.13588		Total	0.00733	0.93367

Notes: *, **, and *** indicate rejecting the null hypothesis at 10%, 5%, and 1% level, respectively.
Source: Data estimation.

Table 6: Granger Causality Test for Indonesia Export to US - *FDI* from Japan

Hypothesis (11)	SITC Number	F-statistic	Probability	Hypothesis (12)	SITC Number	F-statistic	Probability
Export to US does not Granger cause *FDI* from Japan	0	324.154	0.10532	*FDI* from Japan does not Granger cause export to US	0	0.02662	0.87400
	1	295.776	0.11958		1	267.829	0.13615
	2**)	602.268	0.03651		2	0.03037	0.86551
	3	197.963	0.19301		3	142.644	0.26287
	4	153.260	0.24704		4	118.951	0.30377
	5	264.914	0.13805		5	0.20904	0.65836
	6	231.634	0.16235		6***)	298.084	0.00040
	7	179.900	0.21270		7	196.824	0.19418
	8	144.620	0.25982		8	0.01272	0.91266
	9	128.826	0.28569		9	289.065	0.12331
	Total*)	0.69904	0.42475		Total	0.00084	0.97752

Notes: *, **, and *** indicate rejecting the null hypothesis at 10%, 5%, and 1% level, respectively.
Source: Data estimation.

Similarly, it tests *FDI* from the US in relation with Indonesian trade with Japan. As shown in Table 7, there is no significant result found for Hypothesis (13) while Hypothesis (14) told differently. In total trade, *FDI* from the US has significantly Granger caused import from Japan and it has embodied specifically in SITC2, 5, 6, 7 and 8 which mostly at 5% level. For export particularly, it finds significant result for SITC6 in the Hypothesis (15), which means export to Japan Granger causes *FDI* from the US, tested at 5% level. Correspondingly, the significant result appeared in Hypothesis (16) for SITC2 and 4 tested at 5% and 10% respectively, means that *FDI* has Granger caused export to Japan (Table 8).

All of these findings have implications to the trade of Indonesia in which different type of *FDI* effect applied. This will be elaborated in the discussion section below. Before it comes into discussion section, it must check the cointegration of the data used in the Granger causality test using Johansen cointegration test. Some of the significant relationships are not valid for long-term conclusion since the data is not cointegrated.

Table 7: Granger Causality Test for Indonesia Import from Japan - *FDI* from US

Hypothesis (13)	SITC Number	F-statistic	Probability	Hypothesis (14)	SITC Number	F-statistic	Probability
Import from	0	0.57505	0.46765	*FDI* from US	0	233.831	0.16058
Japan does	1	161.161	0.23611	does not	1	0.19205	0.67155
not Granger	2	0.63432	0.44627	Granger cause	2**)	436.600	0.06624
cause *FDI*	3	0.56839	0.47016	import from	3	166.969	0.22849
from US	4	0.08951	0.77160	Japan	4	0.08023	0.78340
	5	0.46001	0.51468		5**)	904.345	0.01478
	6	0.53473	0.48323		6**)	659.022	0.03033
	7	0.14351	0.71360		7**)	635.042	0.03277
	8	0.00826	0.92957		8**)	574.819	0.04006
	9	0.87888	0.37298		9	0.04561	0.83565
	Total	0.03889	0.84805		Total*)	338.078	0.09912

Notes: *, **, and *** indicate rejecting the null hypothesis at 10%, 5%, and 1% level, respectively.
Source: Data estimation.

Table 8: Granger Causality Test for Indonesia Export to Japan - *FDI* from US

Hypothesis (15)	SITC Number	F-statistic	Probability	Hypothesis (16)	SITC Number	F-statistic	Probability
Export to	0	0.33858	0.57493	*FDI* from US	0**)	0.79364	0.39619
Japan does	1	249.569	0.14862	does not	1*)	125.768	0.29112
not Granger	2	0.35419	0.56641	Granger cause	2	795.102	0.02006
cause *FDI*	3	0.22566	0.64607	export to Ja-	3	0.71018	0.42121
from US	4	0.76104	0.40567	pan	4	425.879	0.06907
	5	0.35101	0.56813		5	304.571	0.11491
	6**)	616.552	0.03482		6	0.30936	0.59163
	7	0.24473	0.63266		7	0.08139	0.78188
	8	0.58180	0.46513		8	253.959	0.14549
	9	0.42844	0.52913		9	0.44857	0.51983
	Total*)	0.03544	0.85485		Total	198.172	0.19280

Notes: *, **, and *** indicate rejecting the null hypothesis at 10%, 5%, and 1% level, respectively.
Source: Data estimation.

The valid long-term relationships can be summarised as follows. (a) Total Import from Japan Granger causes *FDI* from Japan. (b) *FDI* from Japan Granger causes import from Japan for SITC0 (Food and Live animals) (c) *FDI* from Japan Granger causes total export to Japan. (d) *FDI* from Japan Granger causes export to Japan for SITC 3 (Mineral fuels, lubricants and related materials). (e) Bi-directional Granger causality for *FDI* from US and import from US for SITC6 (Manufactured goods classified chiefly by material). (f) *FDI* from US Granger causes import from US for SITC2 (crude materials, inedible, except fuels). (g) *FDI* from US Granger causes export from US for SITC2 (crude materials, inedible, except fuels). (h) Import from US for SITC 1 (beverages and tobacco) Granger causes *FDI* from Japan. In addition, *FDI* from Japan Granger causes import from US for SITC2 (crude materials, inedible, except fuels). Export to US for SITC2 (crude materials, inedible, except fuels) Granger causes *FDI* from Japan. *FDI* from Japan Granger causes export to US for SITC6 (manufactured goods classified chiefly by material). While *FDI* from US Granger causes import from Japan for SITC6 (manufactured goods classified chiefly by material) and 7 (machinery and transport equipment)

Unlike the result from Nakamura and Oyama (1998) it finds for Indonesia a similar indication of causal relationship between *FDI* from Japan and trade with Japan as it has been found in China (Liu et al. 2001). This research indicates an existence of *FDI*-creating import and an export creating *FDI* for total trade with Japan. In this case, Indonesia apparently has become a part of Vernon's product cycle of Japanese industry. Looking deeply at SITC one digit trade, it finds that the *FDI*-creating import occurs as total and not concentrated on particular SITC number. Contrarily, the export-creating *FDI* is found mostly in SITC 3. It is understandable since in SITC3 there

are several primary export commodities from Indonesia to Japan such as natural gas, fuels and lubricants. Then the conclusion of product cycle becomes invalid for Indonesia. A resource seeking *FDI* instead of efficiency seeking seems more suitable to describe this *FDI* – trade relationship of Indonesia – Japan. Beside this resource seeking *FDI*, a market seeking *FDI* is found in SITC0 which *FDI* Granger cause import. It is possibly the Japanese pharmaceutical and food industries in Indonesia that are importing some basic raw materials from Japan take a biggest part inside this phenomenon.

A similar product cycle trend could be revealed in the relationship between *FDI* from US and trade for SITC2. In this nonfuel crude material group, import from US Granger causes *FDI* and *FDI* has a Granger causality to export. Once again a careful observation will conclude a resource seeking *FDI* instead of efficiency seeking as described in Vernon's product cycle theory. In SITC 2 one can find a group of mining resources those are done by MNCs such as Freeport and Newmont, in which US *FDI* has been performing a huge contribution in Indonesia. Then in this field, import of mining materials and machineries might precede an *FDI* from US and then the *FDI* creates export of mining output to US. Interestingly the story in SITC 2 does not end here, the export to US then Granger causes *FDI* from Japan, which Granger causes further import from US. It indicates an intensive involvement of Japanese industries in mining industry in Indonesia. Indeed, data from Indonesian Investment Board (BKPM 2007) shows Japanese investment in mining industry is in the fifth rank of Japanese *FDI* in Indonesia.

Another interesting finding is in SITC 6, which indicates a complex *FDI* – trade relationship involving Japan and US as well as the world import to Indonesia. This research reveals that in SITC6 *FDI* from US Granger causes import from US,

import from Japan and when we try to look further then we find that it Granger causes import from the world. However the import from US has a Granger causality effect to further *FDI* from US. Meanwhile *FDI* from Japan Granger causes export to US in this sector. Several industries contributing to this phenomenon most probably are pulp and paper industry (3rd rank in Japanese investment), cork and wood manufactures (3rd rank in exported goods to US) and non-metallic mineral manufactures (further processing industry of SITC2).

Comparing this result to the trade values data with Japan and US (see Table 9), it finds that the highest trade values (SITC 7) have weak relationship with *FDI*. However there are several SITC numbers those are in the big five commodities list and have significant Granger causality relations with *FDI*. These are SITC2, 3 and 6 for Indonesian export to Japan and SITC2 and 3 for Indonesian trade with US. It reflects that even though the trade volume of *FDI*-creating trade or trade-creating *FDI* is not the biggest trade contribution, it might have a quite significant trade volume.

Table 9: Trade Values of Import and Export between Indonesia and USA, and between Indonesia and Japan, 1991-2003

Export to USA	Code	Description	Trade Value (USD)
	84	Clothing and accessories	21,964,355,360
	85	Footwear	10,738,837,433
	76	Telecomm. Sound equip etc	10,549,295,811
	23	Crude rubber	7,993,433,623
	23	Petroleum, petrol product	7,212,736,314
		Other commodities	52,389,006,073
Import from USA	Code	Description	Trade Value (USD)
	79	Other transport equipment	3,635,689,784
	72	Special indust. machinery	3,456,637,438
	26	Textile fibers	3,172,850,244
	22	Oil seed, oleaginous fruit	2,138,515,296
	74	General industl. Mach. Nes.	1,958,381,009
		Other commodities	22,116,919,853
Export to Japan	Code	Description	Trade Value (USD)
	34	Gas, natural, manufactured	51,640,511,195
	33	Petroleum, petrol product	35,313,671,380
	63	Cork, wood manufactures	16,412,481,714
	03	Fish, crustaceans, mollus	12,596,591,323
	28	Metalliferous ore, scrap	11,796,661,587
		Other commodities	52,048,598,637
Import from Japan	Code	Description	Trade Value (USD)
	34	Road vehicles	12,079,821,153
	33	Elec mch, parts, nes	11,582,798,725
	63	General industl.mach.nes	9,632,777,399
	03	Special.indust.machinery	9,329,477,112
	28	Power generating machines	7,778,182,604
		Other commodities	40,173,138,714

Notes: (1) Code is SITC two digit numbers. (2) The trade value is in USD.
Source: Comtrade data (2008), UN Comtrade Statistic, www.comtrade.un.org, accessed on 20/4/2008.

Having understood several above *FDI* – trade relationship, the Government of Indonesia might be willing to adjust its *FDI* and trade policies. For example the previous export-driving *FDI* policy seems end up with a resource seeking ones instead of efficiency seeking. There could be a failure on creating efficiency comparative advantage or location advantage (Dunning in Chunlai 1997). There might be a lack of providing MNCs requirements on investing in Indonesia as well. An integrated review on trade policy for commodities under SITC2, 3 and 6 is necessary to boost trade volume of these products and get more *FDI* that eventually will further increase the trade. It will be good to have further research on these commodities trade behaviour in evaluating such policies.

Indeed there are many limitation of this research especially from the availability of the data and limited time for doing this research. Therefore many further researches could be developed to consider many other variables such as trade with third countries, as well as try other econometric models such as a first different log model. This research has a one-year lag Granger causality test only while further research might check a two-year lag or even three-year lag.

CONCLUSION

The purpose of this research was to understand the relationship between *FDI* and trade of Indonesia with two of its main partners, namely Japan and the USA, for one digit SITC numbers. The result showed that an *FDI* – trade relation for certain SITC number could behave differently from a total trade – *FDI* relation that might lead to a wrong conclusion. This research found an *FDI* – creating import and export – creating *FDI* that mainly in SITC3 for Japan and SITC2 for US, which were mostly oil, gas and mining industries, and made a Vernon's product cycle *FDI* could not be applied here.

Another important finding of the research was a market seeking *FDI* from Japan in SITC 0 and an import – creating *FDI* from US and Japan in SITC6. Commodities under these SITC numbers had a significant Granger causality, and they were traded in a significant volume. These findings implied a need of integrated *FDI* – trade policy review for these SITC numbers in order to enhance the positive impact of this *FDI* – trade relationship. Possible further researches might be on making the result of this research more valuable for policy review.

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