Impact of Belt Road Initiative on Indonesia’s Oil and Gas Trade

Rafi Rachmadi & Eka Puspitawati

Abstract
The development of international trade is important to boost an economy. Economic integration is used by Indonesia to increase trade values. Belt Road Initiative (BRI) is a new integration that is useful for Indonesia. Under BRI, the most frequently traded commodities are oil and gas. However, Indonesia should consider impacts of the integration on the trade of oil and gas. This study using a gravity model aims to analyse impact of BRI on Indonesia’s oil and gas trade and determinant factors in the trade. The result of this study shows that Indonesia get a trade diversion from BRI. Determinant factors influencing on Indonesia’s trade are GDP, distance, price and consumption. Indonesia should take more benefits of energy sectors particularly oil and gas from BRI.

Key Words: economic integration, oil and gas, gravity model, BRI, international market
INTRODUCTION

The BRI project itself is at the centre of the policies given by President Xi Jinping who want to reconnect China to Central Asia, Europe and the Middle East and to strengthen China's dominance as an economic power by providing infrastructure program assistance across integration members. BRI targets Asia, Africa and Europe along 5 routes; the Chinese government focuses and takes advantage of international routes, important cities and major ports to strengthen relations and economic development (Iqbal, B.A., Rahman, M.N., & Sami, S, 2019).

Based on Figure 1.1, the BRI consists of the Maritime Silk Road (MSR) and the Silk Road Economics Belt (SREB), where the MSR will connect China with regions in South and Southeast Asia by sea. SREB as a route that will connect Europe by land. BRI itself has connected around 140 countries with 6 economic corridors, namely, 4 land routes and 2 sea routes (OECD, 2018). The economic corridor focuses on countries with large energy resources, namely the new Eurasian land bridge, the China-Mongolia-Russia Corridor, China-West Asia Corridor, China-Indonesia China Corridor, China-Pakistan Economics Corridor, Bangladesh-China-India-Myanmar Corridor. The paths traversed by BRI such as Central Asia, West Asia, South Asia are consumer markets and are an ideal route to carry out extensive export activities that will create substantial growth (China-Britain Business Council, 2020).

Figure 1. Map of Belt Road Initiative
Sources: China-Britain Business Council (2020)

Countries that are members of BRI expect growth, thus the promotion of trade without barriers is the key to the BRI concept (Iqbal, B.A., Rahman, M.N., & Sami, S, 2019). By bringing the Belt Road Initiative, China aims to have a region with new investments, opportunities to develop new businesses, targeting export supplies,
energy supplies and building construction materials to create economic dependence (Chung, C.P, 2017). The Belt Road Initiative will not only focus on the growth side but will become a pathway for the movement of oil and gas (oil and gas) for producers which will be profitable for its members and oil and gas trade will be the key and will have an impact on the global economy (Zhang, C., Fu, J., Pu, Z, 2019). The demand for China's oil and gas in 2018 increased from year to year. In 2018 alone China's total consumption was dominated by imports for oil 71.3% and gas 45.3% (Yang, S., & Zarzoso, I, 2014). The Asian region is one of the sources of oil and gas which is one of the destinations for obtaining oil and gas supplies. The Asian region is hopeful with the development of abundant natural resources and China is also expanding regional relations. Therefore, the main focus of BRI is related to trade and investment in oil and gas.

The geographical location for South and Southeast Asia falls into the China-Pakistan Economics and the Bangladesh-China-India-Myanmar Corridor. This corridor is directly connected to 2 lines, namely SREB and MSR. Based on [8], the value of imports and exports of Oil and Gas (oil and gas) in China is still dominant for imports from South and Southeast Asian countries. The high import activity is due to industrialization activities that make China require oil and gas imports from the Asian region and has increased every year. The biggest reason for the formation of BRI integration is as a link to get more and easier oil and gas supplies in the Asian region. According to (Zhang, C., Fu, J., Pu, Z, 2019), nearly 250 million tons or 61% of the world's total oil has passed through the trade route. Therefore, energy trade cooperation, especially oil and gas, will be an important priority for BRI integration. Therefore, several member countries have started to become trading partners for oil and gas commodities. According (Zhao, L., Li, D., Guo, X., Xue, J., Wang, C & Sun, W, 2021), in 2018, 28 countries cooperated with China. Forms of cooperation in the form of investment, exploitation, mining, processing and international market development. Countries that cooperate include countries in South Asia and Southeast Asia, including Indonesia, which participates in cooperation in the oil and gas sector.

Oil and gas trade conditions in South and Southeast Asia tend to import rather than export. This condition is caused by uneven oil and gas reserves and a population explosion which makes it impossible for these reserves to meet the needs of industry and the consumption needs of the people. According to the (WITS, 2021), the value of Indonesia's oil and gas exports to South and Southeast Asian countries was recorded at 92.80 million US$ in 2019 and the import value was recorded at 15 thousand US$. In 2020, the export value itself will increase to US$ 179 million or almost 2 times, enabling Indonesia to focus on trade in South and Southeast Asia. According to (Kementerian Perdagangan, 2021), the value of the contribution of oil
and gas for exports in 2021 will reach 14.98% so that oil and gas commodities become the mainstay commodity for Indonesian exports.

Based on Figure 2 it can be seen that the productivity of Indonesia's oil and natural gas from 2016-2020 has decreased. The highest oil and natural gas production in 2018 for oil and gas was 1,372 mboepd. The downward trend for natural gas production occurred in 2019 and 2020, the decline was due to leakage of flow pipes and the Covid-19 pandemic which reduced demand. On the oil side, there is saturation as a result of the absence of sustainable exploration as well as unstable world oil prices and a pandemic that has reduced oil production. The integration of the Belt Road Initiative will create a seamless relationship that is expected to generate benefits for its members. Indonesia as one of the largest oil and gas producers, in its (IHS Markit,2021), reports an oil and gas production level of 1,836.7 thousand b/d enabling Indonesia to enter the market as an oil and gas exporter. However, Indonesia has the potential to become a market for countries that are members of BRI for refined oil and gas products.

**Figure 2.** Indonesian Oil and Gas Production (2016-2020)
Sources: Ministry of Energy and Mineral Resources Indonesia (2020)

In previous studies, it was found that BRI will have a positive impact, such as the (Puspitawati, E, 2021), BRI in 2030 will have a trade impact of up to 5% through cooperation and knowledge transfer. The research (Foo, N., Lean H., & Salim R, 2020), stated that the trade impact of BRI ASEAN and China made trade creation. Based on (Cui, L., & Song, M,2018), states that BRI will be a promising trade route, this potential can occur. Research results reveal an increase in the economy and welfare that can encourage the development of BRI. However, some countries will experience losses, such as research by Herrero (A.G., & Xu, J,2017) which states that BRI will make a loss if the trade cooperation is continued with FTA makers.
The initial idea as a barrier-free trade route was clearly the main goal of BRI development. BRI is different from economic integration such as ASEAN, EU or NAFTA. BRI does not only provide ease of trade through its corridors but also offers investment distribution in the form of infrastructure to facilitate trade. Asian countries are most of which are developing countries and the mainstay commodity is oil and gas. Oil and gas, which is the main focus of BRI integration, make them possible to see the impact of trade by seeing the formation of trade opportunities that are bigger than before. Therefore, the researcher aims to analyse impact of BRI on Indonesia’s oil and gas trade and determinant factors in the trade. Particularly this study investigates whether Indonesia gets trade creation or trade diversion from joining BRI.

**Literature Review**

Based on previous research, many researchers have investigated the effect of economic integration on trade and what factors affect trade in a region using gravity or panel models. In research (Zidi, A., & Dhifallah, S.M, 2013), they researched that FTA European and Tunisian industrial areas were able to increase trade exchange by looking at trade creation and trade diversion. Using the gravity model with a panel of 41 countries from 1986-2010 and the result the agreement between Tunisia and Europe, there is no trade creation. The second result shows that the preferential agreement between the two partners results in trade creation import however, there is a trade diversion export.

In (Endoh, M, 2010) he looked at trade creation and trade diversion in trade at the European Economic Association to estimate the intensity of trade that occurred. Using a gravity model with a panel of 80 countries for the period 1960-1994, in terms of trade. The trade creation effects trade diversion of each of the domestic sectors proved to be generally weak during the 1990s. The researcher also observes that each organization has a distinctive international trade character.

Based on (Akhter, N., & Ghani, E, 2010) conducted a study to see the benefits of SAFTA in increasing trade through trade creation and trade diversion for Pakistan, India and Sri Lanka. Using a gravity model with panel countries and the second model uses a pooled estimate to view trade flows in 2003-2008. The results show that SAFTA makes trade creations for Pakistan, India and Sri Lanka but makes transfers to other countries outside the agreement.

Another study conducted by (Yang, S., & Zarzoso, I, 2014) aims to evaluate the trade agreement between ASEAN and China by looking at their impact through trade creation and trade diversion. This study uses the gravity panel data method for the period 1995 to 2010 with a sample of 31 countries. The results show FTA ASEAN
and China has positive overall especially in agricultural commodities, manufacturing, chemical and transportation machinery.

**METHOD**

This research used secondary data. The data used are from 2010 to 2020 that comes from 12 countries as the member of BRI and non-member of BRI (Bangladesh, Cambodia, Indonesia, Malaysia, Myanmar, Pakistan, Philippines, Singapore and Thailand). The data obtained from UN COMTRADE, Cepii, and other relevant sources. The focused commodities in this study are oil and gas, the commodities that have high export values for Indonesia and regularly trading in BRI. In this study used a gravity model to analyze the determinants of export for Indonesian oil and gas and using dummy variable for analyze the effect of trade for Indonesia.

The gravity model has been used by researchers for a long time to analyze trade bilaterally between countries of origin and partner countries. This model can explain the factors, potential, trade flows and effects received by the trade agreement taken (Crescimanno, M., Galati, A., & Yahiaoui, D, 2013). The gravity model of trade takes the idea from the law of physical gravity called Newton's law. Newton's law states that the relationship between 2 particles is affected by weight and distance. Based on this statement, (Tinbergen, J, 1954) introduced a gravity model to analyze trade flows.

This article analyzed the impact and determinants of export for Indonesia oil and gas. The factors are real GDP, distance, exchange rate, commodities price oil and gas and household consumption. In this study, the gravity model is using in a logarithmic natural (Ln) form. So, the estimation using an Ordinary Least Square (OLS) cross-country panel regression with random effect. The specific model is as follow:

\[
\ln X_{it} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln RER_{it} - \beta_3 Dist_{it} + \beta_4 D_{\text{Trade}it} - \beta_5 \ln PC_{it} - \beta_6 \ln PG_{it} + \beta_7 \ln HC_{it} + \varepsilon_{it} \tag{1}
\]

Where: \( X_{it} \) is oil and gas value (US$); \( GDP \) is real GDP countries (US$); \( Dist \) is geographical distance (km); \( RER \) is exchange rate (Rp/Local Currency); \( D_{\text{Trade}} \) is dummy binary to see the impact of BRI; \( PC \) is crude price; \( PG \) is LNG price and \( HC \) is Household consumption (US$).
RESULTS AND DISCUSSION

Indonesia export value of oil and gas for countries member in South and Southeast Asia i.e., Bangladesh, Cambodia, Malaysia, Myanmar, Pakistan, Philippines, Singapore and Thailand. As seen in figure 2, it is showing Indonesia export value dramatically dropped since Indonesia joining Belt Road Initiative in 2013. For the highest export, after entry was in 2014 which reached 2403 billion USD% with imports at 880 billion USD (Kementerian Perdagangan, 2021). The revenue comes from trade in South and Southeast Asia, including Bangladesh, the Philippines, Indonesia, Cambodia, Malaysia, Myanmar, Pakistan, Singapore, Thailand and Vietnam. According to research conducted (OECD, 2018) countries participating in BRI will experience little loss in the short term because not all countries are connected as one. BRI’s weakness for now is poor connectivity for the infrastructure of the MSR and SREB sections. If successful, it will increase trade and ultimately in the long-term connectivity from BRI will be a way to become a trade creation for all its members.

![Figure 3. Indonesian Trade Conditions Before and After Joining BRI](Sources: World Trade Integration Solution (2021))

The result of the gravity model to analyze factors contributing to the export value of Indonesian oil gas shows in Table 1 Result perform statistical tests on the model equations using the global / overall significance test (f test), individual significant test (t test) and the coefficient of determination test (R2). The f test is used to test...
whether the independent variables used in the study have a significant overall effect on the dependent variable. Based on the test results, the value of Prob > F Statistics is 0.000, it is smaller than the significance level of (alpha = 0.05/5%). Therefore, it can be concluded that the model used by the independent variable has a significant effect on the dependent variable. For the t-test 6, the independent variables have values of 0.000 (ln_gdp), 0.074 (distance), 0.031 (dummy), 0.000 (ln_PC), 0.000 (ln_PG), and 0.000 (ln_kt), so it can be concluded that the independent variable has a significant effect on the variable. dependent. For the R2 test, it shows how much the independent variable in the model is able to explain the dependent variable. The R2 value 0.772 or 77.2 percent in the oil and gas export variable can be explained by the independent variables contained in the model and the remaining 22.8% can be explained by other variables outside the research model.

Table 1. Determinant Factors of Export Value of Indonesian Oil and Gas

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefisien</th>
<th>Prob</th>
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<tbody>
<tr>
<td>ln_GDP</td>
<td>1.474</td>
<td>0.000***</td>
</tr>
<tr>
<td>ln_RER</td>
<td>0.03</td>
<td>0.778</td>
</tr>
<tr>
<td>Distance</td>
<td>-0.39</td>
<td>0.074*</td>
</tr>
<tr>
<td>D_Trade</td>
<td>2.294</td>
<td>0.031**</td>
</tr>
<tr>
<td>ln_PC</td>
<td>4.691</td>
<td>0.000***</td>
</tr>
<tr>
<td>ln_PG</td>
<td>-5.177</td>
<td>0.000***</td>
</tr>
<tr>
<td>ln_HC</td>
<td>1.082</td>
<td>0.000***</td>
</tr>
<tr>
<td>Konstanta</td>
<td>-38.84</td>
<td>0.000***</td>
</tr>
<tr>
<td>Prob&gt;F</td>
<td></td>
<td>0.000</td>
</tr>
<tr>
<td>R2</td>
<td></td>
<td>0.772</td>
</tr>
</tbody>
</table>

Note: *,**,*** refers to significance testing 1%, 5%, 10% significance level
Trade creation and trade diversion are direct impacts or positive and negative effects of the establishment of a trade cooperation that only occurs in member countries, which in this case is the Belt Road Initiative. Trade creation can occur when consumption shifts from domestic products with high manufacturing costs to imported products with low manufacturing costs (Viner, J, 1950). The difference in tariffs applied to a country and a non-member country in a trade area causes a trade diversion which refers to non-optimal trading partners so that low-cost imports must be replaced with high-cost imports. Variable dummy used as a variable that captures the impact of the Belt Road Initiative on the value of Indonesian exports.

Dummy makes it possible to find out whether Indonesia gets trade creation or trade based on a country joining or not in the integration. Based on the estimation results made in this study, the dummy shows a comparison between Indonesia's conditions of trading with member and non-member countries. Based on Table 1 the results of the dummy obtained show a significant difference. If Indonesia joins the BRI integration, it will reduce the value of oil and gas exports by 2 times compared to Indonesia which does not join the BRI integration. Therefore, Indonesia gets a trade diversion because it reduces the value of Indonesia's oil and gas exports and the inability of an economic integration to open new trade routes for its members.

According to (Song, Z., Che, S., & Yang, Y, 2018) countries in Asia will receive the impact on trade that occurs in the Belt Road Initiative and Indonesia takes advantage of the use of BRI up to 53.26%. However, the oil and gas sector has not been able to show a positive response to the increase in the value of oil and gas exports. Since joining the Belt Road Initiative in 2013, Indonesia has experienced a decline in the value of exports for oil and gas and tends to stagnate, especially in the South and Southeast Asia region. This is due to the lack of demand by countries that are the main importers of Indonesia's oil and gas commodities.

Based on the results obtained in Table 1 that there are six variables in the model that significantly affect the variable gross domestic product per capita (ln_GDP), economic distance (distance), crude oil commodity prices (ln_PC), lng (ln_PC) and household consumption (ln_hc), while the non-significant influence is the exchange rate variable (ln_RER) with a significance level of 1%, 5% and 10%.

Based on the regression results obtained, the GDP per capita of the destination country has a positive effect on the growth of oil and gas exports in Indonesia. It can be seen from the coefficient value of the ln gdp variable of 1.232, this value means that an increase in the per capita economy in the destination country will increase Indonesia's oil and gas exports by 1.474 percent (cateris paribus). So, this result is in accordance with the researcher's initial hypothesis which states that developments in the economy of the destination country will increase export growth
for Indonesia. The positive sign on the coefficient represents the purchasing power of consumers, the higher the purchasing power of the people. The results of this study are also in line with the results of previous findings which state that the per capita income of trading partner countries shows a positive and positive effect, it will increase exports of the country of origin. The results of this study are in line with research by (Zidi, A., & Dhifallah, S.M,2013), (Endoh, M,2010), (Akhter, N., & Ghani, E,2010), (Yang, S., & Zarzoso, I,2014), (Ritaningsih, T., Hakim, D.B., & Sahara,2013), dan (Saleh, S., & Supriyatno, B,2010).

Indonesia's export growth itself has a significant causal relationship to Indonesia's economic growth. The Ministry of Trade noted that the value of Indonesia's oil and gas exports experienced an increase in oil and gas exports by 41.88% in 2021. The value of oil and gas exports in 2021 was 12.28 billion USD, while in 2020 it was 8.25 billion USD. The increase was also accompanied by an increase in oil and gas imports by 35.59% with the value of oil and gas imports reaching USD 14.26 billion in 2020 and USD 25.53 billion in 2021 (Kementerian Perdagangan,2021). This makes Indonesia's oil and gas trade balance deficit at USD 13.25 billion. The conditions were different in the non-oil and gas sector, where the trade balance experienced a surplus of up to 48.6 billion USD$ with commodities having the highest contribution being mineral fuels (Karemera, D., & Ojah, K,1998) and vegetable fats and oils (Zidi, A., & Dhifallah, S.M,2013) with China as a country that often-traded partners until has a transaction value of 51.11 billion USD (Kementerian Perdagangan,2021).

Cost of transportation in this study is measured by the value of economic distance. Economic distance is one of the important conditions in the gravity model and the magnitude of distance will negatively affect export trade flows. The estimation results obtained by the model show that the distance variable has a significant negative effect of 0.39. The coefficient is negative so that it is in accordance with the hypothesis of this study. Every 1 km increase in distance between countries that trade with each other will reduce the value of oil and gas exports by 39% ceteris paribus. The results of this study are in line with the findings obtained by (Zidi, A., & Dhifallah, S.M,2013), (Endoh, M,2010), (Akhter, N., & Ghani, E,2010), (Yang, S., & Zarzoso, I,2014), (Ritaningsih, T., Hakim, D.B., & Sahara,2013), dan (Saleh, S., & Supriyatno, B,2010). This explains that a negative distance coefficient identifies the wider or farther the distance between trading partner countries, the lower the trade will be.

Based on the regression estimation results obtained, the exchange rate against the currencies of partner countries has an insignificant effect on oil and gas exports of 0.03. A positive coefficient is in contrast to exports. This means that an increase in the real exchange rate will reduce the value of exports by 0.03%, ceteris paribus.
This result is in contrast to (Zidi, A., & Dhifallah, S.M, 2013) and (Ritaningsih, T., Hakim, D.B., & Sahara, 2013), adding the exchange rate variable as one of the factors that influence trade. If the exchange rate of the destination country appreciates, it will decrease the value of exports and vice versa. When there is depreciation, it will increase the value of exports.

Based on the estimation results, commodity prices have a significant effect on increasing the value of oil and gas exports. This result is in accordance with research by (Karemera, D., & Ojah, K, 1998) which shows that commodity prices are a factor that influences trade. In this study, estimates are separated for crude oil and liquid natural gas (LNG) commodities. LNG commodity has a significant negative effect on oil and gas exports by 5.177%. This means that the increase in LNG prices will have a significant effect and reduce the value of Indonesia's oil and gas exports. Any increase in prices will reduce demand from the public, because there is less oil and gas exploration so that it will make the selling price high because it does not achieve low production costs. Crude oil has a significant positive effect on oil and gas exports by 4.691%. This means that an increase in the price of crude oil will increase Indonesia's oil and gas exports. This condition can occur because the cost of oil production is suppressed so that the price of goods becomes relatively competitive with other oil prices and will increase the number of consumers.

Based on the estimation results of research, household consumption will have a significant effect on increasing oil and gas exports. It can be seen from the coefficient value of the variable ln_HC of 1.082, this value means that an increase in consumption of the destination country will increase Indonesia's oil and gas exports by 1.082 percent ceteris paribus. This is in accordance with the initial research hypothesis which states that the development of consumption in the destination country will increase export growth for Indonesia. A positive sign indicates the regional economy, the higher the purchasing power, the higher the increase in oil and gas exports. Additional exports may occur to carry out industrial activities in the destination country. The estimation results in this study are the same as those conducted by (Zidi, A., & Dhifallah, S.M, 2013) dan (Ritaningsih, T., Hakim, D.B., & Sahara, 2013).
CONCLUSION

Based on the results of the analysis conducted in this study regarding the impact of BRI on Indonesia's oil and gas trade in Asia, it can be concluded as follows:

The influence of BRI's economic integration on the development of investment in Asian countries always provides an increase from the beginning of a country entering BRI integration. The investment is used to support the integration of the Silk Road Economic Belt (SREB) and 21ST Maritime Silk Road (MSR). The form of assistance is in the form of grants or loans to a country and this influence will have both positive and negative impacts on the country. Positive impacts can be felt in the form of significantly increasing GDP, infrastructure development, reducing unemployment and increasing community resource skills through knowledge transfer. The negative impact that must be watched out for is the debt trap that is deliberately given so that the country remains dependent on the investment country.

The impact of BRI in oil and gas for Indonesia is trade diversion. Trade diversion occurs when a country fails to get new trade flows to be able to market a commodity. When Indonesia joins BRI, Indonesia will experience a decrease in the value of exports to BRI member countries in Asia by 2 times over 10 years. This is evidenced by the stagnant export value and tends to experience a decline in the value of Indonesia's oil and gas exports to Asian countries. Indonesia's decision to join BRI is detrimental in terms of oil and gas trade but profitable in investment.

GDP per capita, distance, commodity prices and household consumption have a significant influence on the growth of Indonesia's oil and gas exports. GDP per capita gave a significant positive contribution of 1.474%. Distance has a significant negative impact of 39 units, then for commodity prices it has 2 impacts, for crude oil commodities it will have a positive impact while LNG commodities have a negative impact on the development of Indonesia's oil and gas exports. Meanwhile, household consumption has a positive impact of 1.028% on the development of the value of Indonesia's oil and gas exports.

Based on the conclusions above, the suggestions that can be given to the public, the government related parties in realizing the development of Indonesia's oil and gas exports in the integration of BRI are:

The integration of BRI has proven not to be profitable in terms of Indonesia's oil and gas trade in Asia. It is proven by the export value which tends to stagnate, so the government needs to evaluate Indonesia's joining BRI. The evaluation could be in the form of a comparative study of BRI with ASEAN-SAFTA, because these BRI
members are also registered in ASEAN integration and SAFTA for trade. Increased exploration related to oil and gas in Indonesia needs to be increased, oil and gas production continues to decline resulting in a decline in the value of Indonesia's exports. This is necessary because the price of oil and gas commodities has a significant effect on the value of Indonesia's oil and gas exports.

The integration of BRI in addition to providing ease of trade also provides investment to support the ease of trade. A policy that regulates incoming investment from BRI is needed. The purpose of the policy establishment is so that Indonesia has investment limits so that there is no debt trap due to not being able to provide the promised investment return. Then infrastructure investment is expected to have a positive impact on economic growth so that the investment can be felt by the community.

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