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# Evaluating the Effects of "One Belt, One Road" Initiative on Vietnam's Agricultural Export to China

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**Abstract:** China is not only the world's second largest economy with a population of 1.4 billion, but also a neighbor country of Vietnam, whose demand for agricultural products is huge. Vietnam is an emerging economy in Southeast Asia. Its development has been remarkable over the past decade since the Vietnamese Government started its economic renovation policy in the late 1980s. Vietnam has been taking steps to become integrated in the region and in the world. Vietnam itself has an abundance of natural resources, which are potential for exporting agricultural products and minerals. According to statistics of the Ministry of Industry and Trade, China accounts for an average of about 28% of Vietnam's total agricultural and fishery exports to the world. In particular, vegetables, cashew nuts, coffee, rice, cassava and products from cassava, rubber, seafood witness such a large turnover. Since 2013 China has proposed the "One-belt, One-road" initiative, of which Vietnam is a part. The study uses gravity model with research's hypotheses: Gross Domestic Product (GDP) per country, geographical distance (measured by the participation in the "One-belt, One-road" initiative – considered as a positive reason that leads to the export's expansion of Vietnam's agricultural products to the China's market), population, the level of economic openness (measured by China's policy on countries participating in the "One-belt, One-road" initiative), inflation, agricultural land area. Thus, the research could deeply evaluate the positive influences from the "One-belt, One-road" initiative on the export of Vietnam's agricultural products to China's market.

**Keywords:** The Gravity Model, The Agriculture of Viet Nam, Export, "One Belt, One Road"

## 1. Introduction

### 1.1. The Research Model of Agricultural Exporting of Vietnam to China

The gravity model is a common theoretical model which has been widely used by many economists to measure and analyze factors that affect the export condition among countries for years [1]. The gravity model in international trade was firstly applied with the aim to measure export value between two countries [2, 3], which was formed by two scientists [4, 5] based on Newton's law of universal gravitation (1687). Timbergan demonstrated that countries with large economic scale and close geographical distance will have the tendency to trade to each other. That means the greater the distance is, the riskier it rises with the partner countries and vice versa, the more potential the commerce becomes [6, 13].

The mentioned gap here is not only about the geographical matter but also the culture, economic and institution gap. While expanding the gravitational force model, many researchers found out several factors that have influence on the commercial flow among countries. Those factors are the foreign exchange rate [5], the level of technology innovation [3], the level of economic openness [1, 15], trading among countries in the same commercial block [7-9].

Based on the previous researches' outcome as well as the theoretical basis, the author brought about the gravity model of trading for Vietnam's agricultural export to China:

$$\ln EXPvn = A + \beta_1.\ln GDPVNit + \beta_2.\ln GDISij + \beta_3.\ln EDISijt + \beta_4.INFVNit$$

$$+ \beta_5.\ln LANDVNit + \beta_6.\ln POPNKjt + \beta_7 EOPENij + uijt \qquad (1)$$

EXPTijt: Vietnam's agricultural export (calculated by USD) to country j in year t.

GDPVNit: Gross Domestic Product of Viet Nam in year t.

EDISij: the economic gap between two countries.

EOPENij: the level of economic openness.

INFVNit: the inflation of Vietnam at moment t.

LANDVN: the agricultural land area of Vietnam.

POPNKjt: the total population of the import country in year t.

DISij: Dummy variable of geophysical distance measured by partaking in project"One belt, One road".

A: the intercept term of the model.

β1, β2, β3, β4, β5, β6: random error is considered to reflect the degree of impact on the model.

### 1.2. Hypothesis of the Model

Hypothesis 1a: GDP of Vietnam has the positive impacton Vietnam's agricultural export.

Hypothesis 1b: GDP of China has the positive impact on Vietnam's agricultural export.

Hypothesis 2: The project "One belt, One road" augments Vietnam's agricultural export to China.

Hypothesis 3: There is a negative relationship between economic gap and agricultural export.

Hypothesis 4: The population of Chinas has a positive impact on Vietnam's agricultural export.

Hypothesis 5a, b: The level of economic openness of Vietnam and China has a positive relationship with Vietnam's agricultural export to China.

Hypothesis 6: Vietnam's inflation has the positive impact on agricultural export to China.

Hypothesis 7a: Agricultural land area of Vietnam has positive impact on Vietnam's agricultural export.

Hypothesis 7b: Agricultural land area of China has negative impact on Vietnam's agricultural export.

## 2. Research Methods

### 2.1. Data

The study collected secondary time data from Vietnam and China during the period from 2010 to 2019. Data on agricultural exports is gathered from the General Statistics Office and the General Department of Customs of Vietnam, the Organization for Economic Cooperation and Development (OECD). Data on GDP, GDP per capita (on purchasing power parity – PPP), Nominal GDP, population, agricultural land area, economic expansion is collected from WB.

### 2.2. Methods of Data Analysis

With time series data, the study utilizes the ADF method (Augmented Dickey – Fuller test) to determine optimal stop and latency. After optimal stationarity, Impulse Response Function (IRF) is applied to consider the impacts of factors on agricultural exports. In this study, Engle – Granger's co-alignment method is used to measure long-term relationships between variables while the VAR vector or VECM error correction model method to estimate short-term ones. The results of regression were then analyzed in relation to the geographical distance dummy variable to assess the influence of One Belt, One Road project. The support tool is Stata 13 statistical software. [1, 3, 10-11, 14]

## 3. Results – Evaluation

Impulse Response Function IRF is used to estimate the impact of factors on the export of Vietnam's agricultural products to China with a maximum period of 8.
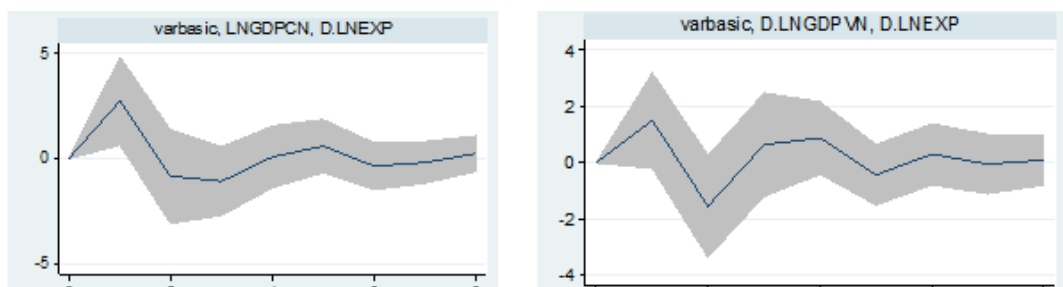


*Figure 1. The relationship between GDP and agricultural exports.*

### 3.1. The Relationship Between GDP and Agricultural Exports

The Impulse Response Function indicates that the GDP of Vietnam and China both exert strong and immediate influence on agricultural exports.

### 3.2. The Connection Between Economic Gap and Agricultural Exports

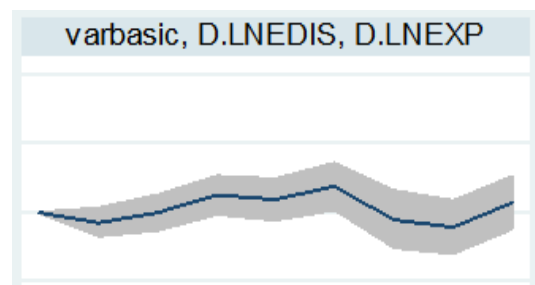The IRF chart reveals that economic distance has both short-term and long-term effects.



*Figure 2. The connection between economic gap and agricultural exports.*

### 3.3. The Association Between the Economic Openness and Agricultural Exports
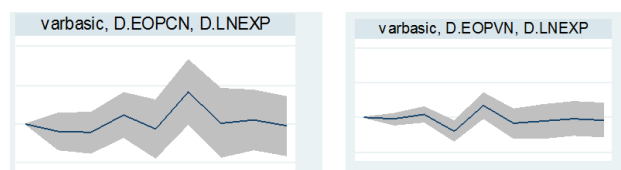


*Figure 3. The association between the economic openness and agricultural exports.*

The chart shows that the economic openness of China and Vietnam at the same time makes an impact on our agricultural exports in which that of China exerts stronger influence than Vietnam's.

### 3.4. The Correlation Between Inflation, Population of Importing Country and the Export of Vietnamese Agricultural Products

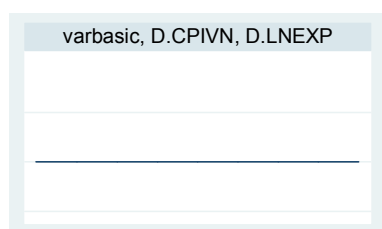Vietnam's inflation and Chinese population have almost no effect on our agricultural exports to China.



*Figure 4. The correlation between inflation, population of importing country and the export of Vietnamese agricultural products.*

### 3.5. The Relationship of Agricultural Land Area with Vietnam's Rural Products Exporting to China

The analysis revealed that China's agricultural land area has an immediate response to Vietnam's rural exports; however, this impact will gradually decrease in the long-term. When it comes to the agricultural land area of Vietnam, it is shown that not much impact on export is made.
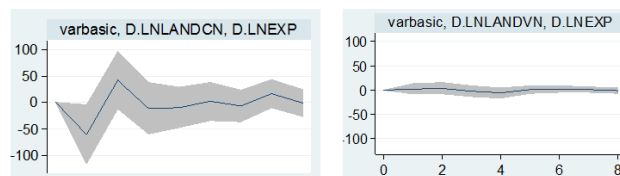


*Figure 5. The relationship of agricultural land area with Vietnam's rural products exporting to China.*

=>Summary: The results indicate that factors influencing Vietnam's agricultural exports to China include Vietnam and China's GDP, the economic gap of the two nations, the economic openness in both countries as well as the area of agricultural land in China.

### 3.6. Determine the Optimal Latency

The variable lag will be identified to show whether the past value of one variable can help to forecast another or not.

The results of the analysis indicate that the AIC makes sense at a latency of 4, which means the optimal lag for the model is 4.

*Table 1. The results of the analysis indicate that the AIC.*

| lag | LL | LR | Df | P | FDF | AIC | HQIC | SBIC |
|-----|------|------|-----|-------|---------|----------|----------|----------|
| 0 | 260.122 | | | | | -33.7496 | -33.7531 | -33.4192 |
| 1 | 334.044 | 147.84 | 49 | 0.000 | 5.2e-24 | -37.0752 | -37.1007 | -344291 |
| 2 | 3278.82 | 5889.6 | 49 | 0.000 | 4.4e-25* | -423.177 | -423.229 | -418.22 |
| 3 | 3781 | 878.35 | 49 | 0.000 | | -481.733 | -481.786 | -476.777 |
| 4 | 3761.4 | 86.795* | 49 | 0.001 | | -487.519* | -487.572* | -482.563* |

Selection order criteria
Sample 2005-2019 Number of obs=15
ENDOGENOUS: D. LINEXP D. LINGDPVN D. LINGPCND. LNEDDISD. EOPVND. LINLAND CNEXOGENOUS:-CON

Johansons tests for cointegration
number of obs= 18
Trend: constant
Sample: 2002-2019 Lags =1

*Table 2. The co-integration result.*

| Maximum rank | Parms | LL | Eigen value | Trace statistics | 5%critical value |
|--------------|-------|-----------|-------------|------------------|------------------|
| 0 | 7 | 304.92214 | | 164.3273 | 124.24 |
| 1 | 20 | 338.9466 | 0.97718 | 96.2824 | 94.15 |
| 2 | 31 | 354.72809 | 0.82687 | 64.7154 | 68.52 |
| 3 | 40 | 368.48444 | 0.78314 | 37.2028 | 47.21 |
| 4 | 47 | 378.30445 | 0.66416 | 17.5627 | 29.68 |
| 5 | 52 | 383.08731 | 0.41224 | 7.9970 | 15.41 |
| 6 | 55 | 386.42291 | .30970 | 1.3258 | 3.76 |
| 7 | 56 | 387.08582 | 0.07101 | | |

### 3.7. Co-integration Test

Co-integration implies that chains fluctuate over the time, as a result, they are related in the long-term. The co-integration result is of important basis for choosing vector of error correction model (VECM) or a vector auto regression (VAR) model.

Johansen test used to assess co-integration shows that at least 1 variable has co-integration, leading to the usage of the VECM model to analyze regression.

**Table 3.** *The result of regression using Vector of Error Correction Model VECM.*

| EquationFarms | | | Chis | | P>chiz | |
|---|---|---|---|---|---|---|
| -cel | 5 | | 11997.61 | | 0.00000 | |
| **Identification: beta is exactly identified, Johansonnormalizationrestraction identified** | | | | | | |
| beta | Coeff | Std error | Z | p>[z] | 95% confi | Interval |
| -cel | 1 | | | | | |
| Lnexp d1 | 269.1923 | 13.18126 | 20.42 | 0.000 | 243.3575 | 295.0271 |
| Lngdpcn d1 | -277.3831 | 13.14099 | -21.11 | 0.000 | -303.139 | -251.6273 |
| Lnedis d1 | 249.8479 | 13.15998 | 18.99 | 0.000 | 224.548 | 275.641 |
| Eopcn d1 | -40.26409 | 0.6754191 | -59.61 | 0.000 | -41.58789 | -38.9403 |
| Lnlandcnd1 | -450.0865 | 4.59858 | -97.88 | 0.000 | -459.0995 | -441.0734 |
| -con | .2276139 | | | | | |

**Table 4.** *Assess the impact of distance control variables (project "One Belt, One Road") on the result of regression.*

*T test _est_ei, by (DIS)*
*Two simple t test with equal variances*

| Group | Obs | Mean | Std error | Std Dev | (95%) conf | Interval |
|---|---|---|---|---|---|---|
| 0 | 14 | .7857143 | .1138039 | .4258153 | .5398558 | 1.031573 |
| 1 | 6 | 1 | 0 | 0 | 1 | 1 |
| Combined | 20 | .85 | .0819178 | .3663475 | .6785441 | 1.021456 |
| Diff | | -.2142857 | .1765762 | | -.5852584 | .156687 |

Differ= mean (0) – mean (1)
t=-1.2136
Ho: diff=0
degree of freedom = 18
Ha: diff < 0
Ha: diff = o
Ha: diff > 0
Pr (T<t) = 0.1203
Pr (|T| > t) = 0.2406
Pr (T>t) = 0.8797

The results illustrated that variables such as Vietnam and China's GDP, the economic gap of the two nations, the openness of the two countries, the area of agricultural land in China have a statistically significant impact on Vietnam's agricultural exports. However, while GDP and the economic gap show the same direction influence, other factors exert the opposite direction effect.

The regression model is rewritten as below:

$$LnEXPVN = 0.23 + 296.2*LnGDPVND1. + 249.8*LnEDISD1. - 277.4*LGDPCND1. - 40.3*EOPD1. - 450*LnLANDCND1. \quad (2)$$

### 3.8. The Impact of GDP on Agricultural Export

The relationship of Vietnam's GDP (($\beta = 296.2$; $p<0,01$) exerts favourably to the value of bilateral trade. The export structure of Vietnam's agricultural products accounts for approximately 20% of the total, therefore, if Vietnam is capable of expanding production, it seems that the ability of exports also increases. Export of rural products to China always makes up a large proportion of about 40% of export turnover to China. However, in recent years, with the development and application of science and technology to increase productivity, China has steadily self-supplied agricultural products, which has assumed the responsibility for the decline in Vietnam's export turnover. In other words, Chinese GDP has the opposition effect on Vietnam's agricultural exports.

### 3.9. The Impact of the Economic Gap on Agricultural Export

The analysis indicated that the economic gap of the two nations indicate the positive influence on Vietnam's agricultural exports. According to Martínez-Zarzoso and Nowak-Lehmann [12], international trade in manufactured goods or services will be more active among countries with equal income per capita in comparison to those with inequal ones. However, agriculture products are necessities that serve the daily needs of the people, as the result, economic gap is no longer a barrier to exports.

### 3.10. The Impact of the Level of China's Economic Openness on Vietnam's Agricultural Export

The openness of the economy is used as a representative of

a country's foreign trade policy. The greater foreign trade policy toward liberalization, the greater the openness of the economy, leading to the increase in international trade exchanges. The analysis, on the contrary, indicated that the openness of Chinese economy exerts statistically opposite influence on Vietnam's agricultural exports. This conclusion can be explained that once the openness of China's economy experiences a growth, contributing to international cooperation. Besides, the project One Belt, One Road is one of the policies that affects Chinese openness and the exports of participating countries, including Vietnam. Therefore, the diversification of supply also witnesses a rise, which means one product can be exported to China from lots of countries and trading partners. As a result, the import of products from Vietnam will experience a decrease.

The results showed that the influence of One Belt One Road project had forward direction (rising the country's agricultural exports), but the due value was $|t|=1.21 <1.95$ (due value at 5%). Therefore, it bears no statistical significance. One Belt One Road project aims at enhancing the circulation of goods by reducing time, decreasing transportation costs as well as minimizing risks in transportation. The project is in the construction stage, so it certainly doesn't show immediate efficiency, but in the long run, it will create strong pushes in agricultural exports in particular and economic trade in general.

# 4. Conclusion and Recommendations

The research's outcome indicated that Gross Domestic Product (GDP), geographical distance"One-belt, One-road" initiative not only exerts significant impact on the development of transport infrastructure but also receives the maximum support from the Government of China), economic gap, population of importing countries (China's population), the level of economic openness (joining the "One-belt, One-road" initiative to get the open policy). More specifically, Vietnam can also benefit from the "One-belt, One-road" initiative as having preferential policies from China's Government to access more agricultural markets. Besides, we must also prepare thoughtfully from quality to design to be ready to compete with other countries). Inflation, agricultural land area are the main factors that make up the influence of Vietnam's agricultural exports to China -the billion-population country. Whether the impact of mentioned factors is more or less, the "One-belt, One-road" initiative whose specifically factor is geographical distance (although the distance does not change) is not statistical significance, but with the investment from China's Government in transport infrastructure into Vietnam who participates in this initiative will surely revitalize exports. Not only does Vietnam's agricultural products penetrate this densely populated market but it also has such an important meaning of exporting to other countries in the "One-belt, One-road" initiative.

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